

Tdap Vaccination Acceptance Among Pregnant Hispanic Women:
English versus Spanish Speakers

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Author Note

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No grants, financial support, or incentives were received for this clinical project. I would like to express my sincere gratitude to Dr. Barbara McAlister, PhD, RN, CNM, Dr. Peggy Mancuso, PhD, RN, CNM, Dr. Julie Dreadin, DNP, RN, WHNP-BC, and Dr. David Hemsell, MD for their dedicated assistance and guidance with this project.

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Abstract

Background: The Tetanus, Diphtheria and Acellular Pertussis vaccine (Tdap) for pregnant women was recommended by the Advisory Committee on Immunization Practices (ACIP) in 2012 to reduce pertussis morbidity and mortality in infants. The objective of the capstone study was to compare pregnant Hispanic women who preferred to communicate in English with those who preferred to communicate in Spanish within the context of their decision to accept or reject third-trimester Tdap vaccination. Method: Using the electronic medical record, a retrospective review was conducted to evaluate patient decisions about the Tdap vaccination among 386 Hispanic women who received prenatal care between 27 and 36 weeks in a large southwestern public health care system starting in June 1, 2013 through December 2, 2013. Results: After exploring any potential relationships of covariates to the dependent variable, logistic regression was used to explore the effect of the preference to communicate in English versus preference to communicate in Spanish on the decision to accept Tdap vaccination during pregnancy. Of all the predictor variables, only education level and number of total clinic visits were significant predictors of a decision to accept vaccination. Higher attainment of education increased the likelihood of accepting the Tdap vaccine increases. In addition, as the total number of clinic visits increased, the likelihood of accepting the Tdap vaccine also increased. The independent variable, *Language*, however, was not a significant predictor of accepting Tdap vaccination ($p = .785$). However, the model overall, was statistically significant, $\chi^2 (7) = 40.22, p < .001$, but with a relatively low predictive power, Nagelkerke $R^2 = .163$.

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Pertussis, or whooping cough, caused by the organism *Bordetella pertussis*, is an acute and prolonged respiratory illness. Pertussis continues to be an important cause of morbidity and mortality in the world's infant population (Cheng et al., 2010). A 2013 Morbidity and Mortality Weekly Report (MMWR) from the Centers for Disease Control (CDC) noted that the United States has experienced substantial increases in reported pertussis cases over the past several years (Sawyer, Liang, Messonnier, & Clark, 2013). Provisional case counts for 2012 have surpassed the last peak year, 2010; 41,880 pertussis cases were documented in 2012, and 14 infants (less than 12 months old) died as a result of pertussis (Sawyer et al., 2013). Of identified sources, parents transmit pertussis to their infants in 50% to 55% of cases, grandparents in 6% to 8% of cases, and siblings in up to 20% of cases (Terranella, Asay, Messonnier, Clark, & Liang, 2013). Therefore, health providers should maintain heightened awareness of recommendations for early recognition of pertussis cases, effective treatment, post-exposure prophylaxis, and appropriate vaccination, which are all essential to limiting community transmission of pertussis (Texas Department of State Health Services, 2013).

In 2012, the Advisory Committee on Immunization Practices (ACIP) recommended that providers of prenatal care implement a Tetanus Toxoid, Diphtheria Toxoid, and Acellular Pertussis (Tdap) immunization program for all pregnant women in order to reduce pertussis morbidity and mortality in infants (CDC, 2013). The CDC recommended that Tdap vaccination be given between 27 and 36 weeks of gestation to maximize the maternal antibody response and passive antibody transfer to the infant. For women not previously vaccinated with Tdap and for those women not vaccinated during pregnancy, the vaccine should be administered immediately

postpartum (2013). These recommendations are congruent with the Healthy People 2020 Objective 11D-1.6, which suggested reduction and elimination of cases of vaccine-preventable disease, such as pertussis, for children under one year of age (Healthy People 2020, 2013).

