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# The Relationship of Provider Cultural Competence and Utilization of Prenatal Care in the Hmong of Minnesota

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COLLEGE OF HEALTH SCIENCES

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Cynthia Larson

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Walden University
2012

# ABSTRACT

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M.S.P.H., Walden University, 2007
B.A., Metrostate University, 2005

Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy
Public Health
Epidemiology

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# ABSTRACT

Experts suggest that the cultural competence of healthcare providers is a critical factor impacting healthcare services to the ethnically diverse patient populations in the U. S. and that it may play a role in improving outcomes and reducing health disparities; however, the association between cultural competence and health outcomes remains unclear. This study used a cross-sectional quantitative design grounded by cultural competency constructs and the ethnic origins theory to explore the relationships between provider cultural competence, adequacy of prenatal care, and neonatal health outcomes in Hmong women, a population whose cultural beliefs affect their use of early and adequate prenatal care. Patient perception and provider self-reported cultural competence data were collected from 80 patients and their 19 corresponding providers. No correlation was found between the patient and provider total cultural competency scores, nor were they predictive of adequacy of prenatal care or neonatal outcomes in multiple regression analyses. However, 3 specific constructs related to physicians' ability to communicate and demonstrate culturally competent behaviors predicted adequacy of prenatal care. There was a moderate but negative correlation between patient and provider cultural competence subscores and a significant difference in 6 of 13 survey questions suggesting discordance between patient and provider perceptions regarding communication during the healthcare encounter. Implications for positive social change include new prenatal care delivery models that incorporate Hmong health beliefs that may increase the number of Hmong women who receive adequate prenatal care, thus potentially improving birth outcomes. This can lead to reduced health disparities experienced by the Hmong.

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# DEDICATION

I would like to dedicate this Doctoral dissertation to my family and friends for their steadfast support and encouragement.

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This journey was fraught with unexpected challenges which taxed my patience at times but the strength and guidance I received from my chair, Dr. Angela Prehn, committee members, parents, sisters, children, and friends helped to finally bring it to fruition.  Thank you to all of you. I could not have succeeded without your support!

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# CHAPTER 1: INTRODUCTION TO THE STUDY

> They [physicians] could hardly be expected to “respect” their [Hmong] patients’ systems of health beliefs (if indeed they ever had the time and the interpreters to find out what it was), since the medical schools they had attended had never informed them that diseases are caused by fugitive souls and cured by jugulated chickens. (Fadiman, 1997, p. 61)

## Introduction to the Problem

Cultural competency is a term used extensively in healthcare to describe a provider’s or organization’s ability to understand and accommodate the special needs and health beliefs of diverse patient populations. The United States Office of Minority Health (U.S. OMH; 1999) identified cultural competence as a critical factor that influences delivery of health care services to culturally and ethnically diverse patients, and *Healthy People 2010* contains several focus areas that relate to improving the cultural competence of healthcare providers (United States Department of Health and Human Services [U.S. DHHS], 2000).

By the middle of the 21st century, minority populations are expected to account for 27% of the United States population and 47% of the U.S. population growth (U.S. Bureau of the Census, 1996). This changing demography is largely a result of the continued influx of immigrants and refugees, and anticipated growth of the Latino and Asian populations (U.S. Bureau of the Census, 1996). Immigrants and refugees bring dependence on alternative health practices and cultural attitudes and belief systems toward health, spirituality, family, childbirth, and death that challenge U.S. healthcare providers and can impede effective healthcare delivery if not understood and accommodated (Her & Culhane-Pera, 2004; Minnesota Department of Health [MDH], 2006; Pinzon-Perez, 2006). To meet the healthcare needs and improve the health outcomes of an increasingly diverse population, providers need to assess their patient populations regularly and adjust their programs and services accordingly (U.S. OMH, 1999). Theoretically, increasing providers' ability to understand and communicate with diverse populations should improve access to and provision of quality healthcare services, enhance patient satisfaction, and work to reduce racial and ethnic health disparities (Her & Culhane-Pera, 2004; U.S. OHM, 1999).

In 2002, Smedley, Stith, and Nelson proposed that health outcomes would improve as a result of culturally competent care delivery and suggested that healthcare providers need to develop the knowledge, attitudes, and skills for effective cross-cultural communication. In response, healthcare organizations have adopted basic standards and developed policies for care delivery, and medical schools have added cultural competence to their curriculum, with the expectation that education will change provider practice and ultimately influence patient satisfaction and improve patient adherence to healthcare recommendations. However, it is not clear that education and provider awareness alone are sufficient to change behaviors and improve care delivery (van Ryn & Fu, 2003). Furthermore, while research suggests that provider cultural competence can increase patient satisfaction and quality of care, there is little evidence to support that it improves patient adherence or health outcomes (Beach et al., 2005; Brach & Fraser, 2000). The ability to define and measure provider cultural competency has been a limiting factor in assessing the association between it and patient outcomes (Lucas, Michalopoulou, Falzarano, Menon, & Cunningham, 2008; Thom & Tirado, 2006). Additionally, little work has been done to evaluate congruence between patient and provider perceptions of cultural competency, an important factor that could affect patient-provider communication (Lo & Stacey, 2008; Perloff, Bonder, Ray, Ray, & Siminoff, 2006; vanRyn, 2002) and influence patient trust, satisfaction and behavior (Culhane-Pera, Vawter, Xiong, Babbitt & Solberg, 2003, p. 99; Lucas et al., 2008;).

Improving provider cultural competency may also reduce health disparities (Brach & Fraser, 2000; van Ryn, 2002). The existence of health disparities across racially and ethnically diverse populations is well documented in the literature. These disparities cannot be fully explained by traditional risk factors, differential healthcare access, or patient preferences (Smedly et al., 2002). There is growing evidence that social influences (Berkman & Kawachi, 2000; Collins et al., 2000; Collins, David, Prachand, & Pierce, 2003; Mustillo et al., 2004) and healthcare provider attitudes, behaviors, and clinical practice (Saha, Arbelaez, & Cooper, 2003; Shoultz, Fongwa, Tanner, Noone, & Phillion, 2006; Smedley et al., 2002; van Ryn, 2002) contribute to these disparities by affecting provider and patient interactions and influencing access, delivery, and utilization of medical care (Capell, Dean, & Veenstra, 2008; Finnström & Söderhamn, 2006; Guendelman, Thornton, Gould, & Hosang, 2005; Her & Culhane-Pera, 2004; Tashiro, 2005; van Ryn & Fu, 2003). Persistent discriminatory practices and negative stereotypes influence healthcare interactions and play a role in perpetuating health disparities (Berkman & Kawachi, 2000; Krieger, Rowley, Herman, Avery, & Phillips, 1993; Mustillo et al., 2004; Nazroo, 2003; Smedley et al., 2002; Stone & Moskowitz, 2011; van Ryn & Fu, 2003; Williams, Neighbors, & Jackson, 2003; Williams & Rucker, 2000). Research suggests that transformation of medical practice is necessary to improve interaction and communication during the healthcare encounter, enhance the patient-provider relationship, and potentially reduce health disparities (Finnström & Söderhamn, 2006; Friemuth & Quinn, 2004; Guendelman et al., 2005; Her & Culhane-Pera, 2004; Paez, Allen, Carson, & Cooper, 2008; Shoultz et al., 2006; Smedley et al., 2002; Tashiro, 2005; van Ryn & Fu, 2003). This transformation includes improving the cultural competency of organizations and healthcare providers (Paez et al., 2008; Reynolds, 2004; Smedley et al., 2002; Williams & Rucker, 2000). Research is needed which explores the relationship between the cultural competency of health providers and health outcomes in their diverse patient populations.

### *Background for the Study*

Over recent years, Minnesota has been the destination for many immigrant and refugee populations, including large numbers of Laotian Hmong (MDH, 2009a). There are an estimated 186,000 Hmong in the United States, and over 41,000 of these live in the Minneapolis/St. Paul metropolitan region (Hmong National Development, Inc. & Hmong Cultural and Resource Center, [HNDI & HCRC], 2004). According to the 2000 United States Census, 38% of Hmong live in poverty, 55% have less than a high school education, and 35% are linguistically isolated (HNDI & HCRC, 2004). Historically, the Hmong have valued early marriage and large families and experienced high fertility and low mortality rates, contributing to their high household size and high dependency ratios (Kunstadter, 1987; Richman & Dixon, 1985). This trend has continued as Hmong refugees have the largest household size and the youngest average age of any Indo-Chinese group in the United States (Rumbaut, 2006, p. 273, 275).

The Hmong population is rapidly growing (Pinzon-Perez, 2006; Ronningen, 2004). Hmong-specific birth rates are not reported in Minnesota; however, the number of births to foreign-born mothers in Minnesota is increasing (Minnesota State Demography

Center, 2009). In Wisconsin, the annual average birth rate for Hmong women is higher than the average for any other ethnic group with 206 births per 1,000 women ages 15-44 years, compared to 82 per 1,000 and 57 per 1,000 for Black non-Hispanics and Whites, respectively (Minority Health Program [MHP], 2004). The highest annual birth rates are for Hmong women age 20-24 (690 births per 1,000), which is 9 times higher than White (75 births per 1,000) and almost 4 times higher than non-Hispanic Black (183 births per 1,000) women of the same age.

Infant mortality is an indicator of a nation's health and social well being (U.S. DHHS, 2000, Chapter 16). According to 2008 estimates, the United States infant mortality rate is 6.3 deaths per 1,000 live births, ranking it 45th among industrialized nations (Central Intelligence Agency [CIA], 2009). Although United States infant mortality rates for Whites and other ethnic groups have improved, disparities persist. The 2005 Hmong infant mortality rate of 8.6 infant deaths per 1,000 live births is higher than that reported for other Asian groups in Wisconsin (5.4 deaths per 1,000 live births; MHP, 2004) or United States Asian and Pacific Islanders (4.67 infant deaths per 1,000 live births; Mathews & MacDorman, 2007).

One of the primary goals of *Healthy People 2010* is to reduce infant mortality to 4.5 deaths per 1,000 live births. No or late prenatal care is one of the risk factors associated with low birthweight infants and increased infant mortality (Herbst, Mercer, Beasley, Meyer, & Carr, 2003; James, 1993). Although prenatal care cannot impact the preconception health of women, it provides an opportunity to identify women at high risk for poor pregnancy outcomes (Kiely & Kogan, 1994; Yu, Alexander, Schwalberg, & Kogan, 2001) and so one of the objectives of *Healthy People 2010* is to increase to 90%

the number of women who receive early and adequate prenatal care. Hmong women are less likely to seek prenatal care during the first trimester than other ethnic groups (Davis, Goldenring, McChesney, & Medina, 1982; Edwards, Rautio, & Hakanson, 1987; Hopkins & Clarke, 1983; MHP, 2008; Owens, 2007; Schauberger, Hammes, & Steingraeber, 1990).

There are a number of factors, in addition to late or no prenatal care, that place Hmong women at high risk for poor neonatal outcomes. These factors include lower birthweight infants (Edwards et al., 1987; MHP, 2008; Richman & Dixon, 1985); higher rates of previous perinatal loss (Edwards et al., 1987); higher rates of premature delivery (Schauberger et al., 1990); short stature, which may indicate maternal undernutrition (Edwards et al., 1987; Richman & Dixon, 1985); short birth intervals, associated with anemia (Richman & Dixon, 1985; Schauberger et al., 1990); grand multiparity (Richman & Dixon, 1985; Schauberger et al., 1990); maternal age >35 (Edwards et al., 1987); low socioeconomic status and poverty (Asian and Pacific Islander American Health Forum, 2006; Helsel, Petitti, & Kunstadter, 1992); and refugee status (Edwards et al., 1987). Tobacco, alcohol, and drug use by Hmong women is rare (Edwards et al., 1987; Kunstadter, 1987; Richman & Dixon, 1985; Rumbaut, 2006, p. 281; Schauberger et al., 1990). Despite having high risk profiles, the initial refugee women had surprisingly few pregnancy complications (Edwards et al., 1987; Richman & Dixon, 1985; Schauberger et al., 1990). This situation was attributed to the protective structure of their cultural and social environment; however, it was predicted that acculturation would eventually negatively affect infant health (Kunstadter, 1987; Rumbaut, 2006, p. 281).

Hmong women seek Western prenatal care later in pregnancy and limit the number of prenatal visits (Edwards et al., 1987; Fadiman, 1997, p. 73; Helsel, 1992; Lao Family Community of Minnesota, n.d.; Levenick, 2001; MHP, 2004; Rice, 1999). They do so because they have limited knowledge of Western medicine as well as specific health and cultural beliefs that impact their willingness to utilize medical services (Conroy, 2006; Culhane-Pera, Vawter, Xiong, Babbitt, & Solberg, 2003; Hein, 2006; Office of Global Health Affairs Humanitarian and Refugee Health Affairs, 2004; Pinzon-Perez, 2006), and a low perception of risk from childbirth (Mattson, 1995; Rising, Kennedy, & Klima, 2004). They also mistrust and fear Western medicine because of negative experiences, stories of which circulate through the Hmong community and are often related to miscommunication or cultural incongruence between patients and providers (Asian and Pacific Islander American Health Forum, 2006; Cobb, 2010; Culhane-Pera et al., 2003; Fadiman, 1997; Pinzon-Perez, 2006).

Unfortunately, Hmong women can no longer assume that their pregnancies will be uneventful or low risk. While infant mortality rates (IMR) experienced by newly arrived Hmong in the 1980s were not statistically different from those of non-Hispanic whites (Kunstadter, 1985), IMR subsequently have increased, as have the number of low birthweight infants born to Hmong women with increasing time in the United States (Wisconsin Department of Health and Family Services [WDOH], 2006). Reasons for this increasing trend are unclear but may be associated with environmental exposures and reduced cultural buffering related to acculturation (Jasso, Massey, Rosenweig, & Smith, 2004). It may also be associated with the increasing number of births to girls younger than age 18.

Between 1990 and 2000, teen births to Hmong girls in Minnesota increased over 31%, and 65% of these births occurred in Ramsey County (Meschke, 2003). Ramsey County 15-17 year old girls had the highest pregnancy and birth rates in the Minneapolis and St. Paul metropolitan region. The 2003-2005 averages of 32.1 pregnancies and 22.9 births per 1,000 teens were 3-4 times higher than the other metropolitan counties (Ramsey County Department of Public Health [RCPH], 2007). Twenty-eight percent of these births were to Asian teen girls, while this same population comprised only about 14% of that age group in the county (RCPH, 2007). Additionally, for 38% of these Asian teens, it was not a first pregnancy. This high birth and parity rate for age is common among the Hmong (Helsel, 1992), and pregnant teens in general are less likely to receive optimal prenatal care (Lena et al., 1993).

Poverty has also been associated with reduced utilization of prenatal care programs and preterm and low birthweight infants (Esperat, Feng, Zhang, & Owen, 2007; Sword, 1999, 2003). In 2000, approximately 38% of the Hmong population lived in poverty, and about half of those were under the age of 18 (HNDI & HCRC, 2004). Add the Hmong cultural beliefs towards prenatal care to the socioeconomic factors and age-related behaviors, and pregnant Hmong women and girls are at increased risk for receiving inadequate prenatal care, which may lead to poorer pregnancy outcomes and increased infant mortality.

The literature indicates that language, health literacy, cultural beliefs, and the Western healthcare delivery models are barriers to increasing the number of Hmong women who seek prenatal care during the first trimester (Center for Reproductive Health Research & Policy, n.d.; Culhane-Pera et al., 2003; Pinzon-Perez, 2006; Rice, 1999;

Spring, Ross, Etkin, & Deinard, 1995; Warner & Mochel, 1998). Moreover, it has been suggested that accommodating linguistic needs and exhibiting cultural sensitivity is foremost in providing culturally competent care to the Hmong (Culhane-Pera et al., 2003, p. 99; Pinzon-Perez, 2006). Understanding the effectiveness of provider cultural competence in overcoming the perceived barriers to prenatal care is important to improving infant health in this population.

## Problem Statement

Cultural competence is one of the critical factors affecting health care access and patient care services to the culturally and ethnically diverse patient populations in the United States. Studies suggest that providing culturally competent care should improve health outcomes; however, little direct evidence exists supporting this association. Underuse of prenatal care is associated with increased neonatal morbidity and mortality, and Hmong women are less likely than other ethnic groups to access prenatal care for a variety of reasons (Spring et al., 1995). One of the factors related to underutilization of health care services may be providers' cultural competence (Health Resources and Services Administration [HRSA], n.d.). Age, parity, and acculturation into Western culture are independent variables that could also influence utilization of prenatal care. The relationship between provider cultural competence and utilization of early and adequate prenatal care has not yet been studied in the Hmong population.

## Nature of the Study

This cross-sectional study extracted Hmong birth records from the Midwest Hospitals electronic health record using 18 Hmong surnames, and identified associated providers from review of the health records. Physician and patient reported cultural competence  were measured using two previously validated survey instruments: Patient Reported Provider Cultural Competency (PRPCC) and Provider Self-Assessment of Cultural Competency (PSACC). It was estimated that approximately 400 respondents were needed to achieve adequate power to find a small effect. This study included analysis of 80 Hmong participants and 19 associated providers. Multiple regression was used to determine if cultural competence scores predict adequate prenatal care, controlling for age, parity, and acculturation.

This quantitative study used ratio, ordinal, and nominal data collected via parallel healthcare provider and patient survey instruments (detailed further in Chapter 3) and extraction from an electronic health record database to study the relationships between defined study variables. A test-retest method was incorporated to assess the reliability of the patient survey instrument and validity of the proposed methods for use with the study population. For each instrument, cultural competence scores were calculated by summing the individual response scores. Additional descriptive variables were also collected. Data were entered into Microsoft Excel and analyzed using SPSS version 19 software. Data were stored on a computer hard drive and secured with access codes. Participants were identified from a list of Hmong women who delivered infants at a midwestern metropolitan hospital between January 1, 2008, and September 30, 2010. An informed consent statement was included in the letter accompanying the surveys. Participants were asked to sign and return the letter with the completed survey to document consent.  For those submitting an electronic survey, informed consent was implied by return of the survey. Hmong interpreters were made available as needed in lieu of translation of the survey instrument. Study design and methodology is further described in Chapter 3.

## Limitations and Delimitations

Limitations are factors not within the control of this researcher that may affect the internal validity of the study. The following limitations for this study are noted: First, this study used a predesigned survey instruments to assess the cultural competency of physicians. Participants were asked questions based on their perceptions, and may not have answered honestly, either consciously to reflect socially desirable behaviors or unconsciously based on ethnocentrism. Second, the Hmong are a heterogeneous population. This study did not control for the degree of acculturation other than language acculturation, which may or may not be a valid representation. The final limitation of this study concerned the parallel standardized instruments available for measuring physician self-reported cultural competence and patient perceptions of provider cultural competence. These instruments had not been used with this population previously.

The following delimitations may affect the generalizability of results outside of the study population. First, many survey instruments are available for assessing cultural competence; however, each was tested against different types of healthcare professionals with varying levels of education practicing in multiple settings. Few have been designed to test patient perception of provider cultural competence, and only one model has an associated survey instrument for assessing provider self-perception. The Thom and Tirado (2006) instruments were selected for this study because of their ability to measure both patient and provider perceptions. Second, the study population was representative of Hmong women who received care within the Midwest healthcare system during the study period. The Hmong have cultural and health beliefs not found in other racial or ethnic groups. Because of the low response rate, the study results may not be valid outside the study population.

## Purpose of the Study

The purpose of this study was to describe the relationship between healthcare provider cultural competence and health outcomes in diverse populations, a present gap in the literature, by examining the effect of provider and patient perceptions of cultural competence on utilization of prenatal care in the Hmong of Minnesota.

## Theoretical Framework

There are a number of theoretical concepts that grounded this study. The U.S. OMH and Agency for Healthcare Research and Quality (AHRQ) Cultural Competence Research Agenda project introduced 14 standards for culturally and linguistically appropriate services (CLAS). These national standards were developed to provide a framework and theoretical foundation for addressing the cultural and linguistic needs of diverse patient populations (Fortier & Bishop, 2004). Research has also identified specific constructs that define culturally competent care. Generally, these constructs are similar across models and can be classified into three main categories: knowledge of patients, communication skills, and cultural brokering (Thom & Tirado, 2006). Within those three sets of competencies are subscales that further define the underlying constructs and, according to Doorenbos, Schim, Benkert, and Borse (2005), include cultural diversity, cultural awareness, cultural sensitivity, and culturally competent behaviors. Similarly, the Campinha-Bacota (1999) model describes cultural competence as a process which incorporates cultural skill, cultural knowledge, cultural awareness, and cultural encounters with the added construct of cultural desire. Further discussion of these models is included in Chapter 2.

It is also important to use social science theory to provide context for the Hmong refugee experience. There are a number of theories that have been proposed as explanations for the integration of immigrants into new host countries, most of which, however, consider immigrant adaptation from the host country perspective rather than consider cultural and experiential influences on behavior (Hein, 2006). The Hmong are a patriarcal, clan people with strong familial values and kinship norms, a unique cultural heritage, and history of nonassimilation. Although cultural explanations for racial and ethnic disparities are controversial (Hein, 2006), Hmong studies cannot discount the role of cultural values, norms, and socialization in describing their experience. The ethnic origins theory posited by Hein (2006) considers a "holistic combination of historical, political, and cultural components" (p. 32) and is an appropriate framework for this study, a view supported in the literature and discussed in Chapter 2.

## Definition of Terms

*Acculturation*: In this study, refers to adoption of the societal norms of the host country and is represented by English proficiency.

*Communication skills*: Ability to effectively listen, explain, and make culturally appropriate recommendations, working through interpreters when necessary (Thom & Tirado, 2006).

*Cultural awareness*: Knowledge about similarities and differences between diverse groups in areas of cultural expression, such as language, kinship patterns, religion, and food (Doorenbos et al., 2005). Related to cultural knowledge.

*Cultural brokering*: The ability to negotiate treatment plans with patients and their families, working through community and health system resources (Thom & Tirado, 2006).

*Cultural competency*: The ability to transcend cross-cultural and linguistic barriers encountered during healthcare interactions through a combination of skills, awareness, attitudes, sensitivity, behaviors, and desire.

*Culturally competent behaviors*: Observable outcomes as a result of diversity experience, awareness, and appreciation for patient needs. Related to cultural skill, cultural sensitivity, and cultural awareness.

*Cultural desire*: Willingness and motivation of providers to become culturally competent (Campinha-Bacote, 1999).

*Cultural diversity*: Individual provider experiences with a variety of diverse patient populations (Doorenbos et al., 2005).

*Cultural encounter*: Settings in which cross-cultural interactions occur (Campinha-Bacote, 1999).

*Cultural knowledge*: Actively seeking education regarding world views of different cultures (Campinha-Bacote, 1999).

*Cultural sensitivity*: Provider attitudes, values, beliefs, and respect as related to cultural issues (Doorenbos et al., 2005).

*Cultural skills*: Ability to perform culturally specific health assessment by collecting relevant cultural data, including health beliefs and level of acculturation (Thom & Tirado, 2006). Requires a culturally sensitive approach (Campinha-Bacote, 1999).

## Operational Definitions

The following list includes definitions of the variables used in this study:

*Adequacy of prenatal care utilization (APNCU):* Prenatal care classified as adequate plus, adequate, intermediate, and inadequate using the Adequacy of Prenatal Care Utilization Index (Kotelchuk, 1994). Measure is calculated using date of first prenatal visit, total number of visits, and expected number of visits.

*Age:* Number of years since birth calculated from date of birth to date of delivery.

*Cultural competency scores (CCScore)*: Summary measures assessed by the Physician Self-Assessed Cultural Competency (PSACC) and Patient Reported Provider Cultural Competency (PRPCC) survey instruments (Thom & Tirado, 2006).

*Country of birth (Bplace)*: Self-reported as born in the United States or elsewhere.

*Cultural competency training (Training)*: Provider reported date of last formal cultural competency training for which Continuing Medical Education (CME) credit was received.

*Cultural diversity experience (Number)*: Number of racial and ethnic groups represented in provider’s patient population during the twelve month period prior to survey date.

*Early and adequate prenatal care:* Defined as the adequate and adequate plus categories of the Adequacy of Prenatal Care Index. Prenatal care begun by the fourth month of pregnancy and patient receives 80% or more of recommended prenatal visits (Kotelchuk, 1994).

*Education (PtEducation)*: Self-reported highest level of education achieved by Hmong women measured as middle school, some high school, GED/high school graduate, some college, college graduate, or post graduate degree.

*Expected number of visits (Visits):* Calculated using number for uncomplicated pregnancies adjusted for month of prenatal care initiation and month of delivery (Kotelchuk, 1994).

*Infant birthweight (Birthwgt):* Defined as normal (≥2500 grams), low (1500-2499 grams), and very low (<1500 grams) (U.S. DHHS, 2000, Chapter 16).

*Gender (PrGender)*: Sex of the healthcare provider.

*Gestational age (Gest)*: Completed weeks before birth defined as term (>36 weeks gestation) and preterm (≤36 weeks gestation) (U.S. DHHS, 2000, Chapter 16).

*Fetal and neonatal mortality (InfDeath):* Death occurring during perinatal period, 28 weeks gestation to 28 days after birth (U.S. DHHS, 2000, Chapter 16).

*Language acculturation (PtAccult)*: Surrogate measure of cultural acculturation using how often participants read, write, think, watch television, listen to the radio, and speak in Hmong at home as self-reported on survey.

*Organizational accommodation (Organization)*: Patient reported perception of services offered at the organizational level for meeting specific cultural needs, including but not limited to interpretator services and translated materials.

*Parity*: Number of previous live births study participant has delivered collected from birth certificate data.

*Patient trust (PtTrust):* Patient reported level of trust in the patient-provider relationship.

*Patient satisfaction (Satisfaction):* Patient reported overall satisfaction with care received.

*Physician age (PrAge):* Provider age in whole years on date of survey.

*Pilot (PLT):* Participation in the pilot portion of study.

*Total adverse health outcome score (TADV):* Sum score calculated from variables fetal and neonatal mortality; infant birthweight, gestational age and the morbidity. conditions noted on the birth certificate (assisted ventilation immediately and at six hours after birth, NICU admission, newborn surfactant therapy, antibiotics for suspected sepsis, seizure or other neurological dysfunction, significant birth injury; United States Census Bureau, 2003; U.S. DHHS, 2000, Chapter 16).

*Years in practice (YrsPractice):* Number of completed years provider has been in medical practice on date of survey.

## Research Questions and Hypotheses

1. Are provider self-reported cultural competency scores predictors of early and adequate prenatal care for Hmong women?

Hypothesis 1 (Null): There is no significant relationship between the cultural competency scores of healthcare providers and the use of early and adequate prenatal care in the Hmong population.

Hyopthesis 1 (Alternative): Higher overall self-reported cultural competency scores are positively associated with the use of early and adequate prenatal care in the Hmong population.

2. Is patient perception of provider cultural competency a predictor of early and adequate prenatal care for Hmong women?

Hypothesis 2 (Null): There is no significant relationship between patient-perceived cultural competency of healthcare providers and the use of early and adequate prenatal care in the Hmong population.

Hyopthesis 2 (Alternative): Higher patient-perception of cultural competency in their healthcare provider is positively associated with the use of early and adequate prenatal care in the Hmong population.

3. What is the relationship between provider-reported and patient-reported cultural competency scores?

Hypothesis 3 (Null): There is no correlation between healthcare provider self-reported cultural competency scores and patient perception of provider cultural competency.

Hypothesis 3 (Alternative): There is a positive correlation between healthcare provider self-reported cultural competency scores and patient perception of provider cultural competency.

4. Are specific constructs of cultural competency more important in their influence on the use of early and adequate prenatal care in the Hmong population?

Hypothesis 4 (Null): None of the cultural competency subscales significantly predict use of early and adequate prenatal care in the Hmong population.

Hypothesis 4 (Alternative): Cultural competency subscales related to accommodation of linguistic needs are more strongly correlated to use of early and adequate prenatal care in the Hmong population.

5. Is there a relationship between cultural competency scores and adverse infant health outcomes?

Hypothesis 5 (Null): There is no relationship between cultural competency scores and adverse infant health outcomes.

Hypothesis 5 (Alternative): Cultural competency scores are inversely correlated to adverse infant health outcomes.

## Significance of the Study

Effective culturally competent communication between healthcare providers and their foreign-born patients is essential in the delivery of quality healthcare and can affect provider credibility and patient satisfaction and compliance. Healthcare providers must acquire a basic understanding of the attitudes, behaviors, and belief systems of these minority populations. Finding a relationship between cultural competence and earlier prenatal care for Hmong women could lead to specific interventions aimed at improving the cultural understanding of healthcare providers and improving timely access to prenatal care and neonatal outcomes. Evidence for the relationship between cultural competency and health outcomes in diverse populations could have significant social change implications for reducing health disparities and improving healthcare delivery models.

## Summary and Organization of Remaining Chapters

Language, culture, and effective communication are factors that affect healthcare delivery and influence patient willingness to utilize healthcare services. To meet the future needs of diverse populations, the U.S. OMH (1999) has advocated that healthcare providers take steps to ensure a culturally competent workforce. While research suggests that culturally sensitive healthcare delivery can increase patient satisfaction and quality of care, there is little evidence to support that it improves patient compliance or health outcomes. As will be detailed in Chapter 2, studies are needed on the relationship between healthcare provider cultural competence and health outcomes in diverse populations.

This study details the current state of knowledge on the relationship between cultural competency of healthcare providers and health outcomes in their diverse patient populations. Chapter 1 provided an overview of the study topics and presented support for the importance of the research. Chapter 2 includes a review of the current literature and concludes with identifying opportunities for further study. The methodology and research design is detailed in Chapter 3, followed by study results in Chapter 4. The study concludes with Chapter 5 which summarizes the results within the current body of knowledge, and makes recommendations for future research.

# CHAPTER 2: LITERATURE REVIEW

## Introduction

It has been proposed that health outcomes improve as a result of culturally competent healthcare delivery; however, this association remains unproven (Drevdahl, Canales, & Dorcy, 2008; Perloff et al., 2006). To assess the current state of knowledge regarding the role of cultural competency in healthcare quality, particularly within the Southeast Asian and Hmong communities, an extensive literature search was conducted. Results of this comprehensive review are summarized in this chapter and organized in sections related to (a) search strategies used in conducting the literature review, (b) studies on diversity and disparity in health outcomes, (c) disparities in prenatal care, (d) Asian American populations in the United States, (e) Hmong specific studies and health beliefs, and (f) research on cultural competency.