Hispanic populations with limited English proficiency (LEP) are at risk for not receiving recommended health care services (Cheng, Chen, & Cunningham, 2007). In addition, the Institute of Medicine identified language barriers and LEP as major system-level determinants of poor health outcomes and limited access to care among Latinos (Martinez, 2008). The number of LEP individuals in the United States grew by 80% between 1990 and 2010 (Pandya, McHugh, & Batalova, 2011). The U.S. Census Bureau reported that in 2010, 308.7 million people resided in the United States, of which 50.5 million were Hispanic, and of those, 9.5 million lived in Texas (Ennis, Vargas, & Albert, 2011). The Migration Policy Institute noted that in 2010, LEP individuals accounted for 25.2 million, or 9%, of the U.S. population over age five, and Texas had the second-highest share of LEP residents, accounting for 13% of the U.S. LEP population (Pandya et al., 2011).

The relationship between limited health literacy and poor health may be due to inadequate communication within health care delivery organizations (Wynia & Osborn, 2010). Therefore, effective communication between the patient and the health care professional is essential to ensure quality and safety in health care. The Joint Commission (2009) reported that people with limited health literacy were more likely to be passive about their care and those with LEP may be inhibited from asking questions because of language and cultural barriers. Goal 13 of the National Patient Safety Goals (NPSG) suggested that health care providers must encourage patients' active engagement in their own care as a crucial component of patient care safety strategies (The Joint Commission, 2009). The Joint Commission explained that when a

provider cannot communicate effectively about a disease or treatment, or when a patient cannot describe their illness, the basic connection needed to result in appropriate care is lacking. Limited health literacy and ineffective practitioner–patient communication challenges the ability of health care organizations to meet the NPSG requirement. Thus, the Joint Commission recommended that health care organizations learn the literacy levels and language needs of the communities that they serve. Title VI of the Civil Rights act of 1964 also prohibits discrimination based on race, color, or national origin in programs that receive federal funds; a failure to provide language access services for LEP persons may be a form of discrimination on the basis of national origin (U.S. Department of Health and Human Services [U.S.DHHS], 2009).

Purpose

The purpose of this capstone project was to explore if language barriers in a population of pregnant Hispanic women affected these women’s decisions to receive or not to receive the Tdap vaccination during the third trimester of pregnancy.

Problem Statement

The Texas Department of Health (TDH) issued a pertussis health alert on September 3, 2013, in view of ongoing, statewide high rates of pertussis. As of September 2013 in the study county, 215 pertussis cases had been reported; 23 cases required hospital admission, and 19 of these hospitalizations were infants less than 12 months old (TDH, 2013). Since the 2011 ACIP vaccination recommendation, Tdap vaccination of pregnant women has been low; one survey of 1,230 women from August 2011 to April 2012 estimated that only 2.6% of women received Tdap during their recent pregnancies (Sawyer et al., 2013).

The site of this study was a large healthcare system in southwestern United States. This system, which delivers approximately 10,000 babies annually, embraced the Healthy People 2020 objectives and implemented the new ACIP guidelines in June 2013 (Turricchi, 2013). This healthcare system serves a variety of patients. According to the 2011 Census Bureau report, of the 2,416,014 persons living in the study county in 2010, 38.9% were Hispanic. A 1998 study conducted in the study site documented the average reading level of patients to be between the third and seventh grade levels (Pestonjee et al., 1998). Over 50% of Hispanic patients tested demonstrated marginal or inadequate functional health literacy skills (Pestonjee et al., 1998).

Empirical evidence details the effect of language as an impediment to obtaining an array of health services and health promotion programs (Farmer, Papachristou, Gotz, Yu, & Tong, 2010). Adults with low literacy encounter more barriers to receiving necessary health care services and are less likely to understand medical advice that can affect their disease progression (American Congress of Obstetricians and Gynecologist [ACOG], 2011). Health literacy also may be a problem for immigrant populations for whom English is a second language (ACOG, 2011). Sociocultural background influences a patient's perspectives, values, beliefs, and behaviors regarding health and well-being. These factors give rise to variation in recognition of symptoms, thresholds for seeking care, comprehension of management strategies, expectations of care, and adherence to preventive measures, such as immunizations and medications (Betancourt, Green, & Carrillo, 2013). Childbearing practices among Hispanic women are influenced by traditional cultural beliefs, including herbal remedies, lunar eclipses, select foods, and the influence of stress on health outcomes (Barragan, Ormond, Strecker, & Weil 2011; Marshall, 1987; Marshall & Gonzalez, 1987). Low health literacy, cultural barriers, and limited English proficiency have been coined the "triplet threat" to effective health communication (Singleton & Krause, 2009).