## Search Strategies

Because the understanding of the role of cultural competency on health outcomes is evolving, this literature review has been ongoing and new, emerging knowledge incorporated into the discussions included in this chapter. Initial and subsequent reviews were conducted by searching several databases including: Academic Search Premier, CINAHL Plus with Full Text, PsychInfo, PsychArticles, SocIndex with Full Text, Ovid (which accesses literature from MEDLINE), Health Sciences: A SAGE Full-Text Collection, Cochrane Library through Wiley Interscience. Search engines used to seek literature for this study included PUBMED, EBSCO, and Google Scholar. Keywords and MeSH terms used included: *cultural competency, Hmong, racial and ethnic disparities, Southeast Asian refugees, cultural diversity, prenatal care, birthweight, psychometrics,* *patient satisfaction, physician trust, health beliefs, physician and patient communication, cultural awareness, health disparities*, and *health communication*.

Peer-reviewed journals were searched for studies conducted since 1970 on the Hmong population, specifically in relation to prenatal care and research done on cultural competency in healthcare. It was necessary to retrieve historical research, as few current studies have been done on this population, and none related to prenatal care. Cultural competency research is evolving, and databases were initially searched for studies published since 2000; more recent searches were restricted to 2007-2011 publications. Additional literature was identified by reviewing the references cited in studies to be included in this chapter. Review of government, academic, and local and national Southeast Asian mutual assistance associations' websites resulted in cultural competency standards, university learning modules, bibliographies, and dissertations, all of which added to the breadth of understanding. This review was comprehensive and identified hundreds of studies on the target population as well as substantial amounts of literature on cultural competency. Literature used was peer reviewed or published by academic or government sources. This strategy resulted in an abundance of information. Studies included in the literature review were restricted to the most recently published and those necessary to trace the work done on the topic of interest through time and provide solid background and support for this study.

## Diversity and Disparity in Health Outcomes

One of the primary goals of *Healthy People 2010* is the elimination of racial and ethnic health disparities. The U.S. DHHS (2000) defined health disparities as unequal burdens of disease morbidity and mortality in ethnic and racial groups when compared to the dominant group. In their historic report, *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*, Smedley, Stith, and Nelson (2002, p. 29) reported (a) that racial and ethnic minorities continue to experience higher rates of morbidity and mortality, in spite of an overall improvement in the health status of the U.S. population and (b) that differential access to quality healthcare is a contributing factor. Although many studies have confirmed that disparities in health outcomes exist, identifying the factors that perpetuate these disparities has proven challenging.

There is ongoing debate over the importance of genetics in explaining health disparities. Geneticists have argued that the relationship between race and genes is apparent in the phenotypic expression of disease in certain defined populations (Fine, Ibrahim, & Thomas, 2005); however, other experts claimed that disease is rarely linked to a single gene, and that the presence of a single gene is generally not highly predictive of chronic disease (Clayton, 2003; Khoury, 1996) or response to treatment (Fine et al., 2005), nor is it necessarily indicative of risk (IInoue et al., 2006). Based on these arguments and genetic studies that indicate that most genetic variation occurs within and not across populations (Fine et al., 2005), opponents of genetic predisposition have contended that race is a social and cultural construct with no biologic or genetic basis and that use of racial and ethnic classifications introduces potential for stereotyping and racism (Austin, 2002; Fine et al., 2005; Tashiro, 2005).

Elimination of race and ethnicity as a social construct is not likely, however, as humans universally apply stereotypes to categorize and simplify complex information and stimuli and assign beliefs and expectations to individuals based on class or group (Stone & Moskowitz, 2011; van Ryn & Fu, 2003). Healthcare providers are not immune to these effects, nor are their patients, and each brings attitudes and experiences into the healthcare encounter (Perloff et al., 2006; Smedley et al., 2002, p. 102; Stone & Moskowitz, 2011; White-Means, Dong, Hufstader, & Brown, 2009). Research has indicated that the social biases which have evolved based on race and ethnicity adversely affect healthcare worker attitudes, influence the quality of healthcare provided to diverse populations, and reduce patient compliance and participation (Finnström & Söderhamn, 2006; Gordon, Street, Sharf, & Souchek, 2006; Green et al. 2007; Guendelman, Thornton, Gould, & Hosang, 2005; Her & Culhane-Pera, 2004; Stone & Moskowitz, 2011; Tashiro, 2005; van Ryn & Fu, 2003).

There is evidence to suggest that environmental stressors introduced because of racial discrimination can affect physical and mental health and promote health disparities (Mustillo et al., 2004; Nazroo, 2003; Williams et al., 2003). Participants of a focus group conducted for the 2002 IOM report revealed perceptions of discrimination during healthcare encounters (Smedley et al., 2002, p. 392). Physicians and nurses of diverse ethnic backgrounds reported that healthcare organizations perpetuate discrimination in policies and practices (Smedley et al., 2002, p. 402) and van Ryn and Fu (2003) concluded that provider bias and unconscious stereotyping can reinforce the marginalization of racial and ethnic minorities. White-Means et al. (2009) found that medical students have inherent race and skin tone preferences, and Williams et al. (2003) suggested that chronic exposure to racial discrimination and its physiological and psychological effects may be a determinant and contributor to health disparities.

Van Ryn and Fu (2003) proposed that provider self-awareness and motivation are insufficient to overcome unconscious bias and that reorganization of service delivery is necessary to influence racial and ethnic variations in care. Smedley et al. (2002, p. 553) also advocated for the transformation of the medical practice and patient-provider relationship in order to more effectively meet the needs of diverse patient populations. Included in this transformation is the recognition that healthcare delivery must be sensitive to and incorporate the cultural context of the patient. The U.S. OMH (1999) further suggested that it is the responsibility of healthcare organizations to develop policies and procedures and provide staff training to ensure the delivery of culturally and linguistically appropriate healthcare to diverse populations; however, organizations need tools to aid in assessment of and monitoring progress toward cultural competence (Castillo & Guo, 2011).

Efforts to address health disparities often focus on health communication, and although this message delivery system is important, it often neglects to incorporate the social, cultural, environmental, psychological, and historical factors that affect the health of the target population (Friemuth & Quinn, 2004; Kreuter & McClure, 2004). Many studies have identified language, culture, and effective communication as important factors that affect quality of healthcare delivery (Shoultz, et al., 2006) and influence patient willingness to utilize healthcare services (Guendelman et al., 2005; Her & Culhane-Pera, 2004; Shoultz et al., 2006). Effective communication is a key component in provision of culturally competent healthcare and improved health outcomes (Castillo & Guo, 2011; Giger & Davidhizar, 2002, p. 185; Her & Culhane-Pera, 2004; Johnson, Roter, Powe, & Cooper, 2004; Kreuter & McClure, 2004; U.S. OMH, 1999).

While many studies have confirmed the existence of health disparities in racially and ethnically diverse populations, much of this knowledge has been accumulated through research on African Americans. Less is known about other populations, including Asians and Pacific Islanders (Baker et al., 2007; Centers for Disease Control and Prevention [CDC], 2004; Le, Kiely, & Schoendorf, 1996), and it is not clear whether the same factors affecting the health of African Americans also impact other ethnic groups. Additionally, few studies have considered the heterogeneity across Asian subgroups limiting available data on specific Asian populations (Pinzon-Perez, 2006; Yu et al., 2001). For these reasons, research is needed on non-African American minority groups and the cultural knowledge and traditions that can influence patient care (Baker et al., 2007; Shoultz et al., 2006; Smedley et al., 2002, p. 235-237).

## Disparities in Prenatal Care and Neonatal Outcomes

Infant mortality is an important measure of a nation’s health and a worldwide indicator of health status and social well-being (U.S. DHHS, 2000, Chapter 16). As of 1995, the United States infant mortality rate ranked 25th among industrialized nations. The 2005 World Health Organization (WHO, 2005) data ranked the United States no better than 38th of 194 nations despite having reduced the infant mortality rate by 10.9% from 1995 to 2004 (Mathews & MacDorman, 2007). The overall 2004 infant mortality rate in the United States was 6.78 infant deaths per 1,000 live births; however, rates varied considerably by racial and ethnic group, from a high of 13.60 per 1,000 live births for non-Hispanic Blacks to a low of 4.65 per 1,000 live births to South and Central American mothers (Mathews & MacDorman, 2007). Reports from the CDC indicated that infant mortality may be underreported for very low birthweight infants, which could elevate currently reported rates (CDC, 2007). In 2004, the three leading causes of infant mortality—congenital defects, low birthweight (LBW), and sudden infant death syndrome (SIDS)—accounted for 45% of infant mortality, and 36.5% of infant deaths were associated with preterm births (Mathews & MacDorman, 2007). Infant mortality rates in Minnesota continue to be among the lowest in the nation, although from 1994-2004, the preterm birth rate in Minnesota increased over 19% (March of Dimes, 2007). African Americans, Native Americans, and Asians had the highest rates of preterm births and LBW infants. These same populations also were more likely to have received inadequate prenatal care (March of Dimes, 2007), although no data specific to the Hmong of Minnesota are available. A MN State Demographic Center (2009) report revealed that birth rates have trended upward since 1995, and that births to Blacks, Asians, and foreign-borne mothers have continued to increase.

In developed countries, most LBW is associated with low gestational age due to preterm births (Kiely, Brett, Yu, & Rowley, 1994). Because studies have associated adequate prenatal care with improved infant and maternal morbidity and mortality (outlined in the following section), one of the objectives of *Healthy People 2010* is to increase to 90% the number of women who receive early and adequate prenatal care (U.S. DHHS, 2000, Chapter 16). Although research indicates that adequate prenatal care reduces the risk of LBW infants (Kiely & Kogan, 1994; Spring et al., 1995; Yu et al., 2001), there is controversy regarding whether this relationship is causal. Furthermore, there is no consensus on the definition of what constitutes adequate prenatal care (Agency for Healthcare Research and Quality [AHRQ], 2002). Prenatal care alone is not likely to eliminate risk of adverse pregnancy outcomes because it cannot account for maternal health prior to conception; however, it does allow for earlier identification of and interventions for high risk pregnancies (Kiely & Kogan, 1994).

### *Measures of Prenatal Care*

Several measures have been used to describe the adequacy of prenatal care. Original prenatal care measures (the Institute of Medicine (IOM) or Kessner Index, and the trimester that care began) have been criticized because their simplicity resulted in an inaccurate portrayal of prenatal care utilization (Kogan et al., 1998; Kotelchuk, 1994). The Revised Graduated Index of Prenatal Care Utilization (R-GINDEX) and Adequacy of Prenatal Care Utilization Index (APNCU), both proposed by Kotelchuk, more accurately define prenatal care utilization and expand previous classifications to include both no prenatal care and intensive prenatal care categories. Although similar, the R-GINDEX and APNCU indices are not interchangeable (Heaman, Newburn-Cook, Green, Elliott, & Helewa, 2008).

Kotelchuk introduced the APNCU Index in 1994. Prenatal care history is categorized as no care, inadequate, intermediate, adequate, or adequate plus (intensive) based on month of the initial prenatal visit, and the ratio of actual versus expected number prenatal visits (based on American Congress of Obstetricians and Gynecologists (ACOG) recommendations), and adjusted for gestational age. Although this index (and potentially all utilization indices) may have limitations which effect its usefulness in describing associations between prenatal care and health outcomes (Koroukian & Rimm, 2002), it is the measure chosen to assess success toward the *Healthy People 2010* objective of increasing the proportion of women who receive early and adequate prenatal care (U.S. DHHS, 2000) as well as adequacy of prenatal care in this study.

The *Healthy People 2010* goal assumes that increasing early and adequate prenatal care will reduce disparities in maternal and infant outcomes. Prenatal care use alone, however, has been disputed as an insufficient measure of the quality and content of prenatal care services received as studies have shown that current measures of prenatal care do not necessarily translate to quality of care or improved outcomes (AHRQ, 2002; Silveira & Santos, 2004). It also does not incorporate appropriateness of care received, effectiveness of services, or stratify for risk. Research is needed to further define adequacy of prenatal care and indicators that can be used to improve health outcomes, particularly in special and high-risk populations (AHRQ, 2002).

### *Prenatal Care and Birth Outcomes*

One of many studies that support the relationship between prenatal care and LBW was an examination of 1968 New York birth and infant death records by Gortmaker (1979). This retrospective review analyzed variables readily available on birth records (adequacy of prenatal care as defined by the IOM or Kessner Index, birth weight, maternal age, marriage status, parental education, birth order, medical conditions during pregnancy, and type of hospital service) to predict the birth outcomes: risk of LBW, neonatal mortality, and post-neonatal mortality. Statistically significant relationships were found between inadequate prenatal care and LBW for both white (RR 1.40, $p < .01$) and black (RR 1.78, $p <.01$) populations, with higher risk of LBW attached to delivery in general services versus private practice. The authors suggested that seeking prenatal care leads to improved maternal behaviors and hence higher birth weights. It must be noted that this study was subject to the limitations of all research using available data, namely data quality and completeness. Only two racial/ethnic groups were included in this analysis, white and black. The reason for exclusion of other populations was not discussed, nor was there explanation of how the original data were validated for completeness. Additionally, this study included only quantitative variables that did not account for quality of care delivered. These weaknesses make it difficult to assume that these findings indicate a causal relationship or that they can be generalized to other populations.

Similarly, Herbst, Mercer, Beasley, Meyer, & Carr (2003) found that lack of prenatal care was associated with preterm births, LBW, and increased neonatal morbidity and mortality among LBW infants in a prospective study conducted at six hospitals in Shelby County, Tennessee. Whites, Hispanics, and African-Americans were represented in this study, however participants were predominantly black (60% of those with prenatal care, 70% of those with no prenatal care). Mothers receiving no prenatal care were almost twice as likely to have LBW infants and their newborns were at higher risk for adverse neonatal outcomes such as respiratory distress syndrome and bronchopulmonary dysplasia. The authors of this study suggested that prenatal care increases birth weight through the prolongation of pregnancy and opportunity for high-risk women to receive specialized care. While the quantitative variables employed in this study suggested a relationship between no prenatal care, LBW, and other adverse neonatal outcomes, it is not possible to establish causation. Again, these authors did not consider the quality or content of prenatal care.

Contrary to Gortmaker (1979) and Herbst et al. (2003), Silveira and Santos (2004) in their review of the literature concluded that evidence for the relationship between prenatal care and LBW was inconclusive and dependent on study design. A total of 25 studies meeting inclusion criteria were included in their review: 17 cross-sectional, four cohort, three case-control, and one randomized trial. The definition of LBW (<2500 grams) was identical across studies, however, adequacy of prenatal care was measured less consistently. Adequate prenatal care was found to be protective against LBW in 16 of the cross-sectional studies; however other study designs varied in their support of the association. The authors contended that most studies use quantitative indicators (such as those described in the two studies above) to measure the adequacy of prenatal care, fail to consider the qualitative aspects of the care delivery, and are not standardized across studies. They also pointed out that study designs that use secondary data (i.e. birth certificates and registries) have inherent limitations that can affect their quality (a concern supported by Forrest and Singh, 1987). Furthermore, they contended that studies based on maternal observation and self-reported data may be biased due to self-selection (inherent differences between women who initiate early prenatal care and those who do not) and recall bias (understanding and identification of prenatal procedures). Finally, it is suggested that publication bias must be considered when exploring studies reporting the association between prenatal care and LBW. This study concluded that the relationship between prenatal care and LBW is unclear.

Research by Ricketts, Murray, and Schwalberg (2005) took a different approach to determining the effectiveness of prenatal care. In contrast to quantitative studies which used adequacy of prenatal care measures based on timing and number of visits, Ricketts and colleagues investigated outcomes based on quality of care outcome indicators. These authors examined the effect of prenatal interventions on known risk factors for LBW in Medicaid eligible women who obtained prenatal care from a Colorado Prenatal Plus program. Patients were initially assessed for modifiable risk factors for LBW and received targeted services aimed at changing lifestyle and behaviors that affect birth outcomes: smoking, inadequate weight gain, and psychosocial problems. Women who received the full package of services were more likely to totally resolve their risk factors and subsequently reduce their risk of LBW. Results of this study suggested that prenatal care services that target known risk factors may influence birth outcomes.

Similarly, midwifery has been successful in providing prenatal care to socially and economically disadvantaged women with encouraging results (Raisler & Kennedy, 2005). Studies have suggested that women tended by midwives have increased prenatal care, fewer preterm infants, and higher birth weights (Raisler & Kennedy, 2005). A study by Ickovics et al. (2003) found that preterm infants born to women who received midwife care in a group setting were significantly larger than infants born to women who had individual prenatal care. Rising, Kennedy, and Klima (2004) proposed that midwife based prenatal programs designed to provide health assessment, prenatal care, education, and support to women and their families in a small group setting may be effective in reducing health disparities.

### *Risk Factors for Prenatal Outcomes*

Much of the infant mortality rate in the United States can be attributed to the disparity between the rates for non-Hispanic Blacks and other racial and ethnic groups (Mathews & MacDorman, 2007). Many studies have attempted to identify the factors contributing to this long standing disparity; however, traditional pregnancy-related risk factors (i.e. maternal age, socioeconomic status, illicit drug, alcohol, and tobacco use, and adequacy of prenatal care) have failed to provide full explanation (Collins, David, Prachand, & Pierce, 2003; Kiely, Brett, Yu, & Rowley, 1994). Recent research has explored the potential effects of less conventional factors such as maternal birth weight

(Collins et al., 2003) and stress related to racial discrimination on preterm births and low birth weight infants (Collins et al., 2000; Mustillo et al., 2004).

Using data from a preexisting data set with linked maternal and infant birth records, Collins et al. (2003) sought to discover whether maternal birthweight was a predictor of birth to a low birthweight infant. After controlling for adequacy of prenatal care, age, education, race, and marital status, these authors found that maternal birthweight was an independent risk factor for LBW infants. Mothers who were themselves LBW infants were twice as likely to deliver LBW infants as non-LBW mothers despite receiving adequate prenatal care. This held true for both Whites and Blacks at all levels of prenatal care utilization. The authors of this study noted inherent limitations in the dataset but suggested that maternal *in utero* fetal experience (i.e. prenatal malnutrition) may contribute to disparities in trans-generational neonatal outcomes. Results of this study may be relevant to the Hmong as their infants on average weigh 200 grams less than those of non-Hispanic whites (Queensland Health, 2006).

Mustillo et al. (2004) studied the relationship between self-reported experiences of racial discrimination (as a psychosocial stressor) and LBW and preterm births in the prospective cohort Coronary Artery Risk Development in Young Adults Study (CARDIA). As many other studies have reported, Black women were 2.5 times more likely to have a preterm birth and 4.2 times more likely to have a LBW infant than White women. Fifty percent of Black women who delivered preterm and 61% who delivered LBW infants reported greater than three racial discrimination experiences (out of seven in specified situations included in the study questionnaire) versus 5% and 0% of White women who delivered preterm and LBW infants, respectively. Results of this study provide evidence that racial discrimination may contribute to disparities, however, study design did not account for many potential confounding variables (e.g., adequacy of prenatal care, alcohol and drug use, and chronic medical conditions) that could influence prenatal outcomes and hence bias study results.

Most studies on reproductive disparities have been conducted on non-Hispanic Blacks and Whites driven by the pronounced disparities between these ethnic groups and availability of data. Fewer studies have been done examining other racial and ethnic populations. Traditionally treated as a homogenous group within the nation's surveillance system, little data is available describing infant mortality and perinatal outcomes in specific subgroups within the larger Asian and Pacific Islander population. Even the ongoing CDC's Pregnancy Risk Assessment Monitoring System (PRAMS) study designed to measure progress toward *Healthy People 2010* goals, does not differentiate between Asian and Pacific Islander subgroups.

One early study by Shiono & Klebanoff (1986) investigated ethnic differences in preterm birth and very preterm births in four ethnic groups enrolled in a Kaiser Birth Defects Study in California. This was one of the first studies to describe the birth experiences of Asian populations, although as a homogenous group. This research found that all of the ethnic minorities studied (Blacks, Mexican-Americans, Asians, and "Others") were more likely than Whites to deliver preterm and very preterm infants. Specifically, Asians were 60% more likely than Whites to deliver prematurely (adjusted OR 1.61, 95% CI 1.31-1.97). Building on this research, Shiono, Rauh, Park, Lederman, and Zuskar (1997) attempted to identify social, psychological and economic predictors affecting the persistent disparities in low birthweight and infant mortality. Participants in this prospective study were pregnant women attending one of six Chicago or New York City clinics and representing six ethnic groups, including Chinese. This research found that impoverished living conditions and feelings of helplessness or powerlessness were positively associated with low birthweight.

## Data on Asian American Populations

It is difficult to gauge the health status of specific groups of Southeast Asian populations because their health outcomes have historically been included in the aggregate data for all Asian and Pacific Islander populations (McKenzie, Pinger, & Kotecki, 2005, p. 274-275). The National Healthcare Disparities Report indicated that overall 86.9% of Asian women received prenatal care in the first trimester (AHRQ, 2005, Appendix D, table 56a). However, these data may not be indicative of the experience within specific subgroups as it is a composite of several Southeast Asian (Indochinese), Chinese, Japanese, and other Pacific Islander populations. Le, Kiely, and Schoendorf (1996) found that maternal characteristics and risk factors varied greatly across Asian American and Pacific Islander subgroups in their study on birthweight outcomes using data from the 1992 United States National Natality File. This study was one of the first to examine the distribution of maternal risk factors for delivering moderately low birthweight (MLBW) and very low birthweight (VLBW) infants within six Asian American (AA) subgroups, including Japanese, Chinese, Filipino, Korean, Asian Indian, and Vietnamese, comparing also utilization of prenatal care, and birth outcomes of United States born and foreign-born mothers. Although not specific to SE Asian populations, this study demonstrated the existence of heterogeneity across AA subgroups and supported the need for studies on individual ethnic groups to address the maternal and child health needs of AA populations.

A similar study by Yu et al. (2001) using 1992-1996 United States natality data supported the results of Le et al. (1996). These researchers noted also that utilization of prenatal care varied significantly across AA subgroups, and suggested that their study was limited by the inability to examine the social and cultural factors that may affect prenatal care use. They further concluded that to meet the *Healthy People 2010* goal of 90% utilization, further study is needed on the ethnic-specific determinants affecting adequate prenatal care.

Heterogeneity exists within the Southeast Asian populations as refugees vary in education, socioeconomic status, and previous experiences and environments, as well as birth outcomes and prenatal care utilization (Cutilli, 2006; Davis, Goldenring, McChesney, & Medina, 1982; Hopkins & Clarke, 1983; Yee, n.d.). Studies on pregnancy outcomes in Indochinese refugee populations were first conducted in the 1980s. Davis et al. (1982) examined 1979-1980 obstetric records of Vietnamese, Laotian, and Cambodian births in Santa Clara County, CA. This retrospective review found that 65% of mothers received prenatal care in the first trimester, 23% in the second trimester, and 12% in the third trimester or had no prenatal care. Additionally, they found that 13.5% of births with recorded gestational age were premature (<37 weeks gestation) and 11% had low birth weight babies. It was concluded that Cambodian and Laotian refugees were at increased risk of LBW infants due to lack of prenatal care and that future studies were needed.

Building on the work of Davis et al., Hopkins & Clarke (1983) examined the birth records of Indochinese refugees residing in Oregon, recognizing that significant differences existed between ethnic subgroups. Of the Laotian refugees included in this study, approximately half were Hmong (233 out of 471). Also, of the 5 Laotian subgroups represented (Kampuchean, Hmong, Mien, Vietnamese, and Other), Hmong had the least favorable maternal risk profile: less education (97.7% had less than 12 years), less adequate prenatal care (57.7% had inadequate or no prenatal care), higher birth rates in women older than 34 and younger than 20 (15.9% and 18.5% of Hmong births, respectively), and higher parity (34.8% had 4 or more previous births). Interestingly, this study also noted that prenatal care utilization decreased and percentage of LBW infants increased with longer length of time in the United States prior to birth across all Oregon Indochinese subgroups suggesting the existence of barriers that affect outreach to these populations, new environmental exposures, or reduction of cultural buffering effects (Jasso, et al., 2004).

In a retrospective study on pregnancy characteristics and outcomes in Massachusetts Cambodian refugees, Gann, Nghiem, and Warner (1989) described the major risk factors and adverse birth outcomes in this population. This study found that approximately 35% of Cambodian women received late (third trimester) or no prenatal care. It was concluded that although the prevalence of low birthweight infants was similar to other women in Massachusetts, reluctance to use prenatal care warranted further study and intervention.

## Hmong Studies

Over 186,000 Hmong have settled in the United States since 1975 (Hmong National Development, Inc. & Hmong Cultural and Resource Center [HNDI & HCRC], 2004). Forty-nine percent of those reside in the Midwest, with the largest concentration living in the Minneapolis and St Paul metropolitan area (HNDI & HCRC, 2004). There have been a number of studies conducted on the Hmong population since their arrival. Coughlan (2006) compiled a bibliography of 108 studies published from 1983 through 2006 that were related to culturally competent health care for the Hmong, however, many of these were done on populations resettled in Australia, and/or focused on aspects of healthcare outside of prenatal care. Studies on the Australian Hmong refugees report similar cultural barriers to Western medicine in relation to prenatal care (Rice, 1999).

Hmong women are less likely to access early and adequate prenatal care than other ethnic groups (Helsel, Petitti, & Kunstadter, 1992; Hopkins & Clarke, 1983; Lao Family Community of Minnesota, n.d.; Levenick, 2001). The average fertility rate for Hmong women (78.8 births per 1,000 women ages 15 to 44 yrs) is higher than the average for American white women (56.4 births per 1,000 women ages 15 to 44 yrs) and their infant mortality rate is also higher (6.2 versus 4.7 infant deaths per 1,000 live births; March of Dimes, 2007).

Spring et al. (1995) sought to understand the social and cultural factors that influenced the use of prenatal care by Hmong women in Minnesota in order to make programmatic changes to care delivery in the clinic setting. This was an ethnographic survey study in which Hmong women who had delivered during the study periods 1984-1988, and 1993 were interviewed using open-ended questions constructed with the input of Hmong leaders and healers and clinic professionals. The 48 Hmong women interviewed from the 1984-1988 study period identified several objections including number and frequency of pelvic exams and poor communication with staff. After implementation of interventions aimed at improved cultural competency in care delivery, women in the 1993 interviews were more positive about their prenatal experiences and communication with staff. This study, however, did not provide evidence that improved cultural competency results in improved prenatal outcomes as it only assessed patient satisfaction.

The Minnesota Department of Health (MDH) reported that 25% of Hmong mothers begin receiving prenatal care in the 3rd trimester or receive no prenatal care at all, 18% of Hmong mothers receive adequate care as measured by the APNCU Index, and 37% of Hmong mothers receive inadequate care or no prenatal care (Lao Family Community of Minnesota, n.d.), which is similar to the data reported on Indochinese refugees by Gann et al. (1989) and Hopkins and Clarke (1983). Helsel et al. (1992) studied the prenatal characteristics of the Hmong population in Merced and San Joaquin counties in California. Their findings on time to prenatal care were consistent with the experience in Minnesota and Massachusetts, 65.6% of Hmong mothers had their first prenatal visit during their second or third trimester, and spoke little English. Consistent with other studies, this population had a high fertility rate compared to whites in the same counties.

### *Hmong Health Beliefs*

Studies indicate that language and cultural and health beliefs are the main barriers to improved prenatal care in the Hmong (Center for Reproductive Health Research & Policy, n.d.; Cobb, 2010; Warner & Mochel, 1998), although socioeconomic status and lack of knowledge regarding Western medicine are also factors (Levenick, 2001). The Hmong have several health beliefs and customs that affect their willingness to utilize Western medicine (including prenatal care) that must be recognized and understood by caregivers. They prefer to use traditional Eastern medicines such as herbs, Shamanism rituals, and home or traditional remedies prior to seeking assistance through Western medicine, primarily from fear that they will not be treated properly (MDH, 2006). Their fear of being mistreated or misunderstood by healthcare providers is not unfounded as Hmong health beliefs and practices are often at odds with Western medicine (Cobb, 2010; Fadiman, 1997).

According to the Health Belief theory, to change health behaviors, there must be a perception of risk. Childbirth for most Hmong women is uneventful and therefore, not considered a health risk requiring medical attention (Mattson, 1995; Rising et al., 2004). Also, the traditional Western care delivery model may not be effective in improving health outcomes in all populations (AHRQ, 2002), and may actually present a barrier for achieving improved patient compliance (Spring et al., 1995). The Hmong are extremely modest and the women are resistant to exposing their genitalia to men who are not their husbands. In addition, they have an aversion to having pelvic examinations because it “violates personal territory” (Levenick, 2001), “provokes embarrassment and shame” and is discouraged by Hmong men (Spring et al., 1995). Need for pelvic examination is a reported barrier to providing prenatal care to the Hmong population (Levenick, 2001; Spring et al., 1995). Interventions which include limiting the number and frequency of pelvic examinations have been successful in increasing patient satisfaction among Hmong women (Spring et al., 1995).

The Hmong believe that illnesses are caused by the imbalance of hot and cold energy (yin and yang), excessive emotions, and evil spirits, and that not honoring these beliefs during childbirth increases risk from evil spirits during the birthing process

(Mattson, 1995). Their traditional practices (avoid cold foods, keep warm, and do not bathe for 30 days after childbirth) encourage women to stay warm so not to attract evil spirits (Wang, 1995). The Western technique used for conducting pelvic exams contradicts this belief; however, Hmong women have not been resistant to warm showers while in the hospital (Wang, 1995). Hmong women also follow a special postnatal diet consisting of fresh chicken, chicken soup, rice, eggs, and lean pork for 30 days after giving birth (Wang, 1995). Organizations must recognize and incorporate these special needs into culturally sensitive prenatal and maternal care (Goode & Jones, 2006; Spring et al., 1995).

## Cultural Competence

Cultural competence is one of the critical factors effecting health care access and patient care services to the culturally and ethnically diverse patient populations in the United States (HRSA, n.d.; U.S. OMH, 1999). Effective culturally competent communication between healthcare providers and their foreign-born patients is essential in the delivery of quality healthcare and can affect provider credibility, and patient satisfaction and compliance (Her & Culhane-Pera, 2004; U.S. OMH, 1999). Smedley et al. (2002) suggested that health outcomes improve as a result of culturally competent care delivery evidenced by enhanced communication between provider and patient (p. 200). However, communication between patients and providers of different cultural, racial, and ethnic backgrounds is complex and shaped by the orientation and assumptions each brings to the healthcare encounter (Lo & Stacey, 2008; Perloff, et al., 2006; Stone & Moskowitz, 2011). These alternate viewpoints can affect how providers deliver and patients perceive the effectiveness of the interaction (Gordon et al., 2006; Lucas et al., 2008). It has been hypothesized by advocates of participatory medicine that patient behavior and ultimately health outcomes is mediated in part by patient perception of provider cultural competence (Lucas et al.). The association between provider cultural competency and racial and ethnic disparities in diverse populations, however, remains unknown.

Cultural competence encompasses the "attitudes, behaviors, knowledge, and skills necessary for staff to work respectfully and effectively with patients and each other" (U.S. OMH 1999, p. 4). Rew, Becker, Cookston, Khosropour, and Martinez (2003) also described the four essential components of cultural competence as: cultural awareness, cultural sensitivity, cultural knowledge, and cultural skills. Previous studies have identified four subscale components that influence cultural competence: cultural diversity (provider experience with a variety of diverse patient populations), cultural awareness (knowledge about similarities and differences between diverse groups), cultural sensitivity (attitudes, values, beliefs, and respect as related to cultural issues), and culturally competent behaviors (observable outcomes resulting from diversity experience, awareness, and appreciation for patient needs; Doorenbos et al., 2005). Ngo-Metzger et al. (2003) and Napoles-Springer, Santoyo, Houston, Perez-Stable, and Stewart (2005) described domains necessary for delivery of quality patient care. It is not known however, which, if any, of these constructs is most important in improving health outcomes in diverse populations.

### *Tools to Measure Cultural Competence*

Assessing the relationship between cultural competence and health outcomes is made more difficult because of the lack of consistent measurement tools. Several tools have been developed; however, most have been designed to measure specific aspects or domains included in cultural competence and are not broadly applicable across "cultures, disciplines, work roles, and education levels" (Doorenbos et al., 2005, p. 325). The Cultural Competence Assessment (CCA) tool is based on the existing cultural competency model which utilizes the subscales of cultural diversity experience, cultural awareness and sensitivity, and culturally competent behaviors. It was initially used to assess the cultural competency of hospice providers, and then further tested on a convenience sample of healthcare providers in a nonhospice setting. The CCA has not been tested on physician groups.

Standardized instruments are also lacking with which to measure patient perception of provider competence or assess provider behaviors in practice (Thom & Tirado, 2006). Thom and Tirado introduced parallel survey instruments designed to measure patient-reported and provider self-reported cultural competence: Patient-Reported Provider Cultural Competency (PRPCC) scale and Provider Self-Assessment of Cultural Competency (PSACC). These researchers grouped culturally competent behaviors into three groups (knowledge of patients, communication skills, and cultural brokering) and incorporated these constructs into both survey instruments. To test the validity and reliability of these tools, they were tested on a group of patients with diabetes and/or hypertension and their corresponding primary care physicians. The PRPCC found provider cultural competence predictive of reduction in blood pressure ($p < .05$) and glycosylated hemoglobin (although not a statistically significant association). Interestingly, the PSACC demonstrated lower internal validity, and scores did not correlate with those reported on the PRPCC, suggesting that physician self-assessment of culturally competent behaviors was not associated with improved patient satisfaction, adherence, or health outcomes. Also unexpected was the inverse relationship found between patient language acculturation and culturally competent behaviors. Additional research is needed to validate the PRPCC with other groups of physicians and patients.

Johnson, Saha, Arbelaez, Beach, and Cooper (2004) highlighted the racial and ethnic differences in patient perceptions of bias and cultural competence in healthcare within the African American, Hispanic, Asian, and White populations. The cultural competency survey included theoretical constructs regarding interactions with primary providers, and while seeking healthcare overall. Among the minority groups, Asians were more likely to report that the "doctor looks down on me and the way I live" ($p$<.01) and dissatisfaction with patient-physician communication ($p$<.001). Also, 9.6% of Asians surveyed did not speak English, and the researchers reported that English literacy was statistically significant in perceptions of healthcare bias. This study concluded that future research was needed to determine how cultural competence impacts health outcomes using validated measures of provider and health system cultural competence, and incorporate patient perceptions. They also suggested that if racial and ethnic disparities in health outcomes are found to be associated with cultural competence, these findings should be included in future interventions and policies designed to eliminate health disparities in these populations.

In a symposium on cultural medicine Her and Culhane-Pera (2004) described the key components in delivering culturally competent healthcare to Hmong patients and their families. They emphasize the importance of understanding minority cultural groups and the application of the listen, explain, acknowledge, recommend, and negotiate

(LEARN) model in all cross-cultural clinical interactions. Each of the five elements of the LEARN model reflects different constructs within the cultural competence model. In addition, these authors noted that cultural sensitivity requires that providers demonstrate respect for a patient's cultural beliefs, and present information as an advisor instead of an authoritarian figure. Healthcare providers who understand and respect these beliefs, and incorporate a culturally sensitive approach can positively affect health outcomes in immigrant and refugee populations (Her & Culhane-Pera, 2004).

Elder (2003) stressed that as healthcare providers seek to become knowledgeable about their patients, patients must also be educated regarding the healthcare system, and disease processes. It is important to consider the literacy levels of the target foreign-born populations and their ability to comprehend healthcare messages, medication prescriptions, and healthcare instructions (Elder, 2003). Even patient education materials written in their native language may not be appropriate in low literacy populations (Elder 2003). Helsel et al. (1992) reported that most Hmong refugees had little formal education, and did not speak or read English. It is also important to note that until their migration to the United States, the Hmong did not have a written language so Hmong translated materials may be of little value (Cobb, 2010; Yee, n.d.).

The United States Office of Minority Health (1999) report *Assuring Cultural Competence in Health Care* found that culturally competent healthcare delivery has the potential for improving health outcomes in diverse populations, yet few studies have been conducted examining this association. Beach et al. (2005), in a systematic review of studies done evaluating interventions designed to improve the cultural competence of health professionals, reported that evidence is lacking which demonstrates that cultural competence training improves patient adherence or health outcomes and concluded that future research is needed in this area. Fortier and Bishop (2004) suggested that a direct relationship between cultural competence and health outcomes may be difficult to demonstrate (p. 4-5). Perhoff and colleagues (2006) argued that "ethically grounded research" was needed to elucidate any associations between doctor-patient communication and patient satisfaction, compliance, and wellness.

## Conclusion

While research suggests that culturally sensitive healthcare delivery can increase patient satisfaction and quality of care, currently there is little empirical evidence to support that it improves patient compliance or health outcomes. The Hmong have cultural health beliefs which must be accommodated during healthcare delivery. Underuse of prenatal care has been associated with increased neonatal morbidity and mortality, and Hmong women are less likely to access prenatal care for a variety of reasons (Spring et al., 1995). One of the factors related to underutilization of health care services may be providers' cultural competence (HRSA, n.d.). The relationship between provider cultural competence and neonatal outcomes (as measured by adequacy of prenatal care) has not yet been studied in the Hmong population.

This literature review included research reported in peer review journals, and government and academic sources. Consistently, these studies noted the need for research on the relationship between healthcare provider cultural competence and health outcomes in diverse populations. Specifically, research is needed for minority groups, other than African Americans, which can identify components of care delivery that may be associated with racial and ethnic disparities in health outcomes so that they can be addressed in future interventions and policies. This study supported the research needs identified in the literature review. The next chapter includes discussion of methods used to examine the relationship between provider cultural competence and prenatal care in the Minnesota Hmong.

# CHAPTER 3: RESEARCH METHOD

## Introduction

Although it has been hypothesized that provision of culturally competent care should result in improved outcomes and reduced health disparities, the relationship between cultural competency and health outcomes remains unclear (Beach et al., 2005; Cooper, Beach, Johnson, & Inui, 2003; Brach & Fraser, 2000). Chapter 1 introduced the problem and described the rationale for this cross-sectional, quantitative study. Chapter 2 summarized the current state of knowledge regarding the role of cultural competency in healthcare quality, particularly prenatal health outcomes within the Southeast Asian and Hmong communities. Chapter 3 outlines the methodology used to study the research questions described in Chapter 1. It begins with (a) an overview of the study design, followed by discussions of (b) selection of study participants, (c) survey instruments, and (d) analytic procedures and data management.

## Research Design

This study incorporates constructs of both the cultural competence theory and ethnic origins theory. Together these theories posit that improving cultural competency can lead to increased patient satisfaction and compliance and, ultimately, better health outcomes; they also indicate that interventions to improve the health of immigrants and refugees must consider the historical, social, and cultural contexts of the target population (Campinha-Bacota, 1999; Doorenbos et al., 2005; Fortier & Bishop, 2004; Hein, 2006; Thom & Tirado, 2006). The literature review identified that the Hmong have specific cultural needs that must be accommodated during the healthcare encounter (Culhane-Pera et al., 2003; Pinzon-Perez, 2006; Rice, 1999; Spring et al., 1995; Warner & Mochel, 1998).

Because factors influencing health outcomes are many and complex, the AHRQ suggested that intermediary outcomes may be appropriate surrogates for improved health status (Fortier & Bishop, 2004). As evidenced in the literature, there are many confounding risk factors which affect neonatal and maternal health outcomes. For this reason, this study used utilization of prenatal care as a proxy measure for infant morbidity and mortality.

Although the primary dependent variable in this study was an intermediate proxy measure, finding an association between cultural competency and neonatal outcomes would be an important addition to the literature. As noted in Chapter 2, studies of the relationship between prenatal care and birth outcomes often failed to consider the quality of the care received (Gortmaker, 1979; Herbst et al., 2003), although prenatal programs designed to meet individual needs appear to improve birth outcomes (Ickovics et al., 2003; Raisler & Kennedy, 2005; Ricketts et al., 2005). More culturally competent providers should be better able to deliver individualized care and function in the role of cultural broker, which, theoretically, could improve birth outcomes.

The relationship between prenatal care, cultural competence, and birth outcomes was investigated in this study using variables collected and reported on the United States standard birth certificate (discussed in the section on study variables below). This cross-sectional study extracted Hmong participants from an existing electronic health record database, and identified associated providers from review of the health records. Because race and ethnicity are not reliably documented in medical records (Hasnain-Wynia & Baker, 2006), and Hmong ethnicity is often included under the broader Asian subgroup heading (McKenzie et al., 2005, pp. 271, 274-275), an alternate method was required to identify Hmong patients.

The Hmong have a distinct kinship and family structure with well-recognized rules with regard to marriage between clans (Culhane-Pera et al., 2003, p. 14-17; Lee, 2005; Meschke, 2003; Moua, 2003) and social norms that discourage interracial marriage (Culhane-Pera et al., 2003, p. 16-17; Hein, 2006, p. 5; Rumhaut, 2006, p. 286). There are 18 major kinship groups or clans that define marriage and family relationships and allow the Hmong to trace their family histories through a patrilineal descent system (male ancestors; Culhane-Pera et al., 2003; Moua, 2003). Previous studies on the Hmong have successfully used clan surnames to identify participants from medical records (Helsel et al., 1992) and birth certificates (Meschke, 2003). The appropriateness of this approach is strengthened by the fact that interracial and interethnic relationships are infrequent in the Hmong community (Rumbaut, 2006, p. 284). This study identified participants through extraction from the electronic health record database using the 18 Hmong major clan surnames listed in Table 1 (Culhane-Pera et al., 2003, p.14). It was anticipated that this method would accurately identify potential study participants.

Table 1

*Hmong Surnames*

| | | |
|---|---|---|
| 1.Chang, Chang, Cha | 7. Kong | 13. Tang |
| 2. Chue, Chu | 8. Kue | 14. Thao, Thor |
| 3. Fang | 9. Le, Lee, Ly | 15. Va, Vang |
| 4. Her, Heu | 10. Lor, Lo, Lao | 16. Vue |
| 5. Hang | 11, Moua, Mua | 17. Xiong, Song |
| 6. Khang | 12. Phang | 18. Ya, Yang, Yan |

The number of participants necessary for inclusion in this study was based on expected effect size. There is a dearth of literature describing the relationship between cultural competence and health outcomes, and those that have been reported reveal small or no effect (Ferdinand, 2008; Thom & Tirado, 2006), although a recent study noted important trends toward statistical significance (Ferdinand, 2008). Many of these studies were limited by small sample sizes. Studies of the relationship between cultural competence and intermediary outcomes suggest that cultural competency is moderately correlated with patient satisfaction (Chen, 2008; Saha et al., 2003; Thom & Tirado, 2006; Walter, 2001). This study assumed that patients who were satisfied with their healthcare encounter were more likely to seek early and adequate prenatal care.

Sample size estimates for Hmong participants were calculated using both small and moderate effect sizes ($f^2$=0.02 and $f^2$=0.15), 12 predictor variables, 0.05 level of significance, and 80% power. Using G*power statistical software, 395 and 55 participants were required to detect small and moderate effects, respectively (version 3.1.2). Assuming a 60% response rate, it was estimated that an initial mailing of 650 surveys was needed to receive 390 completed responses, and 100 to assure a minimum of 60. A larger sample size would also result in inclusion of a greater number of associated providers; thus, the goal was to randomly select 650 birth records from the electronic health record extract.

There were 12,788 births in the four Midwest metropolitan hospitals located in Anoka (4,538 births at two hospitals), Hennepin (4,265 births at one hospital), and Ramsey (3,985 births at one hospital) counties in 2007. Minnesota Vital Statistics reported the percentages of births to Asian women in Anoka, Hennepin, and Ramsey counties in 2007 was 6.5%, 9.8%, and 19.1%, respectively (most current available data; MDH, 2009b). Using these data, it was estimated that 1474 births occurred to Asian women at the four metropolitan hospitals in 2007, the majority to Hmong women. Based on MN Asian and Pacific Islander American (APIA) voter profiles, the Hmong make up the largest percentage of APIA populations in Minnesota, particularly in Hennepin and Ramsey counties (MN APIA, 2004). It was assumed that the number of births in 2008 did not significantly differ from 2007. Several hundred physicians provide obstetrical services to patients within the Midwest healthcare system in both urban and suburban settings. Based on these estimates, it was predicted that the required number of participants could be achieved.

## Pilot Study

Because the selected survey instruments had not been used with the Hmong population previously, a pilot procedure was incorporated to assess the reliability of the Patient Reported Provider Cultural Competence (PRPCC) instrument and validity of the proposed survey methods. It also provided opportunity for pretesting the survey questions with the Hmong and allowed for identification of potential barriers to achieving the desired response rate. Because the pilot population was to be a randomly selected subset of the study population, it was assumed that their behaviors and responses were representative of the entire study population. Results of the pilot were used to adjust the methods prior to conducting the full study.

The participant recruitment protocol included a mailing of the PRPCC survey to 80 participants randomly selected from the first half of the sampling frame (patients delivering infants between January 1, 2008, and June 30, 2008) followed by a remailing to the initial test survey respondents (goal of 50 respondents on the initial test survey) 4 weeks later. Participants were asked to return their paper survey within 2 weeks. Reminder postcards to nonrespondents at 10 days with a follow up phone call was planned to ensure an adequate response rate for both the test and retest; however, this step was not completed due to limitations required by the Institutional Review Board (IRB; see Chapter 4). An estimated 80 participants were required to achieve the desired final 30 survey responses for the retest assuming a 60% response rate.

A correlation coefficient (*r* value) was calculated from the two sets of scores to assure reliability of the survey instrument for the study population. It was expected that because the PRPCC had been successfully used with other ethnically diverse populations that the correlation between the test-retest scores would be high (greater than or equal 0.70).

Modifications to study methods were made based on the pilot findings and response rate (detailed in Chapter 4). The number of potential participants was less than expected (*n*=118), as was the response rate (21%). Only seven retest surveys were received, which limited the ability to assess the reliability of the instrument with the study population. Individual survey questions were evaluated to identify potential wording changes to improve understanding and consistency of response; however, no major modifications to the PRPCC instrument were made as a result of the pilot. The data from the initial test survey from the pilot study were included in the final dataset and analysis (see Data Analysis section in this chapter) because there were no significant changes made to the survey questions or instrument based on pilot results, and the pilot population did not significantly differ from the rest of the study population.

## Study Summary

Study methods were modified based on the pilot results. The following sections outline the methods used to identify and recruit potential study participants, and distribute survey materials.

### *Participants*

The target population for this study was the Hmong women residing in the metropolitan area surrounding Minneapolis and St Paul, Minnesota. The Midwest healthcare system is one of the largest healthcare systems in Minnesota and has four metropolitan hospitals located in three counties that serve the Hmong community. Originally, the population of Hmong women who delivered infants at one of the four metropolitan hospitals between January 1, 2008, and December 31, 2008, was the sampling frame for this study. Because there were fewer Hmong births than expected and all potential participants were included in the pilot phase, the timeframe was expanded to include all Hmong births occurring through September 30, 2010 (see Chapter 4) in order to increase the sample size. The new sampling frame resulted in a total of 338 potential participants, of whom 23 had moved, 14 were identified as non-Hmong, and 55 returned surveys for a full study response rate of 18% (55/301).

There are both employed and independent physicians practicing in the Midwest metropolitan hospitals, along with contracted allied health professionals. Providers are credentialed at the local hospital level, and most practice only at one hospital. Almost 300 physicians provide obstetric and gynecologic services to the Midwest healthcare patients, and of these, 19 participated by returning a PSACC survey. The 19 physicians provided care to 24 of the Hmong women participating in the study, although only 23 pairs were included in analysis due to an incomplete patient survey.

The Midwest healthcare system uses an electronic health record that is common across inpatient and outpatient settings, which enabled access to both delivery and prenatal care records. Since patients are often seen by a group of OB physicians, they were asked to identify their provider on the PRPCC survey. If the name was not provided by the patient, the physician noted in the clinic record as providing the prenatal care was included in the study. In the event that multiple physicians were involved in providing prenatal care, the physician who saw the patient most often in the course of that care was included in the study.

*Participant Recruitment*

Potential participants were identified through the electronic health record extraction method described above and all Hmong birth records occurring within the sampling frame (January 1, 2009- September 30, 2010) were included. Postcards were sent to all 338 potential participants prior to mailing of the PRPCC survey instruments as directed by the Midwest IRB (see Chapter 4). The postcards were translated into Hmong and advised participants that they would be receiving the PRPCC survey in the mail. Paper surveys with cover letters were then mailed to the potential participants. As survey responses were received, the participants' providers were identified as described above, and the PSACC survey mailed to the corresponding providers.

Because the Hmong have a higher teen birth rate and lower mean age than other ethnic groups (MHP, 2004), it was anticipated that most of the Hmong women included in this study would be at least second generation and English literate, consistent with findings reported by Meschke (2003) and Rumbaut (2006, p. 273). Survey materials (other than the postcard) were not translated into Hmong, as other healthcare organizations in Minnesota had not found Hmong translations of patient surveys beneficial (B. Hanna, November 6, 2008, personal communication). Hmong interpreters were available to facilitate interviews with women whose primary language was not English.

Electronic versions of both surveys were created in Survey Monkey and the links included in the cover letter mailed with the paper versions of the each survey. The initial mailing was followed with a telephone contact to nonresponders 3 to 4 weeks after the initial mailing as directed by the Midwest IRB (see Chapter 4). Although, literature suggests that a second mailing followed by a telephone contact maximizes the response rate (Singleton & Straits, 2005, p. 232-246), the Midwest IRB limited the protocol to two contacts.

## Study Variables and Measures

The following sections review each of the dependent and independent variables included in this study and the methods used to quantify them for analysis.

### *Dependent Variables*

The dependent variable in this study was early and adequate prenatal care as measured by Kotelchuk's (1994) Adequacy of Prenatal Care Utilization Index (APNCU), a summary measure that uses month of initial prenatal visit and the expected versus actual number of prenatal visits to classify prenatal care as adequate plus, adequate, intermediate, or inadequate. This index is used by the United States Census Bureau Vital Statistics and information used to calculate this measure is recorded on the United States standardized birth certificates. The expected number of visits is calculated using the uncomplicated pregnancies adjusted for month of prenatal care initiation and month of delivery. Earlier indices used to estimate adequacy of prenatal care (i.e., Kessner's Index) poorly classified high risk pregnancies. The Adequate Plus category of the APNCU captures complicated and high risk pregnancies and more accurately classifies them because number of prenatal visits is adjusted for date of initiation. Other advantages of the APNCU include the *no prenatal care* category, which is important to differentiate from those classified as having inadequate prenatal care. Further discussion on these indices can be found in Chapter 2. It was assumed that the variables needed to calculate the APNCU (and others included in the study) could be extracted from the birth certificate data in the electronic health record; however, this situation was not possible, which necessitated manual data extraction.

Although the association between cultural competence and health outcomes was assumed to be small and confounded by several intervening variables, evidence of a relationship could be used to influence models of healthcare delivery. To that end, this study also included a total adverse health outcome score (TADV) as a second dependent variable. This score ranged from 0 (no adverse outcome) to 10 (multiple adverse outcomes) and was calculated as the sum of the following variables related to newborn morbidity and mortality: fetal and infant death during perinatal period (28 weeks gestation to seven days or more after birth; U.S. DHHS, 2000, Chapter 16) coded 0 for live birth, and 1 for death; infant birthweight coded as 0 for normal ($\geq$2,500 grams), 1 for low (1,500-2,499 grams), or 2 for very low (<1,500 grams; *Healthy People 2010*, Chapter 16); gestational age in completed weeks coded as 0 for term (>36 weeks gestation) or 1 for preterm ($\leq$36 weeks gestation; U.S. DHHS, 2000, Chapter 16); and the morbidity conditions noted on the birth certificate (assisted ventilation immediately and at six hours after birth, NICU admission, newborn surfactant therapy, antibiotics for suspected sepsis, seizure or other neurological dysfunction, significant birth injury) coded as 0 if none of these conditions are present or 1 if one or more are present (United States Census Bureau, 2003). This researcher is not aware of other studies which have used a TADV score as a weighted measure for assessing the relationship between cultural competence and neonatal outcomes.

### *Independent Variables*

The primary independent variables in this study were the cultural competence scores collected via survey instruments; however, many other patient and provider variables were also included because of their potential relationship with the dependent variables and are reviewed in the following sections.

*Cultural competence scores*. Several independent variables were collected for this study (see Table 2). The primary predictor variables were the cultural competency scores (total and subscores) of providers as measured by the parallel survey instruments proposed by Thom and Tirado (2006), Physician Self-Assessed Cultural Competency (PSACC) and Patient Reported Provider Cultural Competency (PRPCC; discussed in further detail later in this chapter), using a 5-point Likert-like scale. Three other independent variables were collected on the patient survey: perception of organizational accommodation (ORG), patient trust (PtTrust), and patient satisfaction (SAT) scores.

ORG was assessed using 10 questions regarding patient perception of services related to cultural accommodation at the organizational level, including accessibility of interpreter services. Answers to the organizational questions were nominal variables coded as 2 for *yes*, 1 for *no*, and 0 for *don't know*. Individual question scores were aggregated into a single measure ranked 0 to 20, with higher numbers representing greater perception of organizational accommodation.

Also included in the patient survey were questions rating patient trust and satisfaction with their physician and the physician's office. Both of these domains are important in building patient-provider relationships and providing culturally sensitive prenatal care to the Hmong (Culhane-Pera et al., 2003, p. 56-57; Gervais, 1996; Levenick, 2001; Mattson, 1995). These questions were scored using a 5 point Likert-like scale and ranked as: *strongly agree, agree, disagree, strongly disagree, not sure*; (5 to 1, respectively) or *exellent, very good, good, fair, poor* (5 to 1, respectively), as appropriate to the question. Three of the trust questions were inversely scored (i.e., *strongly disagree* equals a score of 5 and *strongly agree* equals 2, although *not sure* still equals 1). These questions include:

- My doctor sometimes pretends to know things when he/she is really not sure.
- My doctor cares more about holding down costs than doing what is needed for my health
- If a mistake was made in my treatment, I believe my doctor would try to hide it from me.

Individual question scores were aggregated into a single trust and satisfaction score (range 18 to 87). The higher the score, the more culturally competent the provider was perceived to be by the patient.

Within the conceptual model, cultural diversity experience has been linked to cultural awareness, knowledge, and behaviors (Doorenbos et al., 2005). Provider cultural diversity experience was captured as a single measure in the provider survey as previously suggested by Doorenbos and colleagues (2005). Provider respondents were asked the number of racial and ethnic groups represented in their patient populations during the previous twelve month period. This variable was categorized as an ordinal measure: 1-4 (coded as 1), 5-9 (coded as 2), or 10 or more (coded as 3) with higher numbers representing greater diversity experience as most physicians would not be able to provide an exact number of ethnic groups in their practice.

Provider gender (coded 0=*male*, 1=*female*), age (collected as interval measure age in years on date of survey), number of completed years in practice, and date of last formal cultural competency training for which they received CME credit, recorded on a 5 point Likert-like scale as *never*, *equal or greater than 5 years prior to the survey, 3 to 4 years prior to the survey, 1 to 2 years prior to the survey*, and *within last six months* (coded 1 to 5, respectively) were also collected because of their potential association with cultural competence.

### *Patient Variables*

Age, education level, and parity are independent variables which literature suggests influence time to prenatal care for Hmong women. For this study, age was defined as number of years since birth calculated from date of birth to date of first prenatal visit. Parity was the number of previous live births and collected from the electronic health record. Participants were asked to record their highest level of education achieved as: *middle school, some high school, GED/high school graduate, some college, college graduate, or post graduate degree,* and coded 0 to 5, respectively.

Acculturation may have a negative impact on neonatal outcomes (Kunstadter, 1987; Rumbaut, 2006, p. 281) as the protective effects of cultural structure diminish. Country of birth and language acculturation was used as proxy measures for level of cultural acculturation. Country of birth was coded as 0, *born in the United States*, or 1, *born elsewhere*. Language acculturation was assessed using five questions rating how frequently participants read, write, think, watch television, listen to the radio, and speak in Hmong at home, measuring responses on a 5 point Likert-like scale, a method previously used by Thom and Tirado (2006). Survey responses were ranked as *never*, *seldom*, *sometimes*, *usually*, and *always* (coded 1 to 5, respectively), and validated during review of documentation in the medical record (e.g., request for interpreter services). Higher scores were associated with lower language acculturation and, this study assumed, lower cultural acculturation. Interpreters were made available to reduce the effect of nonresponse bias for non-English speaking participants (see section on participant recruitment in this chapter). Participation in the pilot study was recorded and coded as 0, nonpilot group, or 1, pilot group.

Table 2

*Study Variables*

Patient Variables

| *Variable* | *Abbrev* | *Description* |
|---|---|---|
| Age | Age | Age at date of delivery |
| Parity | Parity | Number of previous live births |
| Education | PtEduc | Highest level of education achieved |
| Acculturation | PtAccult | Measure of cultural assimilation and adaption |
| Birthplace | Bplace | Country of birth |
| Organizational accommodation | ORG | Perception of services offered to meet cultural needs |
| Patient reported provider cultural competence | tPRPCC [a] | Survey measure rating patient perception of how well providers demonstrate cultural competence and is the sum of CC, PtTrust, and SAT scores. |
| Cultural Competence | CC-Pt | Portion of PRPCC which is the sum of the history taking and explaining domains |
| Patient history | History patient | PRPCC subscale which measures the history-taking domain |
| Patient explaining | Explaining patient | PRPCC subscale which measures the explaining domain |
| Patient Trust | PtTrust | Measure of how trusting patients are of providers |
| Patient Satisfaction | SAT | Score measuring satisfaction with overall care |

*(table continues)*

Provider Variables

| *Variable* | *Abbrev* | *Description* |
|---|---|---|
| Age | PrAge | Provider age at time of survey |
| Gender | PrGender | Sex of the provider |
| Training | Training | Time since last formal cultural competency training |
| Diversity experience | Number | Number of ethnic groups in patient population |
| Years in practice | YrsPractice | Number of years practicing medicine |
| Provider self-assessment of cultural competence | tPSACC [a] | Self-reported cultural competency score based on survey response and includes 3 domains: History taking, Explaining, and behavior demonstration |
| Cultural competence score | CC-P | Portion of the PSACC with is the sum of history taking and explaining domains |
| Provider History taking | History provider | PSACC subscale that measures history-taking domain |
| Provider Explaining | Explaining provider | PSACC subscale that measures the explaining domain |
| Behavior demostration | Behavior | PSACC subscale that measures provider demonstration of culturally competent behaviors |

Dependent Variables

| *Variable* | *Abbrev* | *Description* |
|---|---|---|
| Adequacy of Prenatal Care | APNCU | Sum that uses month of initial prenatal visit and the expected versus actual number of prenatal visits to classify prenatal care as adequate plus, adequate, intermediate, or inadequate |
| Total Adverse Outcome Score | TADV | Sum of variables related to newborn morbidity and mortality recorded on U.S.birth certificates. |

Note. a. Primary predictor variable

## Study Instruments

Cultural competency includes integration and demonstration of the constructs of attitudes, behaviors, diversity, knowledge, skills, awareness, brokering, and sensitivity into the practice of medicine (Campinha-Bacota, 1999; Doorenbos et al., 2005; Lucas et al., 2008; Thom & Tirado, 2006). Lucas et al. (2008) argued that these constructs can be collapsed into three subscales: cultural awareness, cultural knowledge, and cultural skills. Thom and Tirado (2006) aggregated these constructs into two subscales: history-taking (cultural awareness, cultural knowledge, cultural sensitivity, and cultural skill) and explaining (cultural brokering and communication skills) in their validated, parallel study instruments.

The PRPCC instrument was originally developed under a grant from the Health Services and Research Administration, and coauthored by Dr. Miguel Tirado. The original instrument contained 16 items which were the result of recommendations received from two panels of physicians on essential competencies necessary in providing culturally competent healthcare to minority patients, and further refined with the aid of focus groups compromised of racially and ethnically diverse patients. It was then piloted with patients of physicians in San Francisco and San Diego, California. Thom and Tirado (2006) modified the original survey instrument to evaluate the relationship between patient perception and physician self-reported cultural competency. Items related to patient trust and satisfaction were moved to separate scales, and those related to physician behaviors and cultural brokering skills added. The resultant PRPCC 13 item instrument was piloted with a convenience sample of ethnically diverse patients. Principle component analysis demonstrated history-taking (questions 1-5), and explaining (questions 6-13) subscales, and good internal reliability (a Cronbach's alpha of .89 and item scale correlation .49-.74). The PRPCC was moderately correlated to patient satisfaction and trust (*r*=.32, *p*<.001, and *r*=.53, *p*<.001, respectively) and inversely correlated to language acculturation (*r*= -.24, *p*<.001), supporting construct validity. Predictive validity was assessed using baseline PRPCC total and subscale scores and changes in outcome measures: blood pressure, weight, and glycosylated hemoglobin. Cultural competency scores predicted reduction in blood pressure and though not significant, a trend toward reduction in glycosylated hemoglobin. No associations were found between PRPCC scores and patient or physician demographic variables. Example questions from the PRPCC can be found in Table 3. Three interval measures were calculated from the PRPCC: total cultural competency score (range 13 to 65); and subscale scores for both history-taking (range 5 to 25) and explaining (range 8 to 40).