These factors could possibly affect acceptance of preventative health care measures such as Tdap vaccination during pregnancy among Hispanic women. Therefore, it is meaningful to explore whether the preference to communicate in English versus Spanish affects the decisions of Hispanic women to accept the Tdap vaccination during the third trimester of pregnancy.

Clinical Inquiry

Research Question

This clinical inquiry project addressed the following research question:

1. Does the preference to communicate in English affect the decision of Hispanic women to accept Tdap vaccination during the third trimester of pregnancy?

Hypothesis

The preference to communicate in English or the preference to communicate in Spanish among pregnant Hispanic women in their third trimester significantly affected their decision to accept or decline the offer of Tdap vaccination.

Null Hypothesis

The preference to communicate in English or the preference to communicate in Spanish among pregnant Hispanic women in their third trimester did not significantly affect their decision to accept or decline the offer of Tdap vaccination.

PICO Question

Among pregnant women, self-identified as Hispanic, who sought prenatal care from a large southwestern healthcare entity, did the preference to communicate in English versus Spanish affect the decision to accept or decline the Tdap vaccine in the third trimester?

Theoretical and Conceptual Framework

The theoretical framework that was used for this capstone project is Madeleine Leininger's (1991) theory regarding transcultural care diversity and universality. This theory addresses the historical, social, and cultural context of human beings to explain and predict the broad dimensions of human care behaviors (Fitzpatrick & Whall, 2005). A major goal of Leininger's theory is to improve and advance the quality of care to people through the deliberate and creative use of transcultural nursing knowledge (Fitzpatrick & Whall, 2005). Leininger's theory is described by the sunrise enabler conceptual model (refer to Appendix A for illustration). The sunrise enabler model explains the acquisition of transcultural knowledge by means of examining social structure, worldview, cultural values, language, and environmental context (Nursing Theories, 2013). According to the model, nursing care actions and decisions that recognize and respect cultural care values of Hispanic pregnant women needing Tdap vaccinations should facilitate cultural congruency and minimize cultural imposition, cultural care negligence, and cultural care conflicts (Fitzpatrick & Whall, 2005). The Hispanic pregnant client's preference to speak English or Spanish would impact her decision to accept Tdap vaccine, as addressed by the 'language' component of Leininger's theory. Ultimately, knowledge gleaned from this study should equip health care providers to better assist, support, and facilitate decisions that help Hispanic pregnant women to accept Tdap vaccination.

The theoretical and operational definitions related to the study hypothesis are included in Table 1 below. Theoretical and operational definitions of potential covariates are shown in Table 2.

Theoretical and Operational Definitions

Table 1

Theoretical and Operational Definitions Related to the Hypothesis

Variable	Theoretical Definition	Operational Definition
Preference to speak Spanish.	(The preference of) persons who are unable to communicate effectively in English because their primary language is not English and they have not developed fluency in the English language (U.S.DHHS, 2013).	Participants who verbally claim to the counselor that Spanish is the preferred language chosen to discuss health issues. The counselor thereby documents “Spanish preferred language” in the learning assessment portion of electronic medical record.
Preference to speak English		Participants who verbally claim to the counselor that English is the preferred language chosen to discuss health issues. The counselor thereby documents “English preferred language” in the learning assessment portion of electronic medical record.
Hispanic	An ethnic category referring to persons who trace their origin or descent to Mexico, Puerto Rico, Cuba, Central or South America, or Spain (Talamantes, Lindeman, & Mouton, nd).	Pregnant women who self-identify as Hispanic in the EMR demographic.
Last trimester of pregnancy	Includes the 29 th through 42 nd weeks of pregnancy (Cunningham et al., 2010).	Gestational age is between 27 weeks to 36 weeks documented at EMR. (in accordance with ACIP guidelines for Tdap vaccination)
Vaccination	Consists of introducing an agent such as bacterium, virus, or molecule, into the body that has been deprived of its pathogenicity but has kept its immunogenicity (Sanofi Pasteur, 2013).	Tdap vaccination that was available for administration to pregnant Hispanic women.
Acceptance of Tdap vaccination during pregnancy		Acceptance of Tdap vaccination documented in the Tdap Best Practice Alert section of the EMR.
Lack of acceptance of Tdap vaccination during pregnancy		No documentation of Tdap vaccination having been administered in Tdap Best Practice Alert of EMR.