The 18 item PSACC was constructed to measure provider self-reported cultural competency and to accompany the PRPCC, using the same behavior domains (history-taking [5 questions], explaining [8 questions]) and asking physicians to rate how often he/she demonstrated the behavior. The remaining five questions were designed to assess cultural awareness and behavior demonstration. The PSACC demonstrated slightly lower internal reliability and item to scale correlations (Cronbach's alpha=.81, .16-.71, respectively) than the PRPCC. PSACC scores were not correlated with PRPCC scores or health outcome measures in their study (Thom & Tirado, 2006). Four interval measures were calculated from the PSACC: total cultural competency score (range from 13 to 65);

and subscale scores for history-taking (range from 5 to 25), explaining (range 8 to 40), and cultural awareness (range 5 to 25).

For both PRPCC and PSACC instruments, items are ranked on a 5 point Likert-like scales where *never*, *seldom*, *sometimes*, *usually*, and *always* are scored 1 to 5, respectively. The authors transformed the scores to a 0 to 100 scale and reported mean scores 53.7 and 59 on the PRPCC and PSACC, respectively. Example questions from the PSACC can be found in Table 3. See Appendix A for the complete PRPCC and Appendix B for the PSACC survey instruments.

Table 3

*Survey Sample Questions*

| Domain | PRPCC | PSACC |
|---|---|---|
| History Taking | My doctor asks me why I think I got sick | I ask patients why they think they are sick |
| | My doctor talks with me about traditional healing remedies I may use | I talk with patients about traditional healing remedies |
| Explaining | My doctor takes time to help me understand possible side effects of the medications he or she prescribes for me | I take extra time to ensure that my limited and non English speaking patients understand the side effects of the medications prescribe for them |
| | My doctor helps me to ask questions about my condition and treatment | I help patients to ask me questions |

Note: PRPCC= Patient Reported Provider Cultural Competency. PSACC= Physician Self-Assessed Cultural Competency. From “Development and validation of a patient-reported measure of physician cultural competency,” by D. Thom, D. and M. Tirado, 2006, *Medical Care Research and Review*, *63*, p. 636-655. Copyright 2006 Sage Publications. Adapted with permission of the author.

## Data Management

After receiving approval from the Midwest and University Internal Review Boards (IRBs), a report request was submitted to the institution’s Information Services for an extract from the electronic health record which included names and study variables, although it was discovered that most of the patient variables were not available via an electronic extract. Reports received were formatted as Microsoft Excel spreadsheets. Data were inspected for completeness and medical record review conducted to identify missing variables. Healthcare system assigned medical record numbers were used as identifiers for linking study participants to their corresponding medical record. Study participants were assigned unique study ID numbers that linked the data extracted from the medical record with survey responses.

The PRPCC and PSACC surveys were recreated in both Microsoft Word for printing the paper versions of the surveys and in Survey Monkey to accommodate preferences for an electronic survey. Responses from Survey Monkey were exported to an Excel spreadsheet format and matched to data extracted from the medical record using the study ID number. Paper survey results were manually entered into an Excel spreadsheet by the researcher, and again a second time with results compared to minimize entry errors. All variables were coded as noted in the Study Variables section. Adequacy of Prenatal Care Utilization Index (APNCU) scores, and total and subscale cultural competency scores were calculated electronically with formulas in Microsoft Excel to minimize opportunity for manual calculation errors.

All study data were securely stored on password protected computer drives. This researcher continues to maintain all records and control access to the study database.

## Data Analysis

SPSS software version 19 was used to analyze the study data. Descriptive statistics were used to summarize the characteristics of study participants and their associated providers. The following methods were used to analyze the data and answer the research questions as they were deemed appropriate for examining associations between multiple independent variables and dependent variables provided that the data do not violate assumptions related to representativeness, correlation, normal distribution, and linearity. This study assumes an alpha level of 0.05.

The pilot test data were not excluded from analysis. Pilot study participants and their responses were analyzed to ensure that they are representative of the group as a whole prior to combining the pilot and full study data sets. Descriptive statistics (Age, Parity, PtEducation, PtAccult, and Bplace) were used to compare the characteristics of the pilot group and study population. In addition, the average score and range of responses for each survey question was compared between the two groups. No significant differences were found between the two groups so the datasets were combined to answer the research questions below (see Chapter 4 for detailed analysis).

*Research Questions:*

1. Are provider self-reported cultural competency scores predictors of early and adequate prenatal care for Hmong women?

Multiple linear regression was proposed to establish a prediction equation for the relationship between the independent variable, PSACC total score, and the dependent variable APNCU, by measuring percent of variance ($R^2_{\text{change}}$) while controlling for the confounding effects of the other independent variables as described in the Study Variable section above using the following model:

> Age+Parity+PtEducation+PtAccult+Bplace+PrAge+Gender+Training+YrsPractice+ Organization+PtTrust+tPSACC =APNCU

*F*-distribution was used to test the contribution and significance of tPSACC to the overall amount of variance ($R^2$) found in the dependent variable. To improve statistical power, alternate models containing only the variables significantly correlated with the independent and dependent variables were also developed as detailed in Chapter 4.

2. Is patient perception of provider cultural competency a predictor of early and adequate prenatal care for Hmong women?

Similar to research question 1, multiple regression was proposed to establish a prediction equation for the relationship between the independent variable, PRPCC total score, and the dependent variable APCNU by measuring percent of variance ($R^2_{\text{change}}$) while controlling for the confounding effects of the other independent variables as described for research question one above using the model:

> Age+Parity+PtEducation+PtAccult+Bplace+PrAge+Gender+Training+YrsPractice+ Organization+PtTrust+tPRPCC =APNCU

*F*-distribution was used to test the contribution and significance of tPRPCC to the overall amount of variance ($R^2$) found in the dependent variable. To improve statistical power, alternate models containing only the variables significantly correlated with the independent and dependent variables were also developed as detailed in Chapter 4.

3. What is the relationship between provider-reported and patient-reported cultural competency scores?

Pearson correlation coefficient statistics were used to understand the overall relationship between the independent variables PRPCC and PSACC cultural competency total scores. Analysis using multiple linear regression further elucidated the relationship while controlling for provider age and years in practice, and patient trust and satisfaction scores (found significantly associated with either of the cultural competency scores) utilizing the following model:

PrAge+YrsPractice+PtTrust+SAT+tPSACC=tPRPCC

4. Are specific constructs of cultural competency more important in their influence on the use of early and adequate prenatal care in the Hmong population?

Multiple linear regression was proposed to establish a prediction equation for the relationship ($R^2_{\text{change}}$) between the independent variable, PSACC subscores (history-taking, explaining, behavior demonstration) and PRPCC subscores (history-taking, and explaining), and the dependent variable APNCU index score, while controlling for the confounding effects of the other independent variables as described in the Study Variable section above using the following model:

> Age+Parity+PtEducation+PtAccult+Bplace+PrAge+Gender+Training+YrsPractice+ Organization+PtTrust+ (CC, CC-P, HistoryPatient, ExplainingPatient, HistoryProvider, ExplainingProvider, Behavior) =APNCU

*F*-distribution was used to test the contribution and significance of each of the subscores (independently) to the overall amount of variance ($R^2$) found in the dependent variable APCNU. To improve statistical power, alternate models containing only the variables significantly correlated with each of the subscores or APCNU were developed as detailed in Chapter 4.

5. Is there a relationship between cultural competency scores and adverse infant health outcomes?

Multiple linear regression was proposed to predict the relationship between the independent variables (tPRPCC and tPSACC scores) and the dependent variable, total adverse infant health outcome score (TADV), while controlling for the effects of the independent variables described in the Study Variable section above using the following model:

> Age+Parity+PtEducation+PtAccult+Bplace+PrAge+Gender+Training+YrsPractice+ Organization+PtTrust+tPRPCC+tPSACC=TADV

To improve statistical power, alternate models containing only the variables significantly correlated with the tPRPCC, tPSACC, or TADV were developed as detailed in Chapter 4. *F*-distribution was used to test the contribution and significance of both tPRPCC and tPSACC to the overall amount of variance ($R^2$) found in the dependent variable TADV. Because TADV was skewed to the left (as would be expected as most births are uneventful), TADV scores were re-categorized as 0, 1, and 2 or more adverse events (versus unlimited) in an effort to achieve a more normal distribution.

## Protection of Participants Rights

As an employee of Midwest healthcare system and under Federal HIPAA regulations, this researcher was obliged to protect the health information of patient participants. Only the information required for this study was extracted from the medical record, and all information obtained stored securely in password protected databases, or in locked cabinets. All records are under the control of this researcher.

Prior to conducting the Pilot study approval was received from both the Midwest IRB (2695-2E) and the Walden University IRB (1-01-2010-0316471). Modifications to the methods made in response to Pilot results were also presented and approved by the IRBs before the surveys were mailed to the potential participants.

Data used for this study were collected through noninvasive means as part of routine patient care or through survey responses. This study qualified for expedited IRB review because the research was limited to the perception, cultural health beliefs, and social behaviors of individuals or a group (IRB Expedited Review form, 2005); however, because the population was deemed a vulnerable population, this study was subject to full IRB review. Data were collected through surveys, and retrospective chart review, and there was minimal risk to participants. Confidential patient satisfaction surveys are routinely conducted for patients admitted to a Midwest healthcare system facility. This study extended the collection of patient satisfaction information to perception of organization accommodation and provider cultural competence.

As noted previously, although this study targeted a minority population, it is anticipated that most young Hmong are English literate. Informed Consent documents were provided to all participants (in English only) as cover sheets to the paper survey documents, and as the initial screen which needed to be acknowledged for the electronic survey format. The informed consent statement included: explanation of the nature and purpose of the study; risks and benefits to the participants; language regarding voluntary participation; costs and compensations applicable to participants; a statement regarding confidentiality of responses; and principle investigator contact information. Informed consent language concluded with the following statement: “CONSENT to PARTICIPATE: To voluntarily agree to take part in this study, sign on the line below. By doing this, you are acknowledging that you have read and understand the study well enough to participate. Return this signed form with your completed survey to the researcher using the included self-addressed, stamped envelope” (or click the 'NEXT' button in the electronic version). Informed consent was assumed for all surveys voluntarily submitted by participants.

## Summary

The U.S. OMH (1999) identified cultural competence as one of the critical factors affecting health care access and patient care services to the culturally and ethnically diverse patient populations in the United States, yet few studies have been done examining the relationship between cultural competence and health outcomes (Beach et al. 2005) and none related to birth outcomes in the Hmong women of Minnesota.

This study used a cross-sectional design, data collected via patient and provider surveys and retrospective chart review to assess the relationship between cultural competency scores and birth outcomes. Results of this study are outlined in Chapter 4 and implications in Chapter 5.

# CHAPTER 4: RESULTS

## Introduction

This study sought to explore the relationship between culturally competent health care delivery and health outcomes in diverse patient populations. As outlined in Chapter 3, Hmong surnames were used to identify and extract a line list of potential study participants from an electronic health record database to answer the research questions posited in Chapter 1. The results of the study are outlined in Chapter 4 beginning with (a) a summary of pilot study findings, followed by (b) changes to the study methodology and protocol, (c) variable review, and full study (d) descriptive data, (e) univariate, and (f) multivariate regression analysis summaries, (g) findings for each research question, and, finally, (h) concluding statements.

## Pilot Study

As outlined in Chapter 3, an initial pilot study using a test-retest method was conducted to assure validity of the patient survey tool with the study population. Because the provider survey tool had been tested previously, it was assumed that the provider tool was valid across physician groups and was not included in the pilot study. After receiving approval from the Midwest and Walden University Internal Review Boards (IRBs), the 18 Hmong surnames were used to extract birth records from January 1 to December 31, 2008, resulting in 146 identified potential participants, of which 80 participants were randomly selected from the first 6 months of 2008 as outlined in Table 4.

Table 4

*Summary of Pilot Respondents by Hospital*

| Pilot Participants | Hospital<br>Number (%) | | | |
|---|---|---|---|---|
| | A | B | C | D |
| Potential participants | 20 (14) | 19 (13) | 78 (53) | 29 (20) |
| Actual potential participants [a] | 16 (13) | 14 (12) | 67 (55) | 22 (18) |
| Respondents | 3 (19) | 4 (29) | 9 (13) | 9 (41) |
| Retest | 1 (33) | 2 (50) | 2 (22) | 2 (22) |

*Note*. a. Total potential participants minus those who moved, were non-Hmong, or requested not to participate.

The proposed methodology outlined in Chapter 3 was modified by the Midwest IRB, which restricted contact with the patient population to two mailings, no personal contacts, and the inclusion of an introduction letter signed by a Midwest healthcare system physician. Paper surveys were mailed to the 80 potential participants along with the IRB approved pilot patient consent form. A second mailing to nonrespondents was completed 3-4 weeks after the first mailing and retest surveys sent to initial respondents at that time also. An electronic survey option using Survey Monkey was made available.

Because there were fewer Hmong births than expected and the initial pilot study had a low response rate, the pilot was expanded to include all Hmong births in 2008 to increase the sample size for the test-retest validation. Another mailing to the remaining 66 potential participants was completed following the same protocol as the initial pilot study. There were a total of 118 possible participants in the final population after accounting for patients who moved, were not Hmong, or requested to be removed from the study (see Table 5).

To validate the number of births identified with the pilot study methodology, a data extraction was requested from the publicly available Minnesota birth certificate data. Using the 18 Hmong names plus birth mothers born in Laos, Cambodia, or Thailand or who indicated Other Asian as their race, the MN Department of Health found 1561 records; eight were nonhospital births; 259 were from the four Midwest metropolitan hospitals (197 of them from Hospital D); and almost half of all Hmong births occurred at two non-Midwest hospitals. Due to HIPAA regulations, the line list was not made available for comparison; however, based on this information, the surname methodology appeared adequate for the purposes of this study. It was also discovered at this time that Minnesota did not adopt the standard U.S. birth certificate until March 2010 so outcome data for this study was not available through birth certificate records.

Table 5

*Summary of Prospective Participants*

| Pilot results | 1st mailing | 2nd mailing | Total | Percent |
|---|---|---|---|---|
| Total prospective participants | 80 | 66 | 146 | 100% |
| Returned as address unknown | 16 | 9 | 25/146 | 17% |
| Not Hmong | 1 | 1 | 2/146 | 1.3% |
| Hmong women requested to be removed from study | 1 | 0 | 1/146 | 0.7% |
| Remaining prospects | 62 | 56 | 118/146 | 81% |
| Respondents | 14 | 11 | 25/118 | 21% |
| Retest responses | 4 | 3 | 7/25 | 28% |

### *Pilot Results*

Survey responses were received from Hmong women delivering at all four hospitals. Hospital A is located in Minneapolis, MN, and is the largest of the four hospitals. Hospital D is one of the primary hospitals in St Paul, MN, and hospitals B and C are community hospitals located in the northern metropolitan area. Only two responses (one test and one retest) were received through Survey Monkey, and both were incomplete and excluded from the study. The final response rate for the pilot study was 21% (25/118) with 28% (7/25) of initial respondents submitting retest surveys for an overall response rate of 7% (7/118) for the test-retest portion of the pilot. The average age at time of delivery was 27 (range 17-44).

Because there were few retest responses, the overall correlation found in the test-retest analysis cannot be used to assess the reliability of the study instrument with the study population. Little if any correlation was found between test and retest patient satisfaction or total PRPCC scores (0.28 and 0.17, respectively); however, some of the subscales appear to demonstrate higher reliability. There was moderate to high correlation between test and retest organizational competency (ORG), provider cultural competence (CC), and patient trust (TRUST) scores, and very high correlation between acculturation scores (see Table 6).

Table 6

*Correlation (r) Between Test and Retest Responses*

| Domain | *r* |
|---|---|
| Organizational accommodation | 0.62 |
| Cultural competence | 0.57 |
| Patient trust | 0.72 |
| Patient satisfaction | 0.28 |
| Total PRPCC | 0.17 |
| Acculturation | 0.94 |

### *Pilot Conclusions*

The number of Hmong births in the Midwest healthcare system was significantly smaller than expected, although the methodology using surnames was adequate for identifying the study population. The pilot sample size was small and the response rate low so no conclusions regarding the overall reliability of the PRPCC survey could be drawn, though several of the subscales appear to be reliable. Previous research has demonstrated that a minimum 50% response rate is needed even with a reliable instrument in order to get actionable patient satisfaction data (Barkley & Furse, 1996). The restrictions on personal contact required by the Midwest IRB limited the response rate. Pilot results indicated that modification to the study methods were needed to assure adequate response rate and statistically significant results.

## Study Summary

Based on the pilot results, the following changes to the study protocol were made and approved by both the Midwest and Walden University IRBs:

- The recruitment procedure was modified to include a postcard contact, one survey mailing and follow-up recruitment phone call when necessary to verify receipt of survey.
- No second survey mailing was done unless requested by the patient during the follow up phone call.
- The study time period was expanded to include all Hmong births between January 1, 2009 and September 30, 2010.
- The patient consent and cover letter was revised, removing the previously required Participant Bill of Rights table.
- Infant health outcomes were manually extracted from the electronic health record
- Because patient education was not included on the pilot survey, this variable was extracted from the Minnesota Pregnancy Assessment form in the electronic health record for the pilot participants. The variable was recategorized as less than 12th grade education and high school or greater prior to data analysis.
- Parity was reduced from an indefinite number of categories based on the number of live births within the study population to three new categories (0, 1, and greater than 1).

- Mothers giving birth to multiples were counted only once, randomly selecting the first birth from the set of twins or triplets.

Although the electronic survey was not successful in the pilot, it was deemed important and offered to participants as an option for the full study. A second electronic survey was created for the providers and a link included on the provider cover letter.

### *Descriptive Data*

There were a total of 338 potential participants meeting study criteria on the initial line list received, of whom 37 were excluded because they had moved (23) or were not Hmong (14). Of the remaining 301 possible participants, almost half (49%) were from Hospital D, and the others distributed among the other three hospitals in proportions similar to those found in the pilot study. The study response rate was 18% (55/301) with 49% of participants having received care at Hospital D (see Table 7). Before analysis the pilot (*n*=25) and study (*n*=55) responses were merged and included 80 total participants.

As noted in Table 8, 58% of participants received adequate prenatal care as measured by the APNCU index (adequate and adequate plus categories). Forty-two percent of women received inadequate or no prenatal care. The majority of women (90%) delivered after 37 weeks; however, 10% had preterm births and low birthweight infants (see Table 8). One woman delivered a very low birthweight infant before 20 weeks gestation and this infant subsequently died.

Table 7

*Summary of Study Participants by Hospital*

| | Hospital Total (%) | | | |
|---|---|---|---|---|
| Study results | A | B | C | D |
| Total prospective participants (*n*=338) | 60 (18) | 38 (11) | 73 (22) | 167 (49) |
| Returned as address unknown | 4 | 1 | 3 | 15 |
| Not Hmong | 4 | 5 | 2 | 3 |
| Total potential participants (*n*=301) | 52 (17) | 32 (11) | 68 (23) | 149 (49) |
| Study Respondents (*n*=55) | 12 | 3 | 13 | 27 |
| Pilot participants (*n*=25) | 3 | 4 | 9 | 9 |
| Total participants (*n*=80) | 15 (19) | 7 (9) | 22 (27) | 36 (45) |
| Provider respondents (*n*=19) | 6 (31) | 2 (11) | 2 (11) | 9 (47) |
| Patient/provide response match (*n*=24) | 6 | 2 | 2 | 14 |

Table 8

*Birth Outcomes*

| Outcomes | | Percent (No.) |
|---|---|---|
| Prenatal care | Adequate | 58 (46) |
| | Inadequate | 41 (33) |
| | No care | 1 (1) |
| Gestational age | >37 wks | 90 (72) |
| | <37 wks | 10 (8) |
| Birthweight | Normal >2500 gr | 89 (71) |
| | LBW <2500 gr | 10 (8) |
| | VLBW <1500 gr | 1 (1) |

### *Pilot Comparison*

The average age (26.9 years), acculturation score (15 out of 25), and parity were not significantly different between the pilot and study participants. Pilot respondents were more likely to be foreign-born and have less than a high school education than participants in the study, although only the education difference was statistically significant (see Table 9). The response scores for all domains (organizational accommodation, provider cultural competence behaviors, patient trust, patient satisfaction, and total patient reported cultural competency) and health outcomes (total adverse outcomes and adequacy of prenatal care) were also not different between the pilot and study survey respondents (see Table 10). Because the two groups were determined to be similar, the pilot and study participants were combined before final analysis. In the combined population, 60% of participants were born outside of the U.S., 85% had at least a high school education, and for 71% this was their first or second live birth (parity ≤ to 1).

Table 9

*Participant Demographics*

| | | | 95% *CI* of the Difference | | |
|---|---|---|---|---|---|
| | Pilot [c] | Study [d] | Lower | Upper | *t*-test |
| Age at time of birth: | | | | | |
| Average | 26.9 | 26.9 | -2.93 | 2.66 | -.09 |
| Range | 17-44 [a] | 18-38 | | | |
| Born U.S. (%) | 7 (28%) | 25 (45%) | -.08 | .39 | 1.37 [b] |
| Acculturation score mean | 15.08 | 15.30 | -1.51 | 2.34 | .43 |
| Parity: Mean | 1.56 | 1.38 | -.32 | .51 | .46 |
| Pt Education: high school or greater | 16 (64%) | 52 (95%) | .10 | .52 | 2.97** |

*Note.* a. All study participants were >18 yrs of age at time of study. b. Data not collected on pilot survey, collected from electronic health record. **p<.01. c. Pilot *n*=25. d. Study *n*=55.

Table 10

*Patient Survey Responses*

| | | | | | 95% *CI* for Difference | | |
|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | Lower Bound | Upper Bound | t test |
| ORG | Study [a] | 7.42 | 5.05 | .68 | -1.70 | 3.11 | .59 |
| | Pilot [b] | 8.13 | 4.68 | .95 | -1.65 | 3.06 | .60 |
| CC | Study | 42.27 | 12.85 | 1.73 | -3.70 | 9.40 | .87 |
| | Pilot | 45.12 | 15.25 | 3.05 | -4.24 | 9.94 | .81 |
| PtTrust | Study | 18.51 | 5.16 | .70 | -3.98 | 1.37 | -.97 |
| | Pilot | 17.20 | 6.40 | 1.28 | -4.26 | 1.64 | -.90 |
| SAT | Study | 43.78 | 9.66 | 1.30 | -6.32 | 3.16 | -.66 |
| | Pilot | 42.20 | 10.33 | 2.07 | -6.51 | 3.34 | -.65 |
| tPRPCC | Study | 104.56 | 22.09 | 2.98 | -11.23 | 11.14 | -.01 |
| | Pilot | 104.52 | 25.78 | 5.16 | -12.07 | 11.98 | -.01 |
| APNCU | Study | 2.53 | 1.10 | .15 | -.76 | .35 | -.75 |
| | Pilot | 2.32 | 1.25 | .25 | -.79 | .38 | -.71 |
| T ADV | Study | .55 | 1.36 | .18 | -.80 | .35 | -.78 |
| | Pilot | .32 | .75 | .15 | -.70 | .25 | -.95 |

*Note*. a. *n*=55 for all Study variables. b. *n*=24 for Pilot ORG, and *n*=25 for all other Pilot variables. ORG= organizational accommodation; CC= cultural competency score; PtTrust= patient trust; SAT= patient satisfaction; tPRPCC= total patient reported provider cultural competency score; APNCU= adequacy of prenatal care utilization score; T ADV= total adverse outcomes score

### *Provider Participants*

Fifty-five healthcare providers were associated with the patient participants, of which 19 (35%) submitted a completed Provider Self-Assessment of Cultural Competency (PSACC) survey. These 19 provided care to 24 patients distributed between all four hospitals with 47% at Hospital D, 31% at Hospital A, and 11% each at Hospitals B and C (see Table C1). One provider had cared for four patients, 2 had two patient participants each, and the remaining 16 had one patient each. Respondents were more likely to be females (73%) in their midforties with almost 15 years of experience and 5-9 ethnic groups in their patient populations (68%). Male providers were older on average (age 51) with longer years of practice than their female counterparts (21.7 vs. 14.5 years, respectively). Most providers reported that they had never had formal cultural competency training or that their training had been done 5 years or more ago (42% and 15.8%, respectively). Only 5 of the 19 had received formal cultural competency training 1 to 4years prior to the survey (see Table C1). Survey responses were not significantly different between male and female providers (see Table 11).

Table 11

*Provider Response Scores by Gender*

| Survey Domain | | Mean | Std. Deviation | Std. Error | 95% *CI* for Difference Lower Bound | 95% *CI* for Difference Upper Bound | t test |
|---|---|---|---|---|---|---|---|
| History taking | Male | 17.00 | 4.30 | 1.92 | -3.03 | 3.16 | -.05 |
| | Female | 17.07 | 2.37 | .63 | -5.31 | 5.17 | -.04 |
| Explaining | Male | 32.00 | 2.55 | 1.14 | -2.80 | 3.80 | .32 |
| | Female | 31.50 | 3.13 | .84 | -2.72 | 3.72 | .35 |
| Cultural competency subscore | Male | 49.00 | 5.61 | 2.51 | -5.06 | 5.91 | .17 |
| | Female | 48.57 | 4.78 | 1.28 | -6.41 | 7.26 | .15 |
| Behavior demo | Male | 16.00 | 4.30 | 1.92 | -7.01 | 5.87 | -.19 |
| | Female | 16.57 | 6.26 | 1.67 | -6.22 | 5.073 | -.22 |
| tPSACC | Male | 65.00 | 9.57 | 4.28 | -9.33 | 9.05 | -.03 |
| | Female | 65.14 | 7.95 | 2.13 | -11.78 | 11.50 | -.03 |

*Note*. Male *n*= 5; Female *n*= 14

### *Survey Questions*

There were 13 parallel questions included on the patient reported (PRPCC) and provider self-assessment (PSACC) surveys that asked about specific provider behaviors during a healthcare interaction. Participants were asked to rate each question using a 5point scale with 1 being *Never* and 5 being *Always*. These cultural competency subscores (CC for patient and CC-P for provider) were moderately but negatively correlated (see Table D4) which was unexpected and may indicate a significant lack of communication during the healthcare encounter. Responses to 6 of the 13 questions were significantly different between patients and providers:

- My doctor talks with me about medications I use other than the ones he/she prescribes; and
- When discussing diagnosis and treatment related to my condition, my doctor asks if I would like to include family members and friends in the discussion.
- My doctor asks if I understand his/her instructions and if not repeats them when necessary.
- My doctor helps me to ask questions about my condition and treatment.
- My doctor encourages me to stop him or her when I am confused.
- My doctor helps me make decisions about my treatment

Providers rated themselves higher than patients on all of these questions and significantly higher overall (p=.00; see Table 12 and Tables C2-C3). These discrepancies may indicate areas which require further exploration in future studies.

Table 12

*Cultural Competency Questions*

| Question (Scale of 1-5) | Mean Provider score | Mean Patient score | 95% *CI* of the Difference |  | t-test |
|---|---|---|---|---|---|
|  |  |  | Lower | Upper |  |
| 1. My doctor asks me why I think I got sick. | 3.26 | 2.96 | -.90 | .30 | -1.02 |
| 2. My doctor talks with me about medications I may use other than the ones he/she prescribes. | 4.37 | 3.59 | -1.23 | -.32 | -3.38** |
| 3. My doctor talks with me about traditional healing remedies I may use. | 3.00 | 2.59 | -.98 | .19 | -1.36 |
| 4. My doctor asks if I seek advice from other family members and friends in making decisions about my health care. | 2.89 | 2.43 | -1.00 | .08 | -1.74 |
| 5. When discussing diagnosis and treatment related to my condition, my doctor asks if I would like to include family members in the discussion. | 3.53 | 2.70 | -1.58 | -.11 | -2.29* |
| 6. My doctor takes time to help me understand possible side effects of the medications he or she prescribes for me. | 4.16 | 3.88 | -.73 | .14 | -1.38 |
| 7. My doctor informs me of the resources in my local community where I can find help. | 2.68 | 2.81 | -.50 | .73 | .37 |
| 8. My doctor asks if I understand his/her instructions and if not repeats them when necessary. | 4.42 | 3.87 | -.96 | -.14 | -2.66** |

*(table continues)*

| Question (Scale of 1-5) | Mean Provider score | Mean Patient score | 95% *CI* of the Difference | | *t*-test |
|---|---|---|---|---|---|
| | | | Lower | Upper | |
| 9. My doctor asks if I have other questions or concerns before I leave the office. | 4.68 | 4.45 | -.55 | .09 | -1.43 |
| 10. My doctor helps me to ask questions about my condition and treatment. | 4.26 | 3.69 | -1.05 | -.11 | -2.46* |
| 11. My doctor helps me answer the questions he or she asks. | 3.32 | 3.46 | -.50 | .78 | .44 |
| 12. My doctor encourages me to stop him or her when I am confused. | 4.00 | 3.31 | -1.26 | -.14 | -2.50* |
| 13. My doctor helps me make decisions about my treatment. | 4.11 | 3.42 | -1.16 | -.22 | -2.91** |
| Total CC Score | 48.68 | 43.16 | -9.34 | -1.78 | -2.92** |

*Note*. Provider *n*= 19; Patient *n*= 79. From "Development and validation of a patient-reported measure of physician cultural competency," by D. Thom, D. and M. Tirado, 2006, *Medical Care Research and Review*, *63*, p. 636-655. Copyright 2006 Sage Publications. Adapted with permission of the author. **p*<.05, ***p* <.01.

A paired *t* test was also used to examine the 23 patient-provider survey responses to the 13 questions (see Table 13 and Tables C4-C5). On limiting the analysis to the 23 patient surveys (instead of all as above), Question 1 was moderately but negative correlated, again suggesting discordance between patient and provider perceptions regarding communication. One question (My doctor informs me of the resources in my local community where I can find help) was significantly different (*p*=.03) between patient and provider responses which may indicate another opportunity needing further investigation.