Table 2

Theoretical and Operational Definitions of Covariates

Terms	Theoretical Definition	Operational Definition
Age	The length of time in completed years that a person has lived (U.S. Census Bureau, 2013).	Age of the participants as documented in the EMR measured in years.
Gravida or Gravidity	Refers to the number of times a woman has been pregnant, regardless of whether the pregnancy was interrupted by abortion or fetal death, or resulted in a live birth (Cunningham et al., 2005).	Number of pregnancies as documented in the EMR. Nulligravida or Gravida 0 is a woman who has never been pregnant (Cunningham et al., 2005). Primigravida or Gravida 1 is a woman who is pregnant for the first time or has been pregnant one time (Cunningham et al., 2005). Multigravida or, more specifically, a gravida 2, gravida 3, and so on, is a woman who has been pregnant more than one time (Cunningham et al., 2005).
Para or Parity	The number of completed pregnancies beyond 20 weeks gestation whether viable or nonviable (Cunningham et al., 2005).	Number of pregnancies as documented in EMR and specified as TPAL (Term, Preterm, Abortions, Living children). Parity is the sum of T plus P.
Educational attainment	Refers to the highest level of education that an individual has completed (U.S. Census Bureau, 2013).	Highest grade level completed documented in EMR. Completed: none, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, no college, some college, technical, college degree.
Marital status	The state of being unmarried, married, separated as defined by applicable state law. The term unmarried includes persons who are single, divorced, or widowed (U.S. Legal, 2013).	Married, single, divorced as documented in the EMR
Risk factors of pregnancy	The mother, fetus, or neonate is at increased risk of morbidity or mortality before or after delivery (Beers, Porter, Jones, Kaplan, & Berkwits, 2013).	Risk factors of pregnancy listed in EMR as gestational diabetes, gestational hypertension, preterm labor, genetic abnormalities, placental abnormalities, medical history, and surgical history.

Review of Literature

A review of literature was performed using a meta-database from the library at Texas Woman's University (TWU). The following databases were searched: CINAHL, Medline, and ProQuest. The initial CINAHL search term was *Tdap vaccination during pregnancy* (Search 1). A total of three articles were found. Limitations were applied (i.e., the years 2000 to 2014) and the same three articles were listed. Focus then turned to the search terms *Tdap vaccination* (Search 2), with the year limitations still in place. A total of 25 articles were returned and analyzed; five were selected for possible inclusion in the review of the literature. Next, the search term *limited English proficiency* with the year limitations still in place (Search 3) returned a total of 228 articles, which were then analyzed; 10 were selected for possible inclusion in the review of the literature. The next database searched was Medline with full text. Using the same terms in Search 1 above, a total of four articles were found. One article was selected for review. When Search 2 was placed in the search engine, 54 articles were returned; two articles were selected for further reading. Next, Search 3, with the same year limitation still intact returned 327 articles for analysis; a total of five articles pertaining to language as barriers in vaccination were selected for further reading and possible inclusion in the review of literature. ProQuest database was also searched. Search 1 returned three articles; however, the articles were duplicates of those found in CINAHL and Medline databases. Search 2 resulted in a return of 144 articles. Three articles were selected for possible inclusion in the review of literature. Search 3 in ProQuest netted 98,025 articles. Extensive limitations were utilized for this database. First, a limit to peer reviewed journals written in English was applied, which narrowed the scope to 6086 articles with full text. The articles were pared to 2,098 after changing the year limitations from 2010 to 2013. Several articles were duplicates of previous searches found in Medline and CINAHL. Five

additional articles were selected for further reading and possible inclusion in the review of literature. Each of the databases mentioned above were searched for the key term *effect of language barrier on vaccination*, yet no articles were returned.