Table 13

*Paired Patient/Provider Survey Responses*

| Question (Scale of 1-5) | Correlation | 95% *CI* of the Difference Lower | 95% *CI* of the Difference Upper | t-test |
|---|---|---|---|---|
| 1. My doctor asks me why I think I got sick. | -.44* | -.80 | 1.06 | .29 |
| 2. My doctor talks with me about medications I may use other than the ones he/she prescribes. | -.19 | -.37 | .98 | .94 |
| 3. My doctor talks with me about traditional healing remedies I may use. | .02 | -.41 | 1.19 | 1.01 |
| 4. My doctor asks if I seek advice from other family members and friends in making decisions about my health care. | .14 | -.55 | .90 | .50 |
| 5. When discussing diagnosis and treatment related to my condition, my doctor asks if I would like to include family members in the discussion. | -.04 | -.65 | 1.00 | .44 |
| 6. My doctor takes time to help me understand possible side effects of the medications he or she prescribes for me. | .26 | -.29 | .72 | .89 |
| 7. My doctor informs me of the resources in my local community where I can find help. | .38 | .06 | 1.33 | 2.29* |
| 8. My doctor asks if I understand his/her instructions and if not repeats them when necessary. | .42* | -.067 | .94 | 1.80 |

*(table continues)*

| Question (Scale of 1-5) | | 95% *CI* of the Difference | | |
|---|---|---|---|---|
| | Correlation | Lower | Upper | t-test |
| 9. My doctor asks if I have other questions or concerns before I leave the office. | .14 | -.22 | .48 | .77 |
| 10. My doctor helps me to ask questions about my condition and treatment. | .00 | -.73 | .64 | -.13 |
| 11. My doctor helps me answer the questions he or she asks. | .37 | -.20 | .99 | 1.37 |
| 12. My doctor encourages me to stop him or her when I am confused. | -.21 | -1.01 | .40 | -.89 |
| 13. My doctor helps me make decisions about my treatment. | .00 | -1.00 | .22 | -1.34 |

Note: *n*=23 paired responses. From "Development and validation of a patient-reported measure of physician cultural competency," by D. Thom, D. and M. Tirado, 2006, *Medical Care Research and Review*, *63*, p. 636-655. Copyright 2006 Sage Publications. Adapted with permission of the author.
**p*<.05.

## Univariate Analysis

Correlational analysis was done to assess the relationships between the study variables and results are summarized in the following sections.

### *Survey Domain Variables*

The parallel surveys were designed to measure several domains deemed important in delivering culturally competent care: history, explaining (common to both surveys), behavior demonstration (PSACC), trust, and satisfaction (PRPCC). The history and explaining domains when added together result in the cultural competence subscore. As would be expected, the provider assessed cultural competence subscore (CC-P) was significantly correlated with both the history-taking and explaining domains (since CC-P is the sum of these two domains). The total provider self-assessment cultural competence score (tPSACC) was positively correlated with all of the component subscores (history-taking, explaining, behavior demonstration and CC-P; see Table D1). This again would be expected. The explaining domain scores appear to increase with the number of ethnic groups represented in the patient population (.51, *p*=.03) which is interesting, however, these scores were only weakly correlated with tPSACC scores, and not at all with history-taking or demonstration of culturally competent behaviors. Behavior demonstration was highly correlated with the tPSACC (.81, *p*=.00) but none of the other provider variables.

### *Patient Survey Domain Variables*

As found in the provider survey, all domain subscores (cultural competence, patient trust, and patient satisfaction) were moderately to highly correlated with the total patient-reported cultural competency (tPRPCC) scores but unlike the provider survey, all three domain subgroups were significantly associated with one another (see Table D2). Both patient satisfaction and patient trust appeared to be associated with patient perception of cultural competency (CC; 47, *p*=.00 and 38, *p*=.00, respectively), history-taking (.31, *p*=.01 and .42, *p*=.00, respectively), and explaining (.39, *p*=.00 and .45, *p*=.00, respectively). Total PRPCC scores appear highly correlated with the CC (.88, *p*=.00) and satisfaction (.79, *p*=.00) scores and moderately with trust scores (.62, *p*=.00).

### *Summary Survey Domains*

No correlations were found between organizational accommodation and any of the patient or provider survey domains, nor were patient satisfaction, patient trust, or total PRPCC scores associated with any of the provider survey domains (see Table D4). There was a moderate but negative correlation (-.60, *p*=.00; *n*=24) between the patient perception of provider cultural competence (CC) and the provider self-assessment of cultural competence (CC-P). The patient reported history-taking (.91, *p*=.00) and explaining (.96, *p*=.00) domains were highly correlated with the CC score. Similarly, but not quite as strongly, the provider history-taking (.82, *p*=.00) and explaining (.87, *p*=.00), and CC-P scores were associated. Patient reported history-taking scores were also moderately, though inversely, correlated with the provider history (-.63, *p*=.00), explaining (-.44, *p*=.03), and CC-P (-.63, *p*=.00) scores. It was interesting that the patient reported explaining domain scores were not correlated with the provider explaining scores; however, they were associated with both provider history-taking (-.48, *p*=.02) and CC-P (-.51, *p*=.01) scores.

### *Provider Demographic Variables*

Provider age was highly correlated with years in practice (.84, *p*=.00), which would be expected, and moderately associated with tPSACC (.52, *p*=.02) suggesting that older providers may see themselves as more culturally competent than their younger peers. Female providers were younger (-.41, *p*=.00) with fewer years in practice (-.40, *p*=.00). No significant relationships were found between provider cultural competence training and the other provider variables, nor were correlations identified between any of the provider variables and the dependent variable total adverse outcome (TADV).

### *Patient Demographic Variables*

As would be expected, increasing patient age was associated with greater number of live births (higher parity) and being foreign-born (.58, *p*=.00; -.34, *p*=.00; respectively), and patients born in the United States had slightly lower parity (-.25, *p*=.02). Also not surprising was that those born in the United States reported higher acculturation scores (.30, *p* =.01); however, the more acculturated patients tended to rate organizational accommodation lower (-.32, *p*=.00) which is an interesting finding worthy for further investigation. Patient trust also seemed to increase with higher patient education (.22, *p*=.05). The correlation data also suggests that older patients may be more likely to receive adequate prenatal care (.23, *p*=.04), though no association was found between parity and APNCU.

### *Summary Demographic Variables*

Provider training had a fairly strong negative association with patient age (-.70, *p*=.00). Although this is interesting, it is difficult to interpret since the sample size was small and no relationship between provider age and reported training was apparent. This may again be a finding which could be included in future research. No other relationships were found between patient and provider demographic variables (see Table D3).

### *Outcome Variables*

There was a moderate positive correlation between both provider explaining (.55, *p*=.01) and CC-P (.56, *p*=.01) scores and the dependent variable Adequacy of Prenatal Care Utilization (APNCU). There appeared to be a small but significant positive association between patient age and APNCU (.23, *p*=.04), and a significant negative relationship between the two outcome variables APNCU and the total adverse outcome (TADV) scores (-.28, *p*=.01) suggesting that early and adequate prenatal care is associated with fewer adverse outcomes as captured on the standard U.S. birth certificate.

## Multivariable Regression

### *Research Questions*

1. Are provider self-reported cultural competency scores predictors of early and adequate prenatal care for Hmong women?

The first research question sought to establish whether provider self-reported cultural competency scores were predictors of early and adequate prenatal care for Hmong women. Multiple regression was used to test for a relationship between the independent variable, PSACC total score, and the dependent variable APNCU (adequacy of prenatal care utilization as measured by the APNCU index), while controlling for the confounding effects of the covariate variables (patient age and provider age) found significantly correlated with either the dependent or independent variables in the correlation analysis (see Table 14). $F$ distribution was used to test the contribution and significance of tPSACC to the overall amount of variance ($R^2$) found in the dependent variable (see Tables 15, 16, and E1). Years of practice was not included in the analysis as it was more strongly correlated to provider age (already included in the model) than to tPSACC (.84, p=.00; .54, p=.01; respectively) (see Table 14), though adding did not change the predictive equation (data not shown).

In this study, provider self-reported cultural competency scores (tPSACC) were not predictors of early and adequate prenatal care in the Hmong when using the model outlined above; however, the small sample size due to provider respondents limited the statistical power. With two predictor variables and 24 samples, there was only a 44% chance of finding a moderate effect, although a 79% chance of finding a large effect.

Table 14

*Research Question # 1 Correlations*

| | | APNCU | Age | PrAge | YrsPractice | tPSACC |
|---|---|---|---|---|---|---|
| APNCU | | 1 | .23* | .06 | -.10 | .12 |
| | *N* | 80 | 80 | 76 | 75 | 24 |
| Age | | .23* | 1 | .01 | .01 | -.19 |
| | *N* | 80 | 80 | 76 | 75 | 24 |
| PrAge | | .05 | .01 | 1 | .84** | .54** |
| | *N* | 76 | 76 | 76 | 75 | 24 |
| YrsPractice | | -.10 | .01 | .84** | 1 | .44* |
| | *N* | 75 | 75 | 75 | 75 | 24 |
| tPSACC | | .12 | -.19 | .54** | .44* | 1 |
| | *N* | 24 | 24 | 24 | 24 | 24 |

Note. *. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed)

Table 15

*Research Question #1 Model Summary*

| | | | | | Change Statistics | | | |
|---|---|---|---|---|---|---|---|---|
| Model | *R* | *R²* | Adjusted *R²* | *SE* of the Estimate | *R²* Change | *F* Change | df1 | df2 |
| 1 | .15[a] | .02 | -.07 | 1.22 | 2% | .25 | 2 | 21 |
| 2 | .16[b] | .03 | -.12 | 1.25 | 0% | .03 | 1 | 20 |

Note. *n*=24. a. Predictors: (Constant), PrAge, Age. b. Predictors: (Constant), PrAge, Age, tPSACC. ***F* change is significant at the 0.01 level. *. *F* change is significant at the 0.05 level.

Table 16

*Research Question #1 Coefficients*

| Model | | *B* | *SE* *B* | β | *t* | 95.0% *CI* for *B* Lower Bound | Upper Bound | Collinearity Statistics Tolerance | VIF |
|---|---|---|---|---|---|---|---|---|---|
| 1 | (Constant) | 1.58 | 1.78 | | .89 | -2.12 | 5.28 | | |
| | Age | -.00 | .04 | -.00 | -.02 | -.08 | .08 | 1.00 | 1.00 |
| | PrAge | .02 | .03 | .15 | .71 | -.04 | .09 | 1.00 | 1.00 |
| 2 | (Constant) | 1.23 | 2.68 | | .46 | -4.37 | 6.83 | | |
| | Age | .00 | .04 | .01 | .02 | -.08 | .08 | .95 | 1.06 |
| | PrAge | .02 | .04 | .13 | .47 | -.06 | .10 | .69 | 1.45 |
| | tPSACC | .01 | .04 | .05 | .18 | -.08 | .10 | .67 | 1.50 |

Note. *n*=24. a. Dependent Variable: APNCU. ***t* is significant at the 0.01 level. *. *t* is significant at the 0.05 level.

2. Is patient perception of provider cultural competency a predictor of early and adequate prenatal care for Hmong women?

Similar to Research Question 1, multiple regression was used to establish a prediction equation for the relationship between the total PRPCC score and the dependent variable APNCU, while controlling for the confounding effects of the independent variables patient age (AGE), trust (PtTrust), and satisfaction (SAT) which were significantly associated with either PRPCC or APNCU (see Table 17). Sample size was larger (*n*=80) than Question 1 because analysis used patient variables only, and there was 93% power for finding a medium effect and 99.9% power for finding a large effect.

Using this model, PRPCC was not predictive of APNCU (see Tables 18, 19, and E2), adding only 2% to the overall variance in APNCU.

Table 17

*Research Question #2 Correlations*

| | APNCU | tPRPCC | Age | PtTrust | SAT |
|---|---|---|---|---|---|
| APNCU | 1 | -.092 | .234* | .026 | -.028 |
| tPRPCC | -.092 | 1 | -.137 | .620** | .788** |
| Age | .234* | -.137 | 1 | .014 | -.115 |
| PtTrust | .026 | .620** | .014 | 1 | .371** |
| SAT | -.028 | .788** | -.115 | .371** | 1 |

Note. *n*=80. *. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Table 18

*Research Question #2 Model Summary*

| | | | | | Change Statistics | | | |
|---|---|---|---|---|---|---|---|---|
| Model | $R$ | $R^2$ | Adjusted $R^2$ | *SE* of the Estimate | $R^2$ Change | $F$ Change | df1 | df2 |
| 1 | .27[a] | .07 | .02 | 1.14 | 7% | 1.37 | 4 | 70 |
| 2 | .31[b] | .10 | .03 | 1.14 | 2% | 1.81 | 1 | 69 |

Note. *n*=75. a. Predictors: (Constant), PrAge, PtTrust, Satisfaction, YrsPractice. b. Predictors: (Constant), PrAge, PtTrust, Satisfaction, YrsPractice, tPRPCC. c. Dependent Variable: APNCU. ***F* change is significant at the 0.01 level. *. *F* change is significant at the 0.05 level.

Table 19

*Research Question #2 Coefficients*

| | | | | | | 95.0% *CI* for *B* | | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|---|
| Model | | *B* | *SE B* | β | t | Lower Bound | Upper Bound | Tolerance | VIF |
| 1 | (Constant | .71 | 1.20 | | .60 | -1.68 | 3.11 | | |
| | PtTrust | .02 | .03 | .07 | .58 | -.04 | .07 | .87 | 1.15 |
| | Satisfaction | -.01 | .02 | -.08 | -.67 | -.04 | .02 | .84 | 1.19 |
| | YrsPractice | -.06 | .03 | -.47 | -2.21* | -.11 | -.01 | .29 | 3.47 |
| | PrAge | .06 | .03 | .44 | 2.05* | .00 | .12 | .30 | 3.39 |
| 2 | (Constant) | .98 | 1.21 | | .81 | -1.43 | 3.39 | | |
| | PtTrust | .04 | .03 | .19 | 1.25 | -.02 | .10 | .59 | 1.70 |
| | Satisfaction | .01 | .02 | .11 | .56 | -.03 | .06 | .37 | 2.70 |
| | YrsPractice | -.06 | .03 | -.46 | -2.17* | -.11 | -.01 | .29 | 3.47 |
| | PrAge | .06 | .03 | .42 | 1.96* | -.00 | .12 | .29 | 3.41 |
| | tPRPCC | -.02 | .01 | -.30 | -1.35 | -1.68 | 3.11 | .27 | 3.70 |

Note. *n*=75. a. Dependent Variable: APNCU. ***t* is significant at the 0.01 level. *. *t* is significant at the 0.05 level.

3. What is the relationship between provider-reported and patient-reported cultural competency scores?

Pearson correlation coefficient statistics were used to understand the relationships between the independent variables PRPCC and PSACC cultural competency total and subscale scores, and results described in the Correlation section above as well as Table

D4. Although there were associations between the domains included in the PRPCC and PSACC survey instruments, the total scores were not correlated (see Table 20).

A regression model was used to find a relationship between the tPRPCC and tPSACC scores and control for the independent variables PrAge, YrsPractice. PtTrust and SAT which were significantly associated with either PRPCC or PSACC in correlation analysis (see Table 16). Although the four covariates explained 59% (*p*=.00) of the overall variance in tPRPCC, total PSACC did not contribute significantly (*p*=.10) to the predictive model suggesting no relationship between patient and provider total cultural competency scores as measured by the PRPCC and PSACC instruments (see Tables 21, 22, and E3). The analysis was under-powered (*n*=24) for finding a small or moderate effect, however, had almost 80% power for finding a large effect.

Table 20

*Research Question #3 Correlations*

| | | tPRPCC | tPSACC | PrAge | YrsPractice | PtTrust | SAT |
|---|---|---|---|---|---|---|---|
| tPRPCC | | 1 | -.181 | -.079 | -.148 | .620** | .788** |
| | N | 80 | 24 | 76 | 75 | 80 | 80 |
| tPSACC | | -.181 | 1 | .542** | .443* | .090 | .083 |
| | N | 24 | 24 | 24 | 24 | 24 | 24 |
| PrAge | | -.079 | .542** | 1 | .836** | -.010 | -.057 |
| | N | 76 | 24 | 76 | 75 | 76 | 76 |
| YrsPractice | | -.148 | .443* | .836** | 1 | -.060 | -.165 |
| | N | 75 | 24 | 75 | 75 | 75 | 75 |
| PtTrust | | .620** | .090 | -.010 | -.060 | 1 | .371** |
| | N | 80 | 24 | 76 | 75 | 80 | 80 |
| SAT | | .788** | .083 | -.057 | -.165 | .371** | 1 |
| | N | 80 | 24 | 76 | 75 | 80 | 80 |

Note. **. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Table 21

*Research Question #3 Model Summary*

| | | | | | Change Statistics | | | |
|---|---|---|---|---|---|---|---|---|
| Model | *R* | $R^2$ | Adjusted $R^2$ | *SE* of the Estimate | $R^2$ Change | *F* Change | df1 | df2 |
| 1 | .77[a] | .59 | .51 | 15.26 | 59% | 6.92** | 4 | 19 |
| 2 | .81[b] | .65 | .56 | 14.51 | 6% | 3.01 | 1 | 18 |

Note. *n*=24. a. Predictors: (Constant), YrsPractice, PtTrust, SAT, PrAge. b. Predictors: (Constant), YrsPractice, PtTrust, SAT, PrAge, tPSACC. ***F* change is significant at the 0.01 level. *. *F* change is significant at the 0.05 level.

Table 22

*Research Question #3 Coefficients*

| Model | | *B* | *SE B* | β | *t* | 95.0% *CI* for *B* Lower Bound | 95.0% *CI* for *B* Upper Bound | Collinearity Statistics Tolerance | Collinearity Statistics VIF |
|---|---|---|---|---|---|---|---|---|---|
| 1 | (Constant) | 45.67 | 39.26 | | 1.16 | -36.49 | 127.83 | | |
| | PtTrust | .94 | .81 | .19 | 1.16 | -.76 | 2.63 | .83 | 1.20 |
| | SAT | 1.41 | .36 | .65 | 3.93** | .66 | 2.16 | .77 | 1.29 |
| | PrAge | -.43 | .97 | -.16 | -.44 | -2.46 | 1.60 | .17 | 5.82 |
| | YrsPractice | .14 | .91 | .05 | .16 | -1.75 | 2.04 | .18 | 5.59 |
| 2 | (Constant) | 64.87 | 38.93 | | 1.67 | -16.92 | 146.66 | | |
| | PtTrust | .81 | .77 | .16 | 1.05 | -.82 | 2.43 | .83 | 1.21 |
| | SAT | 1.61 | .36 | .74 | 4.46** | .85 | 2.36 | .70 | 1.43 |
| | PrAge | .33 | 1.02 | .12 | .33 | -1.82 | 2.48 | .14 | 7.14 |
| | YrsPractice | -.10 | .87 | -.04 | -.11 | -1.93 | 1.73 | .17 | 5.74 |
| | tPSACC | -.88 | .51 | -.31 | -1.74 | -1.95 | .19 | .62 | 1.60 |

Note. *n*=24. a. Dependent Variable: tPRPCC. ***t* is significant at the 0.01 level. *. *t* is significant at the 0.05 level.

4. Are specific constructs of cultural competency more important in their influence on the use of early and adequate prenatal care in the Hmong population?

The PRPCC and PSACC survey instruments were designed to measure the same behavior domains (history-taking and explaining) from the patient's and provider's perspectives. In addition, questions on the PRPCC assess patient trust and satisfaction; and questions on the PSACC measure the provider's behavior demonstration. The fourth research question seeks to understand which, if any, of these seven domains are predictive of APNCU.

To answer this question, multiple regression was used to establish a prediction equation for the relationship ($R^2_{\text{change}}$) between the independent variables, PSACC subscores (CC-P, history-taking, explaining, and behavior demonstration) and PRPCC subscores (CC, history-taking, and explaining), and the dependent variable APNCU index score, while controlling for the effects of the other patient and provider variables identified as significantly correlated with the subscore of interest or with APNCU (see Table 23). Each of the seven domains was tested separately in models containing the covariates found significantly associated with the specific independent variable. Limiting the number of independent variables (maximum of 6) to those significantly associated with each subscore helped to increase statistical power to approximately 78% for finding a large effect.

The patient CC score (a sum of the history and explaining scores) was predictive of APNCU contributing 15% to the variance (see Tables 24, 25, and E4). The separate domains (history and explaining) were each tested independently to assess their contribution to the prediction equation controlling for covariates as detailed in Table 23. The model containing the patient's history-taking score (HistoryPatient) resulted in a significant change in $R^2$ ($p$=.05) and explained 12% of the variance, but the model did not meet statistical significance ($p$=.06) (see Tables 26, 27, and E5). The patient's explaining score (ExplainingPatient) added little to the model and was not predictive (see Table 23). The models containing the provider CC-P and History-taking (HistoryProvider) scores were also not predictive of APNCU. The ExplainingProvider and Behavior domains did predict APNCU contributing 12.1% and 13.8% to the variance, respectively, resulting in significant change in $R^2$ and the models (*p*=.05 and *p*=.01; *p*=.04 and *p*=.02, respectively) (see Tables 28-31, and E6-E7).

Table 23

*Summary of Subscore Models*

| Domain | Covariates retained in each model | $R^2$ Change | Sig. *F* Change | Predictive significance of model |
|---|---|---|---|---|
| CC | PtTrust, SAT, ExplainingProvider, Age | 14.7% | .04 | .03 |
| CC-P [a] | HistoryPatient, ExplainingPatient, Age, Number | 0.8% | .64 | .06 |
| HistoryPatient | Age, HistoryProvider, ExplainingProvider, PtTrust, SAT, ExplainingPatient | 11.9% | .06 | .05 |
| ExplainingPatient | Age, HistoryProvider, PtTrust, SAT, HistoryPatient | 0.3% | .77 | .12 |
| HistoryProvider | HistoryPatient, ExplainingPatient, Age, ExplainingProvider | 0.8% | .59 | .02 |
| ExplainingProvider | HistoryPatient, Age, HistoryProvider | 12.1% | .05 | .01 |
| Behavior | Age, Provider age, CC-P | 13.8% | .04 | .02 |

Note. a. *n*=22 (loss due to Number variable). All other models *n*=24.

The data suggest that three specific domains, one from PRPCC and two from PSACC instruments, may be associated with earlier and adequate prenatal care (the patient perception of the provider's history-taking competence, and the provider's self-assessed ability to explain and demonstration of culturally competent behaviors). These results are interesting but should be interpreted with caution because of the small number of provider participants in the study. However, the fact that those significant associations were found even with a small sample size (n=24) and less than 80% statistical power suggests that these associations may be real and should be studied further.

Table 24

*Research Question #4 Model Summary Patient Cultural Competence Score Domain*

| | | | | | Change Statistics | | | |
|---|---|---|---|---|---|---|---|---|
| Model | *R* | $R^2$ | Adjusted $R^2$ | *SE* of the Estimate | $R^2$ Change | *F* Change | df1 | df2 |
| 1 | .57[a] | .33 | .18 | 1.06 | 33% | 2.29 | 4 | 19 |
| 2 | .69[b] | .47 | .33 | .96 | 15% | 5.00* | 1 | 18 |

Note. *n*=24 a. Predictors: (Constant), ExplainingProvider, Satisfaction, Age, PtTrust. b. Predictors: (Constant), ExplainingProvider, Satisfaction, Age, PtTrust, CC. ***F* change is significant at the 0.01 level. *. *F* change is significant at the 0.05 level.

Table 25

*Research Question #4 Patient Cultural Competence Score Domain Coefficients*

| Model | | *B* | *SE B* | β | *t* | 95.0% *CI* for *B* Lower Bound | Upper Bound | Collinearity Statistics Tolerance | VIF |
|---|---|---|---|---|---|---|---|---|---|
| 1 | (Constant) | -3.89 | 2.64 | | -1.47 | -9.40 | 1.63 | | |
| | Age | -.02 | .04 | -.10 | -.53 | -.09 | .05 | .89 | 1.12 |
| | PtTrust | .03 | .06 | .11 | .54 | -.09 | .15 | .83 | 1.21 |
| | Satisfaction | -.01 | .02 | -.07 | -.33 | -.06 | .04 | .85 | 1.18 |
| | Explaining Provider | .21 | .08 | .55 | 2.85** | .06 | .37 | .95 | 1.06 |
| 2 | (Constant) | -.53 | 2.83 | | -.19 | -6.47 | 5.40 | | |
| | Age | -.03 | .03 | -.18 | -1.01 | -.10 | .04 | .86 | 1.16 |
| | PtTrust | .04 | .05 | .13 | .70 | -.07 | .14 | .825 | 1.21 |
| | Satisfaction | .01 | .02 | .07 | .36 | -.04 | .06 | .766 | 1.31 |
| | Explaining Provider | .15 | .08 | .38 | 1.94 | -.01 | .30 | .788 | 1.27 |
| | CC | -.04 | .02 | -.46 | -2.24* | -.07 | -.00 | .70 | 1.42 |

*Note. n*=24. a. Dependent Variable: APNCU. ***t* is significant at the 0.01 level. *. *t* is significant at the 0.05 level.

Table 26

*Research Question #4 Patient History-taking Domain Model Summary*

| | | | | | Change Statistics | | | |
|---|---|---|---|---|---|---|---|---|
| Model | *R* | *R²* | Adjusted *R²* | *SE* of the Estimate | *R²* Change | *F* Change | df1 | df2 |
| 1 | .65[a] | .42 | .22 | 1.04 | 42% | 2.06 | 6 | 17 |
| 2 | .74[b] | .54 | .34 | .96 | 12% | 4.15 | 1 | 16 |

Note. *n*=24. a. Predictors: (Constant), Explaining Pt, PtTrust, Age, ExplainingProvider, Satisfaction, HistoryProvider
b. Predictors: (Constant), Explaining Pt, PtTrust, Age, ExplainingProvider, Satisfaction, HistoryProvider, History Pt .
***F* change is significant at the 0.01 level. *. *F* change is significant at the 0.05 level.

Table 27

*Research Question #4 Patient History-taking Domain Coefficients*

| Model | | *B* | *SE B* | β | t | 95.0% *CI* for *B* Lower Bound | Upper Bound | Collinearity Statistics Tolerance | VIF |
|---|---|---|---|---|---|---|---|---|---|
| 1 | (Constant) | -1.35 | 3.17 | | -.42 | -8.04 | 5.347 | | |
| | Age | -.03 | .04 | -.15 | -.75 | -.10 | .047 | .849 | 1.18 |
| | History Provider | -.01 | .11 | -.01 | -.05 | -.23 | .221 | .592 | 1.69 |
| | Explaining Provider | .17 | .08 | .43 | 2.01 | -.01 | .340 | .752 | 1.33 |
| | PtTrust | .04 | .06 | .14 | .67 | -.08 | .161 | .751 | 1.33 |
| | Satisfaction | .00 | .03 | .03 | .14 | -.05 | .056 | .753 | 1.33 |
| | Explaining Pt | -.05 | .03 | -.36 | -1.51 | -.11 | .019 | .590 | 1.70 |
| 2 | (Constant) | 1.53 | 3.24 | | .47 | -5.34 | 8.39 | | |
| | Age | -.05 | .03 | -.30 | -1.53 | -.13 | .02 | .73 | 1.38 |
| | History Provider | -.14 | .12 | -.30 | -1.16 | -.39 | .11 | .42 | 2.40 |
| | Explaining Provider | .16 | .08 | .41 | 2.07 | -.00 | .32 | .75 | 1.33 |
| | PtTrust | .05 | .05 | .18 | .92 | -.06 | .16 | .74 | 1.34 |
| | Satisfaction | .02 | .02 | .18 | .85 | -.03 | .07 | .66 | 1.51 |
| | Explaining Pt | -.00 | .04 | -.03 | -.09 | -.08 | .07 | .38 | 2.65 |
| | History Pt | -.13 | .06 | -.71 | -2.04 | -.26 | .01 | .24 | 4.17 |

Note. *n*=24. a. Dependent Variable: APNCU. ***t* is significant at the 0.01 level. *. *t* is significant at the 0.05 level.

Table 28

*Research Question #4 Provider Explaining Domain Model Summary*

| Model | *R* | $R^2$ | Adjusted $R^2$ | *SE* of the Estimate | Change Statistics<br>$R^2$ Change | *F* Change | df1 | df2 |
|---|---|---|---|---|---|---|---|---|
| 1 | $.65^a$ | .42 | .22 | 1.04 | 42% | 2.06* | 6 | 17 |
| 2 | $.74^b$ | .54 | .34 | .96 | 12% | 4.15* | 1 | 16 |

Note. *n*=24. a. Predictors: (Constant), HistoryProvider,, Age, History Pt. b. Predictors: (Constant), HistoryProvider,, Age, History Pt , ExplainingProvider ***F* change is sig at the 0.01 level. *. *F* change is sig at the 0.05 level.

Table 29

*Research Question #4 Provider Explaining Domain Model Summary Coefficients*

| Model | | *B* | *SE* *B* | β | *t* | 95.0% *CI* for *B*<br>Lower Bound | Upper Bound | Collinearity Statistics<br>Tolerance | VIF |
|---|---|---|---|---|---|---|---|---|---|
| 1 | (Constant) | 5.23 | 2.55 | | 2.05* | -.08 | 10.54 | | |
| | Age | -.03 | .03 | -.15 | -.811 | -.09 | .04 | .93 | 1.08 |
| | History Pt | -.11 | .04 | -.64 | -2.67* | -.20 | -.03 | .56 | 1.79 |
| | HistoryProvider | -.01 | .10 | -.02 | -.10 | -.23 | .21 | .59 | 1.70 |
| 2 | (Constant) | 1.01 | 3.08 | | .33 | -5.45 | 7.46 | | |
| | Age | -.03 | .03 | -.18 | -1.07 | -.09 | .03 | .92 | 1.09 |
| | History Pt | -.10 | .04 | -.53 | -2.36* | -.18 | -.01 | .53 | 1.88 |
| | HistoryProvider | -.06 | .10 | -.12 | -.56 | -.26 | .15 | .56 | 1.78 |
| | ExplainingProvid | .15 | .07 | .40 | 2.12* | .00 | .31 | .76 | 1.31 |

Note. *n*=24. a. Dependent Variable: APNCU. ***t* is significant at the 0.01 level. *. *t* is significant at the 0.05 level.

Table 30

*Research Question #4 Provider Behavior Demonstration Domain Model Summary*

| | | | | | Change Statistics | | | |
|---|---|---|---|---|---|---|---|---|
| Model | *R* | $R^2$ | Adjusted $R^2$ | *SE* of the Estimate | $R^2$ Change | *F* Change | df1 | df2 |
| 1 | .56[a] | .32 | .21 | 1.04 | 32% | 3.09 | 3 | 20 |
| 2 | .67[b] | .46 | .34 | .96 | 14% | 4.82* | 1 | 19 |

Note. n=22. a. Predictors: (Constant), CC-P, Age, PrAge. b. Predictors: (Constant), CC-P, Age, PrAge, Behavior ****F** change is significant at the 0.01 level. *. *F* change is significant at the 0.05 level.

Table 31

*Research Question #4 Provider Behavior Demonstration Domain Coefficients*

| Model | | *B* | *SE B* | β | *t* | 95.0% *CI* for *B* Lower Bound | Upper Bound | Collinearity Statistics Tolerance | VIF |
|---|---|---|---|---|---|---|---|---|---|
| 1 | (Constant) | -3.65 | 2.35 | | -1.56 | -8.55 | 1.25 | | |
| | Age | -.01 | .03 | -.07 | -.39 | -.08 | .06 | .98 | 1.02 |
| | PrAge | -.01 | .03 | -.05 | -.24 | -.07 | .05 | .88 | 1.14 |
| | CC-P | .14 | .05 | .58 | 2.93** | .04 | .25 | .87 | 1.15 |
| 2 | (Constant) | -2.24 | 2.25 | | -.10 | -6.94 | 2.46 | | |
| | Age | -.04 | .03 | -.22 | -1.21 | -.11 | .03 | .85 | 1.18 |
| | PrAge | .02 | .03 | .16 | .79 | -.04 | .09 | .69 | 1.45 |
| | CC-P | .13 | .05 | .53 | 2.87** | .04 | .22 | .85 | 1.17 |
| | Behavior | -.09 | .04 | -.45 | -2.20* | -.18 | -.00 | .69 | 1.45 |

Note. *n*=22. a. Dependent Variable: APNCU. ***t* is significant at the 0.01 level. *. *t* is significant at the 0.05 level.

5. Is there a relationship between cultural competency scores and adverse infant health outcomes?

The final research question sought to discover whether cultural competency scores were associated with adverse infant events as reported on the standard U.S. birth certificate. The adverse outcome score was calculated as a sum of total events extracted from medical record review as described in Chapter 3. Multiple linear regression was used to predict the relationship between the independent variables (total PRPCC and PSACC scores) and the dependent variable, total adverse infant health outcome score (TADV), while controlling for the effects of other independent variables associated with tPRPCC, tPSACC, or TADV (provider age, PtTrust, and SAT) (see Table 32). As in research question one, years of practice (YrsPractice) was not included because it was more strongly associated with provider age (already in the model) than tPSACC. The model was not predictive of TADV (see Tables 33, 34, and E8) and had a small sample size (*n*=24) due to provider responses.

To increase the sample size and statistical power, the analysis was repeated retaining tPRPCC but eliminating tPSACC from the model. This analysis resulted in a sample size of 76 and 91% power for finding a medium effect but tPRPCC did not contribute significantly to the variance (*p*=.61) nor did the model predict TADV (*p*=.25) (see Tables 35, 36, and E9).

It was noted that the TADV scores were skewed to the left (as would be expected) because most births resulted in no adverse outcomes (see Figure E1). Residuals also did not fit the trend line closely on the P-P plot (see Figure E2 and Table E10). Five of the 76 cases were considered outliers with values of 4 (4 cases) or 6 (1 case). To attempt to achieve a more normal distribution, the outliers were excluded and the model reanalyzed. The model excluding the 5 cases resulted in a slightly more normal distribution (see Figure E3), a somewhat better P-P Plot (see Figure E4 and Table E12), and fewer cases (*n*=71). Total PRPCC still did not significantly add to the variance (*p*=.67) or the predictive model although it did not make the model worse (*p*=.01 without, and *p*=.02 with tPRPCC in the model) (see Tables 37, 38, and E11).

In a final analysis, the outliers were added back into the dataset (*n*=76) and TADV was re-coded (TADV2) with 0 adverse events (0), one adverse event (1), or 2 or more adverse events (2) and the model rerun. Results were similar to the model excluding the outliers (*F* change was not significant and tPRPCC did not make the predictive model worse) (see Tables E33-E36, and Figures E5 and E6).

This study was not able to draw conclusions regarding the relationship between tPSACC scores and TADV as the analysis was insufficiently powered to find a small or moderate effect. Total PRPCC scores did not appear to significantly add to the prediction equation containing PrAge, PtTrust, and SAT; however, these variables without tPRPCC was predictive when the model was modified to account for the outlying TADV values (*p*=.01; see Tables E33-E34). Also, the TADV scores were not normally distributed in this study. The models containing 76 samples were adequately powered to find medium (91%) and large (99.9%) effects but had insufficient power for finding small effects, thus the relationship between cultural competency scores and TADV remains unclear.

Table 32

*Research Question #5 Correlations*

| | | tPRPCC | tPSACC | PrAge | YrsPractice | PtTrust | SAT | T ADV |
|---|---|---|---|---|---|---|---|---|
| tPRPCC | | 1 | -.181 | -.079 | -.148 | .620** | .788** | -.187 |
| | *N* | 80 | 24 | 76 | 75 | 80 | 80 | 80 |
| tPSACC | | -.181 | 1 | .542** | .443* | .090 | .083 | -.293 |
| | *N* | 24 | 24 | 24 | 24 | 24 | 24 | 24 |
| PrAge | | -.079 | .542** | 1 | .836** | -.010 | -.057 | -.174 |
| | *N* | 76 | 24 | 76 | 75 | 76 | 76 | 76 |
| YrsPractice | | -.148 | .443* | .836** | 1 | -.060 | -.165 | .012 |
| | *N* | 75 | 24 | 75 | 75 | 75 | 75 | 75 |
| PtTrust | | .620** | .090 | -.010 | -.060 | 1 | .371** | -.145 |
| | *N* | 80 | 24 | 76 | 75 | 80 | 80 | 80 |
| SAT | | .788** | .083 | -.057 | -.165 | .371** | 1 | -.175 |
| | *N* | 80 | 24 | 76 | 75 | 80 | 80 | 80 |
| T ADV | | -.187 | -.293 | -.174 | .012 | -.145 | -.175 | 1 |
| | *N* | 80 | 24 | 76 | 75 | 80 | 80 | 80 |

Note. **. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Table 33

*Research Question #5 Model Summary*

| | | | | | Change Statistics | | | |
|---|---|---|---|---|---|---|---|---|
| Model | *R* | $R^2$ | Adjusted $R^2$ | *SE* of the Estimate | $R^2$ Change | *F* Change | df1 | df2 |
| 1 | $.44^a$ | .20 | .08 | .43 | 20% | 1.62 | 3 | 20 |
| 2 | $.47^b$ | .22 | .00 | .45 | 2% | .27 | 2 | 18 |

Note. n=24. a. Predictors: (Constant), Satisfaction, PrAge, PtTrust. b. Predictors: (Constant), Satisfaction, PrAge, PtTrust, tPSACC, tPRPCC. c. Dependent Variable: T ADV. ***F* change is significant at the 0.01 level. *. *F* change is significant at the 0.05 level.

Table 34

*Research Question #5 Coefficients*

| | | | | | | 95.0% *CI* for *B* | | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|---|
| Model | | *B* | *SE B* | β | *t* | Lower Bound | Upper Bound | Tolerance | VIF |
| 1 | (Constant) | 1.59 | .78 | | 2.03 | -.04 | 3.23 | | |
| | PrAge | -.03 | .01 | -.44 | -2.05* | -.05 | .00 | .87 | 1.15 |
| | PtTrust | .02 | .02 | .16 | .72 | -.03 | .06 | .83 | 1.20 |
| | Satisfaction | -.02 | .01 | -.33 | -1.47 | -.04 | .01 | .78 | 1.29 |
| 2 | (Constant) | 2.05 | 1.06 | | 1.93 | -.18 | 4.27 | | |
| | PrAge | -.02 | .02 | -.38 | -1.36 | -.06 | .01 | .56 | 1.80 |
| | PtTrust | .02 | .03 | .19 | .82 | -.03 | .07 | .78 | 1.29 |
| | Satisfaction | -.01 | .02 | -.14 | -.38 | -.04 | .03 | .33 | 3.00 |
| | tPSACC | -.01 | .02 | -.14 | -.49 | -.04 | .03 | .55 | 1.83 |

Note. *n*=24. a. Dependent Variable: T ADV. ***t* is significant at the 0.01 level. *. *t* is significant at the 0.05 level.

Table 35

*Research Question #5 Model 2 Summary*

| Model | $R$ | $R^2$ | Adjusted $R^2$ | *SE* of the Estimate | Change Statistics $R^2$ Change | *F* Change | df1 | df2 |
|---|---|---|---|---|---|---|---|---|
| 1 | .26[a] | .07 | .03 | 1.21 | 7% | 1.79 | 3 | 72 |
| 2 | .27[b] | .07 | .02 | 1.22 | 0% | .26 | 1 | 71 |

Note. n=76. a. Predictors: (Constant), PrAge, PtTrust, Satisfaction. b. Predictors: (Constant), PrAge, PtTrust, Satisfaction, tPRPCC. c. Dependent Variable: T ADV. ***F* change is significant at the 0.01 level. *. *F* change is significant at the 0.05 level.

Table 36

*Research Question #5 Model 2 Coefficients*

| Model | | *B* | *SE B* | β | *t* | 95.0% *CI* for *B* Lower Bound | Upper Bound | Collinearity Statistics Tolerance | VIF |
|---|---|---|---|---|---|---|---|---|---|
| 1 | (Constant) | 2.99 | 1.10 | | 2.73** | .81 | 5.18 | | |
| | PtTrust | -.02 | .03 | -.09 | -.74 | -.07 | .03 | .89 | 1.13 |
| | Satisfaction | -.02 | .02 | -.15 | -1.24 | -.05 | .01 | .89 | 1.13 |
| | PrAge | -.03 | .02 | -.18 | -1.61 | -.06 | .01 | .10 | 1.00 |
| 2 | (Constant) | 3.09 | 1.12 | | 2.76 | .86 | 5.32 | | |
| | PtTrust | -.01 | .03 | -.05 | -.31 | -.08 | .06 | .60 | 1.68 |
| | Satisfaction | -.01 | .02 | -.08 | -.42 | -.06 | .04 | .38 | 2.65 |
| | PrAge | -.03 | .02 | -.19 | -1.64 | -.06 | .01 | .99 | 1.01 |
| | tPRPCC | -.01 | .01 | -.11 | -.507 | -.03 | .02 | .27 | 3.70 |

Note. *n*=76. a. Dependent Variable: T ADV. ***t* is significant at the 0.01 level. *. *t* is significant at the 0.05 level.

Table 37

*Research Question #5 Model 3 Summary*

| | | | | | Change Statistics | | | |
|---|---|---|---|---|---|---|---|---|
| Model | *R* | $R^2$ | Adjusted $R^2$ | *SE* of the Estimate | $R^2$ Change | *F* Change | df1 | df2 |
| 1 | .39$^a$ | .16 | .12 | .60 | 16% | 4.11** | 3 | 67 |
| 2 | .40$^b$ | .16 | .11 | .60 | 0% | .18 | 1 | 66 |

Note. n=71. a. Predictors: (Constant), PrAge, PtTrust, Satisfaction. b. Predictors: (Constant), PrAge, PtTrust, Satisfaction, tPRPCC. c. Dependent Variable: T ADV, excluding outliers. ***F* change is significant at the 0.01 level. *. *F* change is significant at the 0.05 level.

Table 38

*Research Question #5 Model 3 Coefficients*

| | | | | | | 95.0% *CI* for *B* | | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|---|
| Model | | *B* | *SE B* | β | *t* | Lower Bound | Upper Bound | Tolerance | VIF |
| 1 | (Constant) | 1.94 | .58 | | 3.36 | .79 | 3.09 | | |
| | PtTrust | -.03 | .01 | -.29 | -2.46 | -.06 | -.01 | .90 | 1.11 |
| | Satisfaction | -.01 | .01 | -.15 | -1.22 | -.03 | .01 | .90 | 1.12 |
| | PrAge | -.01 | .01 | -.18 | -1.61 | -.03 | .00 | .99 | 1.01 |
| 2 | (Constant) | 1.99 | .59 | | 3.35 | .81 | 3.18 | | |
| | PtTrust | -.03 | .02 | -.26 | -1.85 | -.06 | .00 | .65 | 1.54 |
| | Satisfaction | -.01 | .01 | -.08 | -.44 | -.03 | .02 | .36 | 2.79 |
| | PrAge | -.02 | .01 | -.19 | -1.63 | -.03 | .00 | .99 | 1.01 |
| | tPRPCC | -.00 | .01 | -.09 | -.43 | -.02 | .01 | .27 | 3.66 |

Note. *n*=71. a. Dependent Variable: T ADV, exluding outliers. ***t* is significant at the 0.01 level. *. *t* is significant at the 0.05 level.

Table 39

*Research Question #5 Model 4 Summary*

| | | | | | Change Statistics | | | |
|---|---|---|---|---|---|---|---|---|
| Model | *R* | $R^2$ | Adjusted $R^2$ | *SE* of the Estimate | $R^2$ Change | *F* Change | df1 | df2 |
| 1 | .36[a] | .13 | .09 | .65 | 13%* | 3.54 | 3 | 72 |
| 2 | .37[b] | .13 | .09 | .65 | 1% | .47 | 1 | 71 |

Note. n=76. a. Predictors: (Constant), PrAge, PtTrust, Satisfaction. b. Predictors: (Constant), PrAge, PtTrust, Satisfaction, tPRPCC. c. Dependent Variable: TADV2 (recoded TADV). ***F* change is significant at the 0.01 level. *. *F* change is significant at the 0.05 level.

Table 40

*Research Question #5 Model 4 Coefficients*

| | | | | | | 95.0% *CI* for *B* | | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|---|---|
| Model | | *B* | *SE B* | β | *t* | Lower Bound | Upper Bound | Tolerance | VIF |
| 1 | (Constant) | 2.14 | .59 | | 3.65** | .97 | 3.30 | | |
| | PtTrust | -.02 | .01 | -.18 | -1.52 | -.05 | .01 | .89 | 1.13 |
| | Satisfaction | -.01 | .01 | -.17 | -1.45 | -.03 | .00 | .89 | 1.13 |
| | PrAge | -.02 | .01 | -.23 | -2.10* | -.04 | -.00 | .10 | 1.00 |
| 2 | (Constant) | 2.21 | .60 | | 3.70** | 1.02 | 3.40 | | |
| | PtTrust | -.02 | .02 | -.12 | -.84 | -.05 | .02 | .60 | 1.68 |
| | Satisfaction | -.01 | .01 | -.08 | -.42 | -.03 | .02 | .38 | 2.65 |
| | PrAge | -.02 | .01 | -.24 | -2.14* | -.04 | -.00 | .99 | 1.01 |
| | tPRPCC | -.00 | .01 | -.15 | -.69 | -.02 | .01 | .27 | 3.70 |

Note. *n*=76. a. Dependent Variable: TADV2 (recoded TADV). ***t* is significant at the 0.01 level. *. *t* is significant at the 0.05 level.

## Conclusion

Despite the modifications made to the study methods, the response rate was lower in the full study than in the pilot. The institutional IRB limited the number of contacts with potential participants to two (first mailing and second phone). Although previous studies had used telephone contact successfully, it was not found to be an adequate second contact method in this study. Many of the phone numbers were no longer in service and no provision was made for a second contact for potential participants whose phone number on record was no longer valid. The postcard pre-study mailing did not appear to improve the response rate.

Because of the small number of provider respondents, the statistical power for some of the research questions was reduced making understanding the significance of results difficult. The low response rate and smaller sample size than expected limit the power for finding small effects, and the ability to generalize the results to others outside the study population. There were, however, interesting findings that support reports in the literature as well as present opportunities for further research.

# CHAPTER 5: SUMMARY, CONCLUSION, AND RECOMMENDATIONS

## Introduction

This study was designed to explore the relationship between the cultural competence of healthcare providers and health outcomes in their diverse patient populations because culturally competent healthcare may play a role in improving outcomes and reducing health disparities (Beach et al., 2005; Brach & Fraser, 2000; Cooper et al., 2003; Smedley et al., 2002). Chapter 1 described the problem and proposed research questions that the literature review (detailed in Chapter 2) suggested were important to answer. The study methodology was outlined in Chapter 3 and the results of the research in Chapter 4. This chapter (a) summarizes the findings within the context of the current literature, and provides conclusions on what this study adds to the literature, (b) describes the limitations of this study, (c) reviews implications for social change, (d) makes recommendations for action, and (e) future research, and finally (f) summarizes the significance of the study results.

## Hmong Studies

The Hmong have health beliefs that must be understood and accommodated during healthcare delivery and may be the barrier to improving health outcomes in this population (Center for Reproductive Health Research & Policy, n.d.; Cobb, 2010; Warner & Mochel, 1998). Most studies on the Hmong, particularly related to prenatal care, were done during the first 10 years after the initial refugees arrived in the United States. The literature review found no recent articles published on cultural competence and prenatal care utilization in the Hmong of Minnesota.

Hmong women have historically been less likely to seek early and adequate prenatal care for a variety of reasons (Helsel, Petitti, & Kunstadter, 1992; Hopkins & Clarke, 1983; Lao Family Community of Minnesota, n.d.; Levenick, 2001). Reports in the literature consistently suggest that 35-65% of Hmong women receive inadequate or no prenatal care. The results of this study indicate that little progress has been made to change this pattern. Only 57.5% of the Hmong women participating in this study received adequate or adequate plus prenatal care as measured by the APNCU prenatal care index, revealing more work is needed to meet the *Healthy People 2010* 90% goal in this population (U.S. DHHS, 2000, Chapter 16).

Ten percent (8/80) of the births in this study were preterm and resulted in low birthweight (LBW) infants. Davis, Goldenring, McChesney, and Medina (1982) reported that 13.5% and 11% of Southeast Asian women in California (not specifically Hmong) delivered premature (<37 weeks) and low birthweight (LBW) infants, respectively, again suggesting that not much progress has been made in improving these rates since the 1980s.

There does seem to be some improvement, however, in level of education and high parity for age, common risk factors cited in the literature for this population. The average age and parity of the study participants was 26.9 years and one or fewer births, respectively, as compared to high rates of women older than age 34 and younger than age 20 with 4 or more births reported by Hopkins and Clarke (1983). Eighty-five percent of women in this study had a 12th grade education or greater, in contrast to 2-3% in the 1983 study.

The Wisconsin Department of Health and Family Services (WDOH; 2006) reported that the percentage of LBW infants born to Hmong women increased with time in the United States, as did Hopkins and Clark (1983) who also found a corresponding decrease in adequacy of prenatal care. It has been hypothesized that acculturation may have a negative impact on neonatal outcomes (Kunstadter, 1987; Rumbaut, 2006, p. 281). Acculturation as measured in this study was not associated with adequacy of prenatal care (APNCU); however, women with higher acculturation scores reported lower perceptions of organizational accommodation. This finding suggests that healthcare providers may not demonstrate the same level of cultural accommodation with patients who appear fluent in English and is similar to the inverse relationship between language acculturation and cultural competence behaviors reported by Thom and Tirado (2006).

## Research Questions

### *Health Outcomes*

The relationship between cultural competence and health outcomes remains unclear (Drevdahl, Canales, & Dorcy, 2008; Perloff et al. 2006) and may be difficult to prove (Fortier and Bishop, 2004). However, it is theorized that improving cultural competence may help to reduce health disparities (Brach & Fraser, 2000; Smedley, Stith, & Nelson, 2002), so findings demonstrating relationships would be important additions to the literature.

The small sample size left the study underpowered for finding small effects and answering some of the research questions. It remains unclear whether total provider self-assessed cultural competency (tPSACC) or the total patient reported provider cultural competency (tPRPCC) scores are associated with early and adequate prenatal care. Data from this study suggest that patient perception of provider cultural competency may be related to the measure total adverse outcome score (TADV). In addition, three specific domains (the patient perception of the provider's history-taking competence, the provider's self-assessed ability to explain, and provider demonstration of culturally competent behaviors) appear to be associated with adequacy of prenatal care utilization (APNCU). These findings provide evidence that there may be specific constructs within cultural competency that may influence health outcomes and disparities.

The association between cultural competence and health outcomes is assumed to be small and confounded by several intervening variables making a relationship difficult to prove. This study used two dependent variables, a proxy measure for improved infant outcomes APCNU and a true outcome measure, total adverse health outcome score (TADV). TADV is an aggregate measure calculated from specific morbidity and mortality outcomes reported on the standard U.S. birth certificate. Use of the TADV score as an outcome measure has not been previously reported in the literature.

In this study, there appeared to be a small but significant negative relationship between APNCU and the TADV scores, suggesting that early and adequate prenatal care may result in fewer adverse infant outcomes. The tPSACC score did not predict TADV; however, although not statistically significant in this study, the data indicate that there may be a relationship between tPRPCC and TADV, suggesting that interventions aimed at increasing the patient's perception of their provider's cultural competence may also help to improve infant outcomes in this population.

### *Cultural Competency*

The United States Office of Minority Health (1999) proposed CLAS standards designed to improve the healthcare services delivered to the growing diverse populations. Measuring organizational and provider cultural competence; however, is difficult as standardized tools and instruments have yet to be developed (Castillo & Guo, 2011; Doorenbos, 2005; Thom & Tirado, 2006) and understanding the specific patient and provider biases influencing effective communication is still evolving (Perloff et al., 2006; Smedley et al., 2002, p. 102; Stone & Moskowitz, 2011; White-Means et al., 2009). Thom and Tirado (2006) created parallel survey instruments PRPCC and PSACC designed to measure patient and provider perceptions of cultural competence. These tools use 13 questions to measure the history-taking and explaining domains from both the patient and provider points of view and were the instruments used in this study. The assumption in using parallel survey instruments is that patients and providers would be assessing the same cultural competence domains making comparison between the two groups possible.

In this study, as in the Thom and Tirado (2006) study, no correlation was found between PRPCC and PSACC scores, and PRPCC scores were significantly associated with patient trust and satisfaction. Although no relationship between the total scores was found, the cultural competence subscores were moderately, though inversely, correlated which was unexpected and has not been previously reported in the literature. This association could be a capricious finding due to small sample size, however, may also indicate that providers and patients have very different perceptions of what constitutes culturally competent care and/or interpretation of the survey questions differed between patients and providers. In addition, patients and providers answered very differently on 6 of the 13 survey questions, again indicating a possible gap in communication during the healthcare encounters.

This study also attempted to identify specific constructs within cultural competence that may be more important in the provision of care and related to health outcomes. Thom and Tirado (2006) aggregated several constructs into two domains, history-taking and explaining, in their survey instruments; however, the separate effects of these domains were not reported in previous studies. Two interesting findings emerged in the current study: first, provider self-assessed ability to explain subscores predicted adequacy of prenatal care utilization (APNCU; $p$=.01); and second, the provider's ability to demonstrate culturally competent behaviors was also predictive of APNCU ($p$=.02). Although not significant ($p$=.05), there was indication of a relationship between the patient perception of the providers history-taking skills and adequacy of prenatal care. These results should be cautiously considered due to the study's inherent limitations but they point to areas needing further investigation.

## Limitations

This study used an epidemiologic survey methodology to explore whether perception of cultural competence was related to early and adequate prenatal care. The low response rate suggests that this method may not be appropriate with the Hmong population, and that alternate methods should be explored for future studies. Phone contact was also not successful as a second contact method in this study, and surprisingly resulted in a lower response rate than two mailings. This finding may be related to the evolution from land line phones to cell phones and may suggest another area for future research. In addition, healthcare organizations are currently focused on patient satisfaction because future Medicare reimbursement is connected to patient reported experience. The low survey response rate may have been related to duplication between the healthcare organization's patient satisfaction survey and the survey instrument used in this study with resultant confusion for the study participants.

Results of this study could be influenced by several factors. Agencies that regulate healthcare today (i.e., Joint Commission, Centers for Medicare and Medicaid Services) require cultural competency training for healthcare providers and provision of culturally competent services. Many providers have already responded and made changes to improve cultural competence (U.S. OMH, 1999). However, cultural competency does not change significantly unless a provider or the organization they work for have made deliberate efforts to change practice and develop competence. As an employee of the Midwest healthcare system, this researcher knows of no organizational focus on improving cultural competence in recent years, although there has been a recent focus on improving patient satisfaction with physician communication.

Studies also indicate that healthcare providers may assess themselves as culturally competent but fail to translate this into effective culturally competent services, which would overestimate the associations found between PSACC scores and the dependent variables. This study compensated for this limitation by also incorporating patient perception.

The Hmong have specific health beliefs and cultural and social norms that are not easily measured and may not translate well in the PRPCC survey instrument. The test-retest procedure incorporated into the pilot study design was intended to assess the reliability of the survey instrument with the study population. This study was unable to draw conclusions regarding the PRPCC reliability due to the low response rate, although some of the survey domains seem to be more reliable than others. Changes to the study methods made based on the pilot results appeared to decrease rather than increase the survey response rate, although the pilot and study participants did not appear to be significantly different.

Completeness and accuracy of data entered into the medical record can affect data integrity and hence influence study results. Variables included in this study were collected during the course of normal patient care delivery, and reported for the standard United States birth certificate; however, studies have demonstrated that information reported on birth certificates is often incomplete (Forrest & Singh, 1987; Kotelchuk, 1994). Data for this study were extracted directly from the electronic health record and did not rely on birth certificate records; however, electronic extraction was not possible, and study variables were manually extracted through chart review which could introduce data integrity issues.

It is also possible that proxy measures of acculturation may not be good indicators of adoption of Western medicine and/or not translate to healthcare understanding and compliance with physician instructions. Inaccurate proxy measures may misclassify participants and result in either over or under estimation of the association between acculturation and prenatal care utilization dependent on the nature of the error. This study used multiple survey questions to assess acculturation in order to limit the potential for misclassification and appeared to be reliable based on the pilot study. Use of early and adequate prenatal care and hence results of this study may also be affected by other barriers to healthcare that are unrecognized and unrelated to cultural competency. The possibility of errors introduced by unrecognized confounders is acknowledged; however, the effects of these factors cannot be controlled.

## Implications for Positive Social Change

The patient populations in the United States are becoming increasingly diverse. The differing perspectives and inherent biases introduced by both providers and patients during the healthcare interaction can impede effective communication and patient compliance both of which can adversely affect health outcomes. Theoretically, accommodating health beliefs through the provision of culturally competent healthcare delivery models should help to reduce health disparities in diverse patient populations.

Though implications of this study are limited by the low response rate and small sample size, results do provide evidence that associations between cultural competence and health outcomes exist. The study’s findings also demonstrated that healthcare delivery models used for providing prenatal care to the MN Hmong have been ineffective in improving access to early and adequate prenatal care or decreasing preterm and LBW birth rates. This study offers direction for future study and next steps for improving healthcare delivery to the MN Hmong, as well as supports the need for continuing research on reducing health disparities through culturally competent healthcare systems.

## Recommendations for Action

The results of this study support the need for research on effective communication between patients and their healthcare providers as an important step toward improving health disparities. Culturally competent communication skills appeared to influence early and adequate prenatal care and infant outcomes. In addition, patients perceived reduced organizational accommodation with increased acculturation. This finding may imply that providers and organizations assume that provision of translator services is sufficient to meet cultural needs, or that English proficiency equates to acceptance of Western health beliefs. It is recommended that organizations continue to explore alternate healthcare delivery models that include development of provider cultural awareness and improved patient-provider communication. Organizations should also consider integration of broader cultural accommodation than language translation services for meeting the unique needs of diverse patient populations.

This study identified that specific interventions are needed to increase the number of Hmong women who receive adequate prenatal care and decrease preterm and LBW infants in this population. Organizations and providers should consider new prenatal care delivery models that incorporate Hmong health beliefs in order to make progress toward meeting the *Healthy People 2010* 90% goal.

## Recommendations for Further Study

A number of opportunities for further research were identified in this study. There appeared to be discordance between Hmong patients and providers on how they define cultural competence (as suggested by the inverse relationship between the cultural competency scores). Specifically, additional study is warranted on improved patient-provider communication. Providers in this study generally rated themselves as more culturally competent than their patients when completing the 13 PRPCC and PSACC questions, six of which were significantly different. This disparity suggests that understanding of the underlying meaning of these questions may be different between patient and provider. It also cannot be assumed that this same variance in understanding translates to other diverse populations.

In order to improve communication between providers and their Hmong patients and improve health outcomes for this population, future studies should employ qualitative methods better suited for exploring patterns in human behavior and clarifying expectations and points of view. Focus groups (versus individual interviews) with Hmong women may be beneficial in identifying broader themes which can be integrated and tested in new healthcare delivery models. This recommendation is particularly important in making progress toward improving prenatal care utilization and health outcomes in the Hmong because little gain has been made since the 1980s.

Epidemiologic studies are not designed to identify the underlying themes affecting perceptions and cannot clarify the differences in perspectives suggested by this study. The methodology used in this study was also constrained by IRB imposed limitations on contacts with potential participants. Results compiled through survey methodology are prone to unpredictability when response rates are low as was the case in this study. Phone contact may not be a reliable contact method for collecting survey data in populations with high cell phone use. There is opportunity for research on methods to improve survey response rates if land line phone use continues to decline.

This study explored the relationship between cultural competence and infant morbidity and mortality as measured by a proxy measure, APCNU, and an outcome measure calculated from data on the U.S. birth certificate (TADV). These measures had not previously been studied in the Hmong and results cannot be generalized outside the study population because of the small sample size and limited statistical power. Future studies are necessary using these variables in other diverse populations to validate their appropriateness in assessing health outcomes.

## Summary

The results of this study suggest that the cultural support systems within the Hmong population in Minnesota continue to influence health beliefs and behaviors. Little gain has been made since the 1980s to improve the percentage of Hmong women who seek early and adequate prenatal care or reduce preterm or LBW births. Encouraging, though, is the apparent increase in levels of education and in age at first birth and the apparent decrease in parity in the MN Hmong population.

Knowledge regarding cultural competency and its effect on patient satisfaction, participation, compliance, and health outcomes is still evolving. Specific cultural competency constructs may be more important than others in mitigating behaviors contributing to health disparities; however, the limitations in this study do not allow generalization outside the study population. Definition of culturally competent healthcare delivery needs further clarification as patients and providers evaluate from very different perspectives. Until future research delineates what and how to measure cultural competence across the two groups, use of parallel survey instruments may not be appropriate.

The relationships identified between cultural competence and the two outcome measures (APNCU & TADV) are significant contributions to the literature as they provide additional evidence of the influence of cultural competence on health outcomes. However, more importantly, the results of this study support the need for further investigation on the differences between patient and provider perceptions of what constitutes culturally competent care because the moderate but inverse relationship between the two cultural competence scores suggests there is a disconnection between patient expectations and provider understanding of those expectations.

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# APPENDIX A: PATIENT REPORTED PHYSICIAN CULTURAL COMPETENCY SURVEY

Directions: Read each statement carefully, then darken the circle that best represents your opinion next to each statement. If English is your native language, start with Part II.

Part I: Availability of services where you receive medical care.

1. Information about my health plan (e.g., forms, brochures) is available in my native language.

○ Yes ○ No ○ Do not know

2. There is a 24 hour phone number which I can call to talk to a health professional who speaks my native language.

○ Yes ○ No ○ Do not know

3. I can make appointments with people who speak my native language.

○ Yes ○ No ○ Do not know

4. There are doctors who speak my native language.

○ Yes ○ No ○ Do not know

5. There are interpreters available to translate for me during my visits with a doctor.

○ Yes ○ No ○ Do not know

6. There are health education materials available in my native language.

○ Yes ○ No ○ Do not know

7. There are bilingual office staff (receptionists, aides) who speak my native language.

○ Yes ○ No ○ Do not know

8. Signs, bulletin boards, and other displays in the doctor’s office are written in my native language

○ Yes ○ No ○ Do not know

9. There are X-ray and lab technicians who speak my native language.

○ Yes ○ No ○ Do not know

10..There are transportation services provided.

○ Yes ○ No ○ Do not know

Part II: Patient Reported Physician Cultural Competency

The following questions refer to Dr. ___________________. If this doctor is no longer your primary doctor, please stop here, mark an 'X' here _____, and return the survey.

| HOW OFTEN DOES YOUR DOCTOR DO EACH OF THE FOLLOWING? (FILL IN THE APPROPRIATE CIRCLE) | Never | Seldom | Some-times | Usually | Always |
|---|---|---|---|---|---|
| 1. My doctor asks me why I think I got sick. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. My doctor talks with me about medications I may use other than the ones he/she prescribes. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. My doctor talks with me about traditional healing remedies I may use. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. My doctor asks if I seek advice from other family members and friends in making decisions about my health care. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. When discussing diagnosis and treatment related to my condition, my doctor asks if I would like to include family members in the discussion. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 6. My doctor takes time to help me understand possible side effects of the medications he or she prescribes for me. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 7. My doctor informs me of the resources in my local community where I can find help. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 8. My doctor asks if I understand his/her instructions and if not repeats them when necessary. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 9. My doctor asks if I have other questions or concerns before I leave the office. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 10. My doctor helps me to ask questions about my condition and treatment. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 11. My doctor helps me answer the | ☐ | ☐ | ☐ | ☐ | ☐ |

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| questions he or she asks. |  |  |  |  |  |
| 12. My doctor encourages me to stop him or her when I am confused. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 13. My doctor helps me make decisions about my treatment. | ☐ | ☐ | ☐ | ☐ | ☐ |

Part III: Trust and satisfaction with your doctor

| PLEASE INDICATE YOUR LEVEL OF AGREEMENT OR DISAGREEMENT WITH EACH STATEMENT: | Strongly agree | Agree | Disagree | Strongly Disagree | Not sure |
|---|---|---|---|---|---|
| 27. I can tell my doctor anything, even things that I might not tell anyone else. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 28. My doctor sometimes pretends to know things when he/she is really not sure. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 29. I completely trust my doctor's judgments about my medical care. | ☐ | ☐ | ☐ | ☐ | ☐ |

| PLEASE INDICATE YOUR LEVEL OF AGREEMENT OR DISAGREEMENT WITH EACH STATEMENT: | Strongly agree | Agree | Disagree | Strongly Disagree | Not sure |
|---|---|---|---|---|---|
| 30. My doctor cares more about holding down | ☐ | ☐ | ☐ | ☐ | ☐ |
| costs than doing what is needed for my health. |  |  |  |  |  |
| 31. My doctor would always tell me the truth about my health even if there were bad news. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 32. My doctor cares as much as I do about my | ☐ | ☐ | ☐ | ☐ | ☐ |
| health. |  |  |  |  |  |
| 33. If a mistake was made in my treatment, I believe my doctor would try | ☐ | ☐ | ☐ | ☐ | ☐ |

to hide it from me.

| HOW WOULD YOU RATE YOUR DOCTOR AND YOUR DOCTOR'S OFFICE ON THE FOLLOWING? | Poor | Fair | Good | Very Good | Excellent |
|---|---|---|---|---|---|
| 34. Sensitivity to my feelings. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 35. Attention given to what I have to say. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 36. Attention to my privacy. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 37. Respect and courtesy shown to me. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 38. The outcomes of my medical care, how much I am helped. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 39. Ability to explain the results of tests in a way I can understand. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 40. Knowledge of me and my family. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 41. Understanding of my health beliefs. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 42. Respect and courtesy shown to me by my doctor's staff. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 43. Overall quality of my medical care. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 44. The physical environment of the waiting room. | ☐ | ☐ | ☐ | ☐ | ☐ |

| | Definitely yes | Probably yes | Probably not | Definitely not | Don't know |
|---|---|---|---|---|---|
| 45. I would recommend the doctor I see under my health plan to my family and friends if they needed care. | ☐ | ☐ | ☐ | ☐ | ☐ |

# APPENDIX B: PHYSICIAN SELF-ASSESSED CULTURAL COMPETENCY SURVEY

## Part I. Physician Self-Assessment of Cultural Competency

This part of the survey is designed to assess your current health care practices. Please indicate the extent to which you practice the behaviors listed below.

| | Not at all | Seldom | Some-times | Usually | Always |
|---|---|---|---|---|---|
| 1. I ask patients why they think they are sick. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. I ask patients if they use medications other than the ones I prescribed. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. I talk with patients about traditional healing remedies. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. I ask my patients if they seek advice from family or friends when making health decisions. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. I ask my patients whether they would like adult family members present when discussing diagnosis and treatment options with my patients. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 6. I take extra time to ensure that my limited and non English speaking patients understand the side effects of the medications I prescribe for them. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 7. I inform my patients about resources in their local community where they can find help. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 8. I check to see if the patient understands my instructions and I repeat them if necessary. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 9. I make sure to ask my patients if they have any questions before they leave my office visit. | ☐ | ☐ | ☐ | ☐ | ☐ |

| | | | | | |
|---|---|---|---|---|---|
| 10. I help patients to ask me questions. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 11. I help patients answer the questions I ask. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 12. I encourage patients to stop me if they are confused. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 13. I help patients make decisions about their treatment. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 14. I include cultural assessments when I do patient evaluations. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 15. I ask my patients to tell me about their own explanations of health and illness. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 16. I recognize potential barriers to service that might be encountered by different people. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 17. I seek information on cultural needs when I identify new patients in my practice. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 18. I consider health beliefs when making decisions about treatment recommendations | ☐ | ☐ | ☐ | ☐ | ☐ |

# APPENDIX C: DESCRIPTIVE TABLES

Table C1

*Provider Respondent Characteristics*

| | Provider Characteristics by Hospital<br>Number (%) | | | |
|---|---|---|---|---|
| | A | B | C | D |
| AGE | | | | |
| Mean | 51.8 | 42.5 | 45.5 | 45.9 |
| Range | 41-58 | 39-46 | 43-48 | 31-64 |
| Gender: | | | | |
| Female | 4 (66) | 1 (50) | 2(100) | 7 (78) |
| Male | 2 (33) | 1 (50) | 0 | 2 (22) |
| Yrs in Practice | | | | |
| Mean | 17.5 | 8.0 | 13.0 | 15.1 |
| Range | 5-25 | 5-11 | 12-14 | 0-34 |
| Number of ethnic groups: | | | | |
| 5-9 | 2 (33.3) | 1 (50) | 2(100) | 8 (88.9) |
| >10 | 2 (33.3) | 1 (50) | 0 | 1 (11.1) |
| Not reported | 2 (33.3) | | | |
| Last Formal training: | | | | |
| Never | 2 (33.3) | 1 (50) | 0 | 5 (55.6) |
| >=5 yrs | 0 | 0 | 2(100) | 1 (11) |
| 3-4 yrs | 0 | 0 | 0 | 3 (33.3) |
| 1-2 yrs | 1 (16.7) | 1 (50) | 0 | 0 |
| Not reported | 3 (50) | 0 | 0 | 0 |

Characteristics by Gender

| | Ave. Age | Ave. Yrs in Practice |
|---|---|---|
| Male | 51.1 | 21.8 |
| Female | 44.6 | 14.5 |

Table C2

*Survey Question Responses*

|  | Respondent | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| 1 WhyIamsick | Patient | 79 | 2.96 | 1.531 | .172 |
|  | Provider | 19 | 3.26 | 1.046 | .240 |
| 2 Medication | Patient | 79 | 3.59 | 1.481 | .167 |
|  | Provider | 19 | 4.37 | .684 | .157 |
| 3 Tradition | Patient | 79 | 2.61 | 1.556 | .175 |
|  | Provider | 19 | 3.00 | 1.000 | .229 |
| 4 Advice | Patient | 79 | 2.43 | 1.411 | .159 |
|  | Provider | 19 | 2.89 | .937 | .215 |
| 5 Family | Patient | 79 | 2.68 | 1.498 | .169 |
|  | Provider | 19 | 3.53 | 1.172 | .269 |
| 6 Side effects | Patient | 79 | 3.86 | 1.308 | .147 |
|  | Provider | 19 | 4.16 | .688 | .158 |
| 7 Resources | Patient | 79 | 2.80 | 1.612 | .181 |
|  | Provider | 19 | 2.68 | 1.057 | .242 |
| 8 Instructions | Patient | 79 | 3.87 | 1.353 | .152 |
|  | Provider | 19 | 4.42 | .607 | .139 |
| 9 Questions | Patient | 79 | 4.46 | 1.035 | .116 |
|  | Provider | 19 | 4.68 | .478 | .110 |
| 10 Helps ask | Patient | 79 | 3.68 | 1.464 | .165 |
|  | Provider | 19 | 4.26 | .733 | .168 |

*(table continues)*

| | Respondent | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| 11 Helps answer | Patient | 79 | 3.46 | 1.534 | .173 |
| | Provider | 19 | 3.32 | 1.157 | .265 |
| 12 Encourages | Patient | 79 | 3.30 | 1.555 | .175 |
| | Provider | 19 | 4.00 | .943 | .216 |
| 13 Treatment | Patient | 79 | 3.42 | 1.464 | .165 |
| | Provider | 19 | 4.11 | .737 | .169 |
| Total_CC | Patient | 79 | 43.13 | 13.696 | 1.541 |
| | Provider | 19 | 48.68 | 4.854 | 1.114 |

Table C3

*Survey Responses: Independent Samples Test*

| | | Levene's Test for Equality of Variances | | *t*-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 95% CI of the Difference | |
| | | *F* | Sig. | *t* | df | Sig. (2-tailed) | Mean Difference | *SE* Difference | Lower | Upper |
| 1WhyIamsic | Equal variances assumed | 5.24 | .02 | -.81 | 96 | .42 | -.30 | .37 | -1.04 | .44 |
| | Equal variances not assumed | | | -1.02 | 38.96 | .31 | -.30 | .30 | -.90 | .30 |
| 2Medicatio | Equal variances assumed | 10.43 | .00 | -2.21 | 96 | .03 | -.77 | .35 | -1.47 | -.08 |
| | Equal variances not assumed | | | -3.38 | 62.99 | .00 | -.77 | .23 | -1.23 | -.32 |
| 3Tradition | Equal variances assumed | 11.75 | .001 | -1.05 | 96 | .30 | -.39 | .38 | -1.14 | .35 |
| | Equal variances not assumed | | | -1.36 | 41.79 | .18 | -.39 | .28 | -.98 | .19 |

*(table continues)*

| | | Levene's Test for Equality of Variances | | *t*-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 95% CI of the Difference | |
| | | *F* | Sig. | *t* | df | Sig. (2-tailed) | Mean Difference | *SE* Difference | Lower | Upper |
| 4Advice | Equal variances assumed | 10.11 | .002 | -1.36 | 96 | .18 | -.46 | .34 | -1.14 | .21 |
| | Equal variances not assumed | | | -1.74 | 40.26 | .09 | -.46 | .27 | -1.00 | .08 |
| 5Family | Equal variances assumed | 3.49 | .07 | -2.29 | 96 | .02 | -.84 | .37 | -1.58 | -.11 |
| | Equal variances not assumed | | | -2.66 | 33.72 | .01 | -.84 | .32 | -1.49 | -.20 |
| 6Sideeffec | Equal variances assumed | 9.18 | .00 | -.96 | 96 | .34 | -.30 | .31 | -.91 | .32 |
| | Equal variances not assumed | | | -1.38 | 53.54 | .17 | -.30 | .22 | -.73 | .14 |
| 7Resources | Equal variances assumed | 11.32 | .00 | .29 | 96 | .77 | .11 | .39 | -.66 | .89 |
| | Equal variances not assumed | | | .37 | 40.84 | .71 | .11 | .30 | -.50 | .73 |

*(table continues)*

| | | Levene's Test for Equality of Variances | | *t*-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 95% CI of the Difference | |
| | | *F* | Sig. | *t* | df | Sig. (2-tailed) | Mean Difference | *SE* Difference | Lower | Upper |
| 8Instructi | Equal variances assumed | 8.14 | .01 | -1.72 | 96 | .09 | -.55 | .32 | -1.18 | .09 |
| | Equal variances not assumed | | | -2.66 | 65.22 | .01 | -.55 | .21 | -.96 | -.14 |
| 9Questions | Equal variances assumed | 4.02 | .05 | -.94 | 96 | .35 | -.23 | .24 | -.71 | .26 |
| | Equal variances not assumed | | | -1.43 | 63.08 | .16 | -.23 | .16 | -.55 | .09 |
| 10Doctorhe | Equal variances assumed | 11.53 | .00 | -1.67 | 96 | .10 | -.58 | .35 | -1.27 | .11 |
| | Equal variances not assumed | | | -2.46 | 56.93 | .02 | -.58 | .24 | -1.05 | -.11 |
| 11Doctorhe | Equal variances assumed | 6.00* | .02 | .37 | 96 | .71 | .14 | .38 | -.61 | .89 |
| | Equal variances not assumed | | | .42 | 34.99 | .66 | .14 | .32 | -.50 | .78 |

*(table continues)*

| | | Levene's Test for Equality of Variances | | *t*-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 95% CI of the Difference | |
| | | *F* | Sig. | *t* | df | Sig. (2-tailed) | Mean Difference | *SE* Difference | Lower | Upper |
| 12Doctoren | Equal variances assumed | 11.18 | .00 | -1.87 | 96 | .07 | -.70 | .37 | -1.44 | .04 |
| | Equal variances not assumed | | | -2.50 | 44.84 | .02 | -.70 | .28 | -1.26 | -.14 |
| 13Treatmen | Equal variances assumed | 10.75 | .00 | -1.98 | 96 | .05 | -.69 | .345 | -1.38 | .00 |
| | Equal variances not assumed | | | -2.91 | 56.57 | .01 | -.69 | .24 | -1.16 | -.22 |
| Total_CC | Equal variances assumed | 11.86 | .00 | -1.74 | 96 | .09 | -5.56 | 3.20 | -11.91 | .79 |
| | Equal variances not assumed | | | -2.92 | 82.84 | .00 | -5.56 | 1.90 | -9.34 | -1.78 |

Table C4

*Survey Responses: Paired Samples Correlations*

| Question | | N | Correlation | Sig. |
|---|---|---|---|---|
| Pair 1 | 1A & 1B | 23 | -.44 | .03 |
| Pair 2 | 2A & 2B | 23 | -.19 | .38 |
| Pair 3 | 3A & 3B | 23 | .02 | .92 |
| Pair 4 | 4A & 4B | 23 | .14 | .51 |
| Pair 5 | 5A & 5B | 23 | -.04 | .85 |
| Pair 6 | 6A & 6B | 23 | .26 | .24 |
| Pair 7 | 7A & 7B | 23 | .38 | .07 |
| Pair 8 | 8A & 8B | 23 | .42 | .05 |
| Pair 9 | 9A & 9B | 23 | .14 | .52 |
| Pair 10 | 10A & 10B | 23 | .00 | 1.00 |
| Pair 11 | 11A & 11B | 23 | .37 | .08 |
| Pair 12 | 12A & 12B | 23 | -.21 | .35 |
| Pair 13 | 13A & 13B | 23 | .00 | 1.00 |

Table C5

*Patient-Provider Paired Samples Test*

| Question | | Paired Differences: Mean | Std. Deviation | *SE* Mean | 95% CI of the Difference: Lower | Upper | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| Pair 1 | 1A - 1B | .13 | 2.16 | .45 | -.80 | 1.06 | .29 | 22 | .78 |
| Pair 2 | 2A - 2B | .30 | 1.55 | .32 | -.37 | .98 | .94 | 22 | .36 |
| Pair 3 | 3A - 3B | .39 | 1.85 | .39 | -.41 | 1.19 | 1.01 | 22 | .32 |
| Pair 4 | 4A - 4B | .17 | 1.67 | .35 | -.55 | .90 | .50 | 22 | .62 |
| Pair 5 | 5A - 5B | .17 | 1.90 | .40 | -.65 | 1.00 | .44 | 22 | .67 |
| Pair 6 | 6A - 6B | .22 | 1.17 | .24 | -.29 | .72 | .89 | 22 | .38 |
| Pair 7 | 7A - 7B | .70 | 1.46 | .30 | .06 | 1.33 | 2.29 | 22 | .03 |
| Pair 8 | 8A - 8B | .44 | 1.16 | .24 | -.07 | .94 | 1.80 | 22 | .09 |
| Pair 9 | 9A - 9B | .13 | .82 | .17 | -.22 | .48 | .77 | 22 | .45 |
| Pair 10 | 10A - 10B | -.04 | 1.58 | .33 | -.73 | .64 | -.13 | 22 | .90 |
| Pair 11 | 11A - 11B | .39 | 1.37 | .29 | -.20 | .99 | 1.37 | 22 | .19 |
| Pair 12 | 12A - 12B | -.30 | 1.64 | .34 | -1.01 | .40 | -.89 | 22 | .38 |
| Pair 13 | 13A - 13B | -.39 | 1.41 | .29 | -1.00 | .22 | -1.34 | 22 | .20 |

# APPENDIX D: CORRELATION TABLES

Table D1

*Provider Variable Correlations*

| | | CC-P | Yrs Practice | History Taking | Explaining | Behavior | tPSACC | PrAge | Number | Provider Gender | Training |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CC-P | Pearson correlation | 1 | .26 | .83** | .84** | .18 | .72** | .37 | .22 | -.04 | -.32 |
| | Sig. (2-tailed) | | .28 | .00 | .00 | .46 | .00 | .12 | .37 | .87 | .20 |
| | N | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 19 | 18 |
| Yrs Practice | Pearson Correlation | .26 | 1 | .31 | .12 | .31 | .37 | .84** | .10 | -.40** | -.20 |
| | Sig. (2-tailed) | .28 | | .19 | .612 | .19 | .12 | .00 | .69 | .00 | .43 |
| | N | 19 | 19 | 19 | 19 | 19 | 19 | 75 | 18 | 75 | 18 |
| History taking | Pearson Correlation | .83** | .31 | 1 | .41 | .24 | .67** | . 27 | -.12 | .01 | -.29 |
| | Sig. (2-tailed) | .00 | .19 | | .08 | .32 | .00 | .27 | .65 | .96 | .25 |
| | N | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 19 | 18 |
| Explaining | Pearson Correlation | .84** | .12 | .401 | 1 | .06 | .55* | .35 | .51* | -.08 | -.26 |
| | Sig. (2-tailed) | .00 | .62 | .08 | | .80 | .02 | .14 | .03 | .75 | .30 |
| | N | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 19 | 18 |

*(table continues)*

| | | CC-P | YrsPrac | History | Explaining | Behavior | tPSACC | PrAge | Number | Gender | Training |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Behavior demo | Pearson Correlation | .18 | .31 | .24 | .06 | 1 | .81** | .42 | .27 | .05 | .21 |
| | Sig. (2-tailed) | .46 | .19 | .32 | .80 | | .00 | .07 | .29 | .85 | .41 |
| | N | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 19 | 18 |
| tPSACC | Pearson Correlation | .72** | .37 | .67** | .55* | .81** | 1 | .52* | .30 | .01 | -.07 |
| | Sig. (2-tailed) | .00 | .12 | .00 | .02 | .00 | | .02 | .23 | .97 | .78 |
| | N | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 19 | 18 |
| PrAge | Pearson Correlation | .37 | .84** | .27 | .35 | .42 | .52* | 1 | .33 | -.41** | -.12 |
| | Sig. (2-tailed) | .12 | .00 | ..27 | .14 | .07 | .02 | | .19 | .00 | .64 |
| | N | 19 | 75 | 19 | 19 | 19 | 19 | 76 | 18 | 76 | 18 |
| Number | Pearson Correlation | .22 | .10 | -.12 | .51* | .27 | .30 | .33 | 1 | .03 | .34 |
| | Sig. (2-tailed) | .37 | .69 | .65 | .03 | .29 | .23 | .19 | | .90 | .17 |
| | N | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |
| PrGender | Pearson Correlation | -.04 | -.40** | .01 | -.08 | .05 | .01 | -.41** | .03 | 1 | .21 |
| | Sig. (2-tailed) | .87 | .00 | .96 | .75 | .85 | .97 | .00 | .90 | | .41 |
| | N | 19 | 75 | 19 | 19 | 19 | 19 | 76 | 18 | 80 | 18 |
| Training | Pearson Correlation | -.32 | -.20 | -.29 | -.26 | .21 | -.07 | -.12 | .34 | .21 | 1 |
| | Sig. (2-tailed) | .20 | .43 | .25 | .30 | .41 | .78 | .64 | .17 | .41 | |
| | N | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 | 18 |

Note. **.Correlation is significant at the 0.01 level (2-tailed).*.Correlation is significant at the 0.05 level (2-tailed)

Table D2

*Patient Variable Correlations*

| | | Age | Parity | PtEduc | ACC | Bplace | ORG | CC | PtTrust | SAT | tPRPCC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Age | Pearson Correlation | 1 | .58$^{**}$ | -.01 | -.02 | -.34$^{**}$ | .04 | -.16 | .01 | -.12 | -.14 |
| | Sig. (2-tailed) | | .00 | .92 | .87 | .00 | .73 | .17 | .90 | .31 | .22 |
| | N | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| Parity | Pearson Correlation | .58$^{**}$ | 1 | -.09 | -.19 | -.25$^{*}$ | .08 | .00 | -.19 | -.01 | -.05 |
| | Sig. (2-tailed) | .00 | | .45 | .09 | .02 | .50 | 1.00 | .09 | .93 | .66 |
| | N | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| PtEduc | Pearson Correlation | -.01 | -.09 | 1 | .19 | .20 | -.06 | -.07 | .22$^{*}$ | .17 | .09 |
| | Sig. (2-tailed) | .92 | .45 | | .09 | .08 | .59 | .55 | .05 | .12 | .44 |
| | N | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| ACC | Pearson Correlation | -.02 | -.19 | .19 | 1 | .30$^{**}$ | -.32$^{**}$ | .06 | .09 | .14 | .12 |
| | Sig. (2-tailed) | .87 | .09 | .09 | | .01 | .00 | .60 | .44 | .22 | .31 |
| | N | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |

*(table continued)*

| | | Age | Parity | PtEduc | ACC | Bplace | ORG | CC | PtTrust | SAT | tPRPCC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Bplace | Pearson Correlation | -.34** | -.25* | .20 | .30** | 1 | -.11 | -.05 | -.01 | .09 | .01 |
| | Sig. (2-tailed) | .00 | .02 | .08 | .01 | | .36 | .6 | .96 | .42 | .95 |
| | N | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| ORG | Pearson Correlation | .04 | .08 | -.06 | -.32** | -.11 | 1 | .17 | .09 | .16 | .19 |
| | Sig. (2-tailed) | .73 | .50 | .59 | .00 | .36 | | .13 | .45 | .15 | .09 |
| | N | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| CC | Pearson Correlation | -.16 | .00 | -.07 | .06 | -.05 | .17 | 1 | .38** | .47** | .88** |
| | Sig. (2-tailed) | .17 | 1.00 | .55 | .60 | .65 | .13 | | .00 | .00 | .00 |
| | N | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| PtTrust | Pearson Correlation | .01 | -.19 | .22* | .09 | -.01 | .09 | .38** | 1 | .37** | .62** |
| | Sig. (2-tailed) | .90 | .09 | .05 | .44 | .96 | .45 | .00 | | .00 | .00 |
| | N | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| Satisfaction | Pearson Correlation | -.12 | -.01 | .17 | .14 | .09 | .16 | .47** | .37** | 1 | .79** |
| | Sig. (2-tailed) | .31 | .93 | .12 | .22 | .42 | .15 | .00 | .00 | | .00 |
| | N | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |

*(table continued)*

| | | Age | Parity | PtEduc | ACC | Bplace | ORG | CC | PtTrust | SAT | tPRPCC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| tPRPCC | Pearson Correlation | -.14 | -.05 | .09 | .12 | .01 | .19 | .88** | .62** | .79** | 1 |
| | Sig. (2-tailed) | .22 | .66 | .44 | .31 | .95 | .09 | .00 | .00 | .00 | |
| | N | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| History patient | Pearson Correlation | -.15 | .03 | -.12 | .02 | -.01 | .22 | .91** | .31** | .42** | .79** |
| | Sig. (2-tailed) | .20 | .76 | .28 | .87 | .93 | .05 | .00 | .01 | .00 | .00 |
| | N | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |
| Explaining Patient | Pearson Correlation | -.15 | -.02 | -.02 | .08 | -.07 | .13 | .96** | .38** | .45** | .85** |
| | Sig. (2-tailed) | .20 | .84 | .85 | .47 | .51 | .27 | .00 | .00 | .00 | .00 |
| | N | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 80 |

Note. **.Correlation is significant at the 0.01 level (2-tailed).*.Correlation is significant at the 0.05 level (2-tailed)

Table D3

*Patient and Provider Demographic Correlation*

| | | Pr Age | Number | Provider Gender | Training | Yrs Practice | tPSACC | APNCU | T ADV |
|---|---|---|---|---|---|---|---|---|---|
| Patient Age | Pearson Correlation | .01 | -.26 | .00 | -.70** | .01 | -.19 | .23* | .05 |
| | Sig. (2-tailed) | .94 | .25 | .98 | .00 | .93 | .38 | .04 | .66 |
| | N | 76 | 22 | 80 | 22 | 75 | 24 | 80 | 80 |
| Parity | Pearson Correlation | .17 | -.29 | -.03 | -.26 | .22 | -.16 | .08 | .06 |
| | Sig. (2-tailed) | .15 | .19 | .80 | .25 | .06 | .44 | .46 | .61 |
| | N | 76 | 22 | 80 | 22 | 75 | 24 | 80 | 80 |
| Patient Educ | Pearson Correlation | .16 | .19 | .06 | -.13 | .04 | .27 | .20 | -.16 |
| | Sig. (2-tailed) | .18 | .40 | .57 | .57 | .76 | .21 | .07 | .17 |
| | N | 76 | 22 | 80 | 22 | 75 | 23 | 80 | 80 |
| Acculturation | Pearson Correlation | .19 | .21 | -.06 | -.06 | .09 | -.10 | -.03 | .18 |
| | Sig. (2-tailed) | .10 | .34 | .61 | .81 | .44 | .64 | .76 | .11 |
| | N | 76 | 22 | 80 | 22 | 75 | 24 | 80 | 80 |
| Birthplace | Pearson Correlation | .06 | .09 | .03 | .18 | .02 | .06 | -.06 | -.03 |
| | Sig. (2-tailed) | .56 | .70 | .79 | .43 | .88 | .80 | .58 | .82 |
| | N | 76 | 22 | 80 | 22 | 75 | 22 | 80 | 80 |

*(table continued)*

| | | Pr Age | Number | Provider Gender | Training | Yrs Practice | tPSACC | APNCU | T ADV |
|---|---|---|---|---|---|---|---|---|---|
| APNCU | Pearson Correlation | .05 | .23 | .22 | -.16 | -.10 | .12 | 1 | -.28* |
| | Sig. (2-tailed) | .68 | .30 | .06 | .49 | .39 | .59 | | .01 |
| | N | 76 | 22 | 80 | 22 | 75 | 24 | 80 | 80 |
| T ADV | Pearson Correlation | -.17 | -.14 | -.12 | -.10 | .01 | -.29 | -.28* | 1 |
| | Sig. (2-tailed) | .13 | .53 | .27 | .67 | .92 | .17 | .01 | |
| | N | 76 | 22 | 80 | 22 | 75 | 24 | 80 | 80 |
| PRPCC | Pearson Correlation | -.08 | -.33 | .18 | .13 | -.15 | -.18 | -.09 | -.19 |
| | Sig. (2-tailed) | .50 | .13 | .11 | .58 | .20 | .40 | .42 | .10 |
| | N | 76 | 22 | 80 | 22 | 75 | 24 | 80 | 80 |

Note. **.Correlation is significant at the 0.01 level (2-tailed).*.Correlation is significant at the 0.05 level (2-tailed)

Table D4

*Survey Domain Correlation*

| | | History Provider | Explaining provider | CC-P | Behavior demonstration | tPSACC | APNCU | T ADV |
|---|---|---|---|---|---|---|---|---|
| ORG | Pearson Correlation | -.19 | -.30 | -.30 | -.01 | -.20 | .07 | -.15 |
| | Sig. (2-tailed) | .37 | .15 | .16 | .96 | .36 | .53 | .19 |
| | N | 24 | 24 | 24 | 24 | 24 | 80 | 80 |
| CC Pt perceived | Pearson Correlation | -.57** | -.44* | -.60** | .04 | -.35 | -.15 | -.13 |
| | Sig. (2-tailed) | .00 | .03 | .00 | .86 | .10 | .19 | .24 |
| | N | 24 | 24 | 24 | 24 | 24 | 80 | 80 |
| History Pt Perceived | Pearson Correlation | -.63** | -.44* | -.63** | .01 | -.40 | -.15 | -.12 |
| | Sig. (2-tailed) | .00 | .03 | .00 | .98 | .06 | .18 | .30 |
| | N | 24 | 24 | 24 | 24 | 24 | 80 | 80 |
| Explaining Pt Perceived | Pearson Correlation | -.48* | -.40 | -.51* | .06 | -.28 | -.13 | -.13 |
| | Sig. (2-tailed) | .02 | .06 | .01 | .78 | .19 | .26 | .26 |
| | N | 24 | 24 | 24 | 24 | 24 | 80 | 80 |
| Pt Trust | Pearson Correlation | .26 | .10 | .21 | -.05 | .09 | .03 | -.15 |
| | Sig. (2-tailed) | .22 | .64 | .33 | .80 | .68 | .82 | .20 |
| | N | 24 | 24 | 24 | 24 | 24 | 80 | 80 |

*(table continues)*

| | | History Provider | Explaining provider | CC-P | Behavior demonstration | tPSACC | APNCU | T ADV |
|---|---|---|---|---|---|---|---|---|
| Satisfaction | Pearson Correlation | .08 | -.10 | -.02 | .12 | .08 | -.03 | -.18 |
| | Sig. (2-tailed) | .71 | .65 | .94 | .58 | .70 | .81 | .12 |
| | N | 24 | 24 | 24 | 24 | 24 | 80 | 80 |
| Total PRPCC Score | Pearson Correlation | -.30 | -.33 | -.37 | .07 | -.18 | -.09 | -.19 |
| | Sig. (2-tailed) | .15 | .12 | .07 | .74 | .40 | .42 | .10 |
| | N | 24 | 24 | 24 | 24 | 24 | 80 | 80 |
| APNCU | Pearson Correlation | .37 | .53** | .56** | -.31 | .12 | 1 | -.28* |
| | Sig. (2-tailed) | .07 | .01 | .01 | .15 | .59 | | .01 |
| | N | 24 | 24 | 24 | 24 | 24 | 80 | 80 |
| T ADV | Pearson Correlation | .10 | -.13 | -.03 | -.36 | -.29 | -.28* | 1 |
| | Sig. (2-tailed) | .64 | .55 | .91 | .09 | .17 | .01 | |
| | N | 24 | 24 | 24 | 24 | 24 | 80 | 80 |

Note. **.Correlation is significant at the 0.01 level (2-tailed).*.Correlation is significant at the 0.05 level (2-tailed)

# APPENDIX E: REGRESSION TABLES

Table E1

*Research Question #1 ANOVA*

| Model | | Sum of Squares | df | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | .74 | 2 | .37 | .25 | .78[a] |
| | Residual | 31.10 | 21 | 1.48 | | |
| | Total | 31.83 | 23 | | | |
| 2 | Regression | .79 | 3 | .26 | .17 | .92[b] |
| | Residual | 31.05 | 20 | 1.55 | | |
| | Total | 31.83 | 23 | | | |

Note. *n*=24. a. Predictors: (Constant), PrAge, Age. b. Predictors: (Constant), PrAge, Age, tPSACC
c. Dependent Variable: APNCU.

Table E2

*Research Question #2 ANOVA*

| Model | | Sum of Squares | df | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 7.15 | 4 | 1.79 | 1.37 | .25[a] |
| | Residual | 91.34 | 70 | 1.31 | | |
| | Total | 98.48 | 74 | | | |
| 2 | Regression | 9.48 | 5 | 1.90 | 1.47 | .21[b] |
| | Residual | 88.10 | 69 | 1.29 | | |
| | Total | 98.48 | 74 | | | |

Note. *n*=75. a. Predictors: (Constant), PrAge, PtTrust, Satisfaction, YrsPractice. b. Predictors: (Constant), PrAge, PtTrust, Satisfaction, YrsPractice, tPRPCC. c. Dependent Variable: APNCU

Table E3

*Research Question #3 ANOVA*

| Model | | Sum of Squares | df | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 6444.27 | 4 | 1611.07 | 6.92 | .00[a] |
| | Residual | 4421.57 | 19 | 232.71 | | |
| | Total | 10865.83 | 23 | | | |
| 2 | Regression | 7078.28 | 5 | 1415.66 | 6.73 | .00[b] |
| | Residual | 3787.56 | 18 | 210.42 | | |
| | Total | 10865.83 | 23 | | | |

Note. *n*=24. a. Predictors: (Constant), YrsPractice, PtTrust, Satisfaction, PrAge. b. Predictors: (Constant), YrsPractice, PtTrust, Satisfaction, PrAge, tPSACC. c. Dependent Variable: tPRPCC

Table E4

*Research Question #4 Patient Cultural Competence Score Domain ANOVA*

| Model | | Sum of Squares | df | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 10.34 | 4 | 2.59 | 2.29 | .10[a] |
| | Residual | 21.49 | 19 | 1.13 | | |
| | Total | 31.83 | 23 | | | |
| 2 | Regression | 15.02 | 5 | 3.00 | 3.22 | .03[b] |
| | Residual | 16.82 | 18 | .93 | | |
| | Total | 31.83 | 23 | | | |

Note. *n*=24. a. Predictors: (Constant), ExplainingProvider, Satisfaction, Age, PtTrust. b. Predictors: (Constant), ExplainingProvider, Satisfaction, Age, PtTrust, CC. c. Dependent Variable: APNCU

Table E5

*Research Question #4 Patient History-taking Domain ANOVA*

| Model | | Sum of Squares | df | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 13.42 | 6 | 2.24 | 2.06 | .11[a] |
| | Residual | 18.42 | 17 | 1.08 | | |
| | Total | 31.83 | 23 | | | |
| 2 | Regression | 17.21 | 7 | 2.46 | 2.69 | .05[b] |
| | Residual | 14.62 | 16 | .91 | | |
| | Total | 31.83 | 23 | | | |

Note. *n*=24. a. Predictors: (Constant), Explaining Pt, PtTrust, Age, ExplainingProvider, Satisfaction, HistoryProvider. b. Predictors: (Constant), Explaining Pt, PtTrust, Age, ExplainingProvider, Satisfaction, HistoryProvider, History Pt. c. Dependent Variable: APNCU

Table E6

*Research Question #4 Provider Explaining Domain Model Summary ANOVA*

| Model | | Sum of Squares | df | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 11.66 | 3 | 3.89 | 3.85 | .03[a] |
| | Residual | 20.18 | 20 | 1.01 | | |
| | Total | 31.83 | 23 | | | |
| 2 | Regression | 15.50 | 4 | 3.88 | 4.51 | .01[b] |
| | Residual | 16.33 | 19 | .86 | | |
| | Total | 31.83 | 23 | | | |

Note. *n*=24. a. Predictors: (Constant), HistoryProvider, Age, History Pt. b. Predictors: (Constant), HistoryProvider, Age, History Pt , ExplainingProvider. c. Dependent Variable: APNCU

Table E7

*Research Question #4 Provider Behavior Demonstration Domain ANOVA*

| Model | | Sum of Squares | df | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 10.07 | 3 | 3.36 | 3.09 | .05[a] |
| | Residual | 21.76 | 20 | 1.09 | | |
| | Total | 31.83 | 23 | | | |
| 2 | Regression | 14.48 | 4 | 3.62 | 3.96 | .02[b] |
| | Residual | 17.36 | 19 | .91 | | |
| | Total | 31.83 | 23 | | | |

Note. *n*=22. a. Predictors: (Constant), CC-P, Age, PrAge. b. Predictors: (Constant), CC-P, Age, PrAge, Behavior. c. Dependent Variable: APNCU

Table E8

*Research Question #5 ANOVA*

| Model | | Sum of Squares | df | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | .90 | 3 | .30 | 1.62 | .22[a] |
| | Residual | 3.72 | 20 | .19 | | |
| | Total | 4.63 | 23 | | | |
| 2 | Regression | 1.01 | 5 | .20 | 1.01 | .44[b] |
| | Residual | 3.61 | 18 | .20 | | |
| | Total | 4.63 | 23 | | | |

Note. n=24. a. Predictors: (Constant), Satisfaction, PrAge, PtTrust. b. Predictors: (Constant), Satisfaction, PrAge, PtTrust, tPSACC, tPRPCC. c. Dependent Variable: T ADV

Table E9

*Research Question #5 Model 2 ANOVA*

| Model | | Sum of Squares | df | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 7.85 | 3 | 2.62 | 1.79 | .16[a] |
| | Residual | 105.15 | 72 | 1.46 | | |
| | Total | 113.00 | 75 | | | |
| 2 | Regression | 8.23 | 4 | 2.06 | 1.40 | .25[b] |
| | Residual | 104.77 | 71 | 1.48 | | |
| | Total | 113.00 | 75 | | | |

Note. *n*=76. a. Predictors: (Constant), PrAge, PtTrust, Satisfaction. b. Predictors: (Constant), PrAge, PtTrust, Satisfaction, tPRPCC. c. Dependent Variable: T ADV

Table E10

*Research Question #5 Model 2 Residuals Statistics*

| | Minimum | Maximum | Mean | Std. Deviation | N |
|---|---|---|---|---|---|
| Predicted Value | -.37 | 1.29 | .50 | .33 | 76 |
| Residual | -.99 | 5.86 | .00 | 1.18 | 76 |
| Std. Predicted Value | -2.61 | 2.38 | .00 | 1.00 | 76 |
| Std. Residual | -.81 | 4.83 | .00 | .97 | 76 |

a. Dependent Variable: T ADV

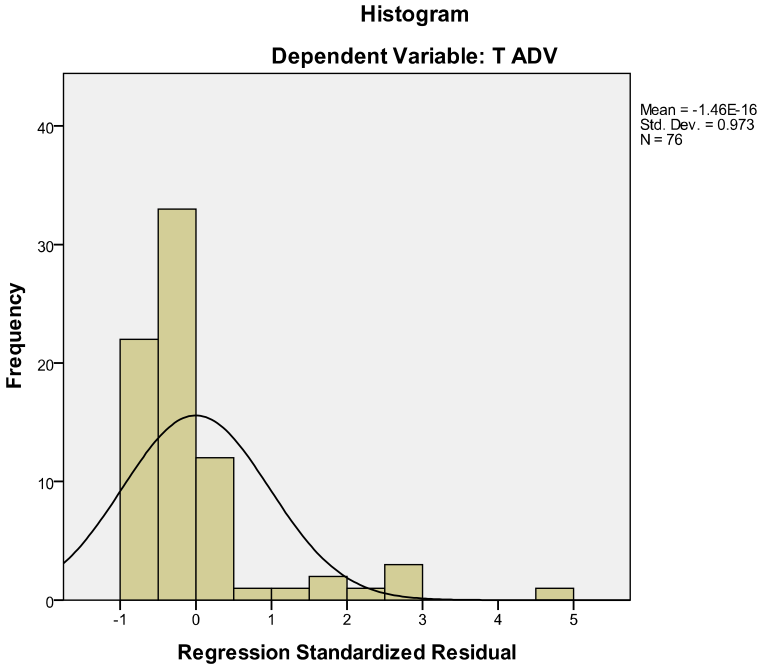

*Figure E1*: Model 2 histogram TADV

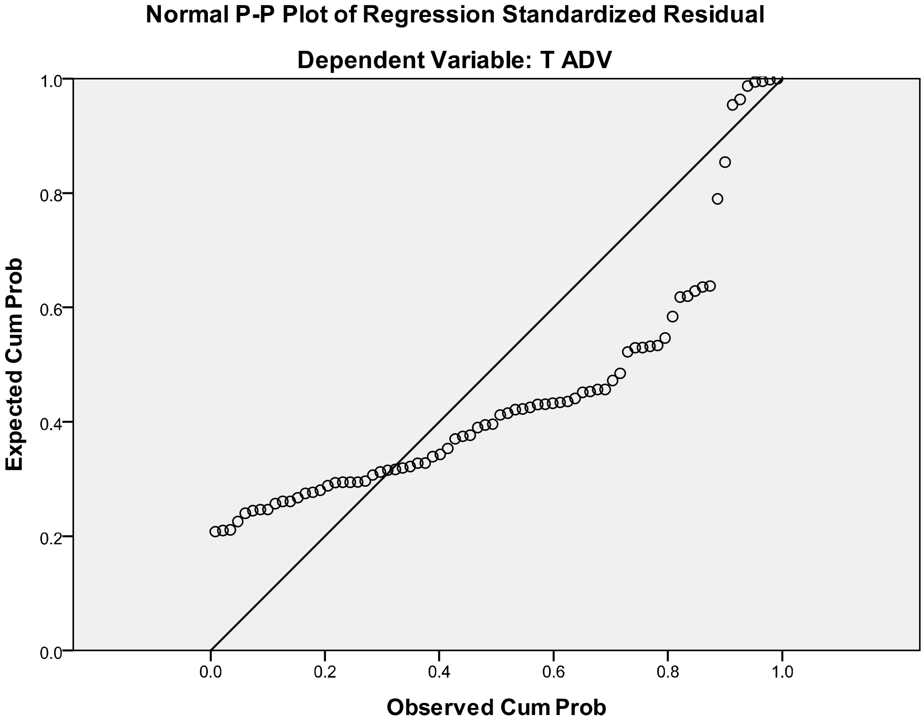

*Figure E2*: Model 2 P-P plot TADV

Table E11

*Research Question #5 Model 3 ANOVA*

| Model | | Sum of Squares | df | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 4.42 | 3 | 1.47 | 4.11 | .01[a] |
| | Residual | 23.98 | 67 | .36 | | |
| | Total | 28.39 | 70 | | | |
| 2 | Regression | 4.48 | 4 | 1.12 | 3.09 | .02[b] |
| | Residual | 23.91 | 66 | .36 | | |
| | Total | 28.39 | 70 | | | |

Note. *n*=71. a. Predictors: (Constant), PrAge, PtTrust, Satisfaction. b. Predictors: (Constant), PrAge, PtTrust, Satisfaction, tPRPCC. c. Dependent Variable: T ADV

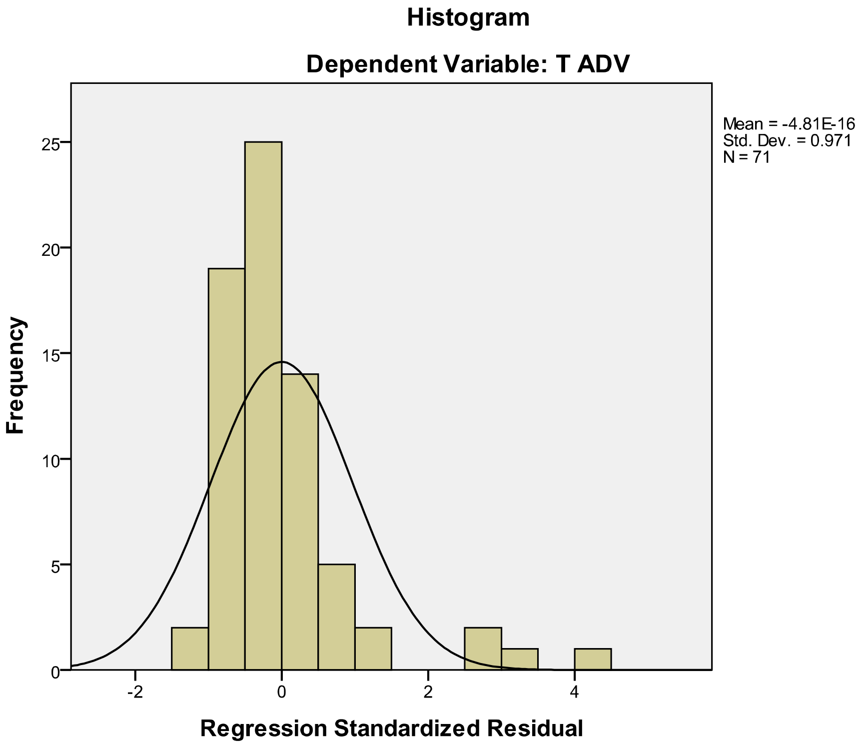

*Figure E3*: Model 3 histogram TADV excluding outliers

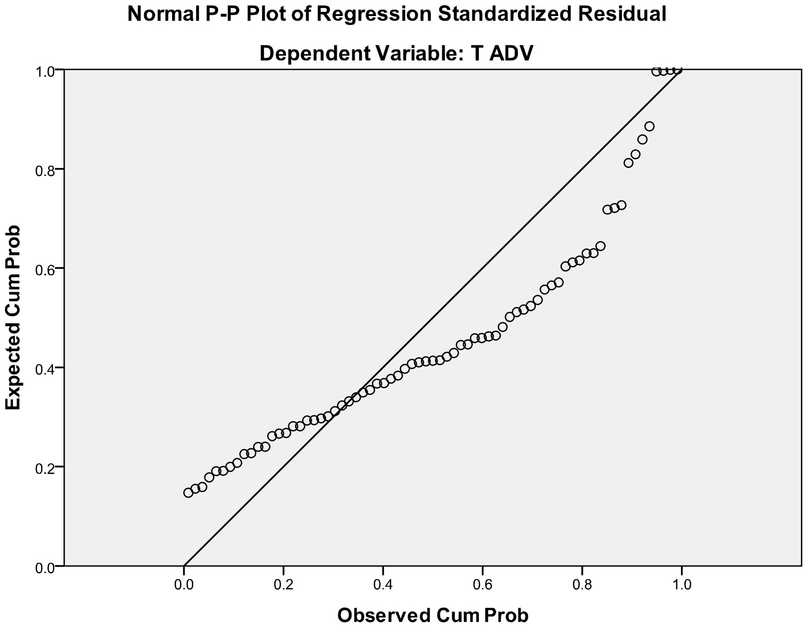

*Figure E4*: Model 3 P-P plot TADV excluding outliers

Table E12

*Research Question #5 Model 3 Residuals Statistics*

| | Minimum | Maximum | Mean | Std. Deviation | N |
|---|---|---|---|---|---|
| Predicted Value | -.35 | .91 | .23 | .25 | 71 |
| Residual | -.63 | 2.61 | .00 | .58 | 71 |
| Std. Predicted Value | -2.29 | 2.71 | .00 | 1.00 | 71 |
| Std. Residual | -1.05 | 4.34 | .00 | .97 | 71 |

a. Dependent Variable: T ADV

Table E13

*Research Question #5 Model 4 ANOVA*

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 4.42 | 3 | 1.47 | 3.54 | .02[a] |
| | Residual | 29.10 | 72 | .42 | | |
| | Total | 34.42 | 75 | | | |
| 2 | Regression | 4.62 | 4 | 1.16 | 2.75 | .04[b] |
| | Residual | 29.80 | 71 | .42 | | |
| | Total | 34.42 | 75 | | | |

Note. n=76. a. Predictors: (Constant), PrAge, PtTrust, Satisfaction. b. Predictors: (Constant), PrAge, PtTrust, Satisfaction, tPRPCC. c. Dependent Variable: TADV2 (recoded TADV)

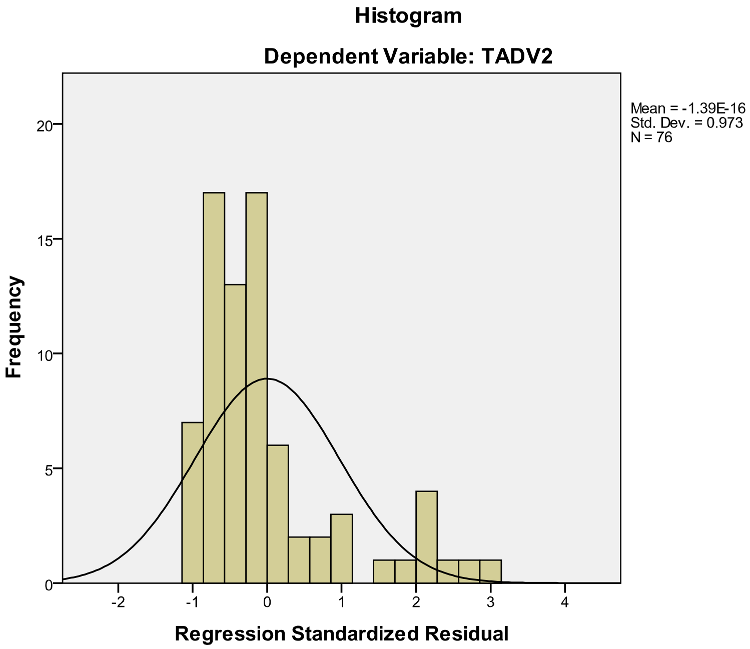

*Figure E5*: Model 4 histogram TADV2

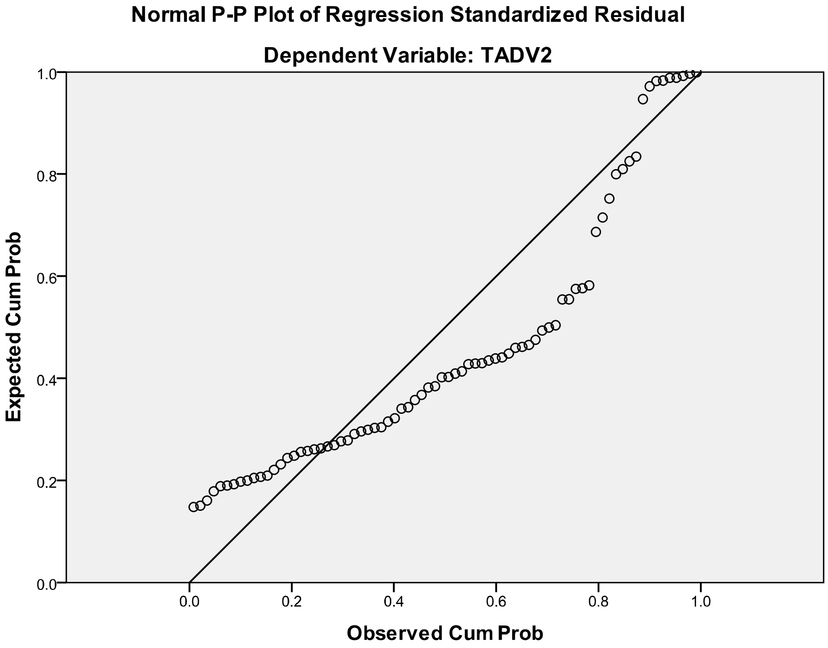

*Figure E6:* Model 4 P-P plot TADV2

Table E14

*Research Question #5 Model 4 Residuals Statistics*

| | Minimum | Maximum | Mean | Std. Deviation | N |
|---|---|---|---|---|---|
| Predicted Value | -.31 | .95 | .32 | .25 | 76 |
| Residual | -.68 | 2.01 | .00 | .63 | 76 |
| Std. Predicted Value | -2.54 | 2.57 | .00 | 1.00 | 76 |
| Std. Residual | -1.05 | 3.11 | .00 | .97 | 76 |

a. Dependent Variable: TADV2

# CURRICULUM VITAE

Cynthia J Larson, PhD, MSPH, MLS-ASCP

## EDUCATION

| | |
|---|---|
| Jan 2012 | PhD Public Health<br>Walden University, Minneapolis, MN<br>Epidemiology specialization<br>G.P.A. 4.0 |
| May 2007 | Master of Science in Public Health<br>Walden University, Minneapolis, MN<br>Community Education specialization<br>G.P.A. 4.0 |
| May 2005 | Bachelor of Arts Biology, Minor Business Administration<br>Metropolitan State University, St Paul, MN<br>G.P.A. 4.0 |
| March 1976 | Medical Laboratory Technician<br>Medical Institute of Minnesota, Minneapolis, MN |

## WORK EXPERIENCE

Infection Preventionist (IP)- System Office — August, 2010 - present

- Doctorate prepared with eleven years experience as Infection Preventionist in high performing organization with progressive responsibility overseeing Infection Prevention and Control programs across 11 hospitals and surgery centers, and physicians offices
- Corporate Infection Prevention regulatory lead
- Corporate Infection Prevention liaison to Employee Health, system operations, and Supply Chain
- Effective problem solving skills and ability to assess and redesign work processes to improve efficiency
- Successfully lead development and implementation of new IP orientation and provide ongoing mentoring and development for Infection Preventionists

- Strong data analyst skills that support Infection Prevention performance improvement projects
- Project management experience including: STERIS SS1 transition; hand hygiene product standardization; antiseptic wipe conversion; Environmental Service standardization and training

Infection Preventionist-

Community hospital

January 1999- present

Regulatory

- Responsible for hospital compliance with Joint Commission Infection Control and Environment of Care Standards. Conduct surveys to evaluate compliance with policies

Quality

- Develop policies and procedures using best practice and evidence-based guidelines designed to protect patients, visitors, employees and the community against transmission of disease.

Surveillance and epidemiology

- Conduct annual and ongoing risk assessment, and create plans and program goals based on findings
- Management of surveillance activities based on targeted quality initiatives required by regulatory agencies or identified by hospital risk assessment
- Outbreak investigations, prevention strategies, interventions and communication of findings to appropriate stakeholders and agencies

Physical Environment

- Understand the building environments included HVAC and water systems as related to patient safety, facilitate and monitor testing of positive and negative pressure areas, and conduct testing and monitor maintenance of dialysis water systems, potable water supplies and cooling towers
- Manage mold remediation activities
- Support facilities personnel in identifying opportunities to improve environmental performance.
- Consultant for patient safety and infection control issues on construction projects

Educator

- Provide new and annual employee education, departmental and special educational sessions, healthcare worker competency assessments and orientation for construction contractors
- Design, review, and revise employee and patient education materials as well as new

employee and physician orientation
- Provide new and annual employee education, departmental and special educational sessions, healthcare worker competency assessments
- System representative on MDH Office of Emergency Planning taskforce for healthcare personnel education and competency planning.

Emergency Preparedness and Response
- Medical/technical Specialist IP Lead system H1N1 Emergency Response.
- Chair IP committee to create an standardized education plan and recruitment process for rapid response teams (AERT)
- Member of the Emergency Preparedness subcommittee: drafted surge capacity plan, sheltering plan, biohazard plan, and negative pressure unit plans for 2 community hospitals, and have provided consultation on development of procedures at other business units
- Requested and received HRSA grant money to update software for the HVAC system so that all the air handlers could be shutdown with the push of a button. Drafted and tested negative pressure surge plans for 2 community hospitals which could be activated in the event of an infectious disease outbreak.
- Developed county/hospital communication plan for coordination with public health alert network
- Collaborated with county and state officials in organizing smallpox vaccinations for healthcare workers

Medical Laboratory

Clinical Laboratory Scientist, Microbiology 1988-2003

- Instrumental in conversion to electronic paperless laboratory system (Ultra)
- Served on team that designed, tested, and implemented microbiology software
- Wrote procedure manual, and education/competency materials
- Educator/trainer for laboratory personnel
- Trainer new employees
- Facilitator of continuing education for current employees
- Resource for physicians and nursing staff
- Procedure writing and implementation; responsible for maintaining procedure manuals
- CAP Surveyor conducting microbiology laboratory inspections
- Participation in CAP quality assurance improvement program
- Resolution of customer questions and concerns
- Review and evaluate validity of patient results

## COMMUNITY LEADERSHIP

- Infection Prevention liaison to the Minnesota Department of Health (MDH) Flu Vaccination workgroup
- Chair Minnesota Department of Health/Minnesota Association for Professionals in Infection Control (APIC) emerging pathogens committee with current work on guidelines for Carbapenemase Resistant Enterobacteriacae
- MN APIC representative to Metropolitan Hospital Compact
- MN APIC representative on Minnesota advisory committee for public emergency planning campaign (Code Ready)
- Representative on MDH Office of Emergency Planning taskforce for healthcare personnel education and competency planning. Products from this committee to be used as template in rapid response training across Minnesota.
- Reviewer for MERET healthcare worker education modules for the University of Minnesota School of Nursing and School of Public Health
- Consultant on ERTK training development for healthcare vendors
- Former MN APIC representative on MDH TB Advisory Board

### Certifications

- American Society for Healthcare Engineering (ASHE)
- Medical Laboratory Scientist (MLS-ASCP)
- Member Minnesota Microbiology Association (MIMA)
- Member Association for Professionals in Infection Control (APIC)

### Awards

- 2010 Recipient of Uncommon Caring Award for H1N1 response (medical/technical specialist informing emergency response)
- 2006 PhD Residency/Academic Competition President's Award (1st place) Walden University

## PROFESSIONAL PRESENTATIONS AND PAPERS

### Dissertation

Walden University, Minneapolis, Minnesota

- Cross-sectional quantitative study designed to describe the relationship between cultural competence and health outcomes in diverse patient populations by examining the effect of both physician and patient reported cultural competence on utilization of prenatal care in the Hmong of MN. Supports/informs Patient Experience.

Midwest Health System

2009 MRSA Prevalence Study

- A total of 2135 patients were tested across all Allina facilities (1637 at the 4 metro hospitals, the remaining at the regional hospitals). Data were analyzed using univariate analysis for all sites, and further analyzed using multivariate analysis.

2008 MRSA PCR Correlational Study

- Nose/throat culture method compared to nasal-only MRSA PCR. A total of 624 patients were tested between the two sites; 606 patients had both PCR and culture testing completed. Sensitivity, specificity, PPV, and NPV were calculated and recommendations made for MRSA testing procedures.

Authorship

- 2011 national APIC abstract on Saturation and Disinfection
- 2011 national APIC abstract on IP orientation program
- 2011 Poster presentation on Saturation and Disinfection at national APIC conference
- 2011 Poster presentation on IP Orientation Program at national APIC conference
- 2010 Poster presentation Provider Cultural Competence and Prenatal Care in MN Hmong Walden University
- 2010 Finalist Student Poster Award Walden University
- 2010 Speaker Minnesota Society for Healthcare Risk Management education session
- 2009 Speaker MN Risk and Insurance Management Society (RIMS) H1N1 Conference
- 2009 Speaker MN Emergency Responders Conference
- 2003 national APIC abstract on Legionella potable water remediation
- 2003 Poster presentation on Legionella potable water remediation at national APIC and MN APIC professional conferences
- 2003 Presenter MN APIC Legionella potable water remediation
- In progress: white paper on association of Legionella in potable water and hands-free electronic faucets in healthcare facilities