Criteria for article inclusion were focused on significance and safety of Tdap vaccination during pregnancy, barriers of vaccination such as limited in English proficiency, and cultural beliefs. Recurring topics in the literature include: implications of updated ACIP guidelines on Tdap vaccination during pregnancy; increased rate of pertussis among infants; barriers of receiving vaccinations; and limited English and health literacy. Various types of articles were chosen for review, including systematic reviews and randomized controlled trials.

Safety of Tdap Vaccination during Pregnancy

ACOG (2011) explained that the goals of vaccination are to preserve the health of individuals as well as the health of the general public. When the health of the individual is considered, vaccines are administered to protect the health of a single patient or, in the case of a pregnant woman, the patient and her fetus. The benefit of preventing disease in the individual also promotes public health because, once immune, the vaccinated individual will not serve as a source of contagion for others (ACOG, 2011). As a result, ACOG asserted that health care professionals have an ethical obligation to keep their patients' best interest in mind by following evidence-based guidelines to encourage patients to be vaccinated (2011).

The safety of the Tdap vaccine during pregnancy is well established (Matlow, Pupco, Bozzo, & Koren, 2013). Data from the Vaccine Adverse Event Reporting System, Sanofi Pasteur, and Glaxo Smith Kline pregnancy registries, as well as several small studies, did not suggest any elevated frequency or unusual patterns of adverse events in pregnant women who received Tdap (Matlow et al., 2013). However, ACIP recommended administering Tdap after 20

weeks of gestation in order to minimize the risk of uncommon adverse events and the possibility that any spurious association between Tdap-related adverse events and another illness might appear causative (Matlow et al., 2013). Very young infants are dependent solely on maternal antibodies and lack the ability to mount a cell-mediated response to whooping cough (CDC, 2013). The effectiveness and optimal concentration of maternal antipertussis antibodies in newborns are unknown, but high levels of antibodies in the first weeks after birth would most likely either prevent infants from becoming infected with pertussis or decrease disease severity in infected infants (CDC, 2013). Fortner, Kuller and Edwards (2012) noted that vaccinations in pregnancy are an important aspect of prenatal care. Pertussis immunization as a component of Tdap is recommended with the intent to both protect the pregnant woman and provide passive antibodies to the infant before the initial neonatal Tdap vaccination at two months of age (Kuller & Edwards, 2012).

Newborns whose mothers received Tdap during pregnancy had significantly higher concentrations of diphtheria anti-toxin, tetanus antitoxin, and antibodies to pertussis when compared to newborns from mothers who did not receive Tdap (Gall, Myers, & Pichichero, 2011). The researchers concluded that administering Tdap during pregnancy increases antibody titers against diphtheria and pertussis antigens and can prevent neonatal pertussis infection. The CDC reported that no evidence exists of risk to the fetus from vaccinating pregnant women with noninfectious viral or bacterial vaccines or toxoids such as Tdap (ACOG, 2011). Tdap may be administered anytime during pregnancy, but vaccination during the third trimester would provide the highest concentration of maternal antibodies and subsequent transferal to the fetus closer to birth (Sawyer et al., 2013). After receipt of Tdap, a minimum of two weeks is required to mount a maximal immune response to the vaccine antigens. Active transport of maternal

immunoglobulin G does not substantially take place before 30 weeks of gestation (Sawyer et al., 2013). Healy, Rench, and Baker (2013) reported that maternal antibodies waned quickly in pregnant women who received Tdap within the prior two years and women immunized during the first or second trimester had low levels of antibodies at term. Therefore, ACIP advised that pregnant women should be vaccinated with Tdap during the third trimester to optimize the concentration of vaccine-specific antipertussis antibodies transported from mother to infant (Sawyer et al., 2013).

Barriers to Vaccination

Language barrier. The number of individuals with limited English proficiency in the United States is large and growing; thus, addressing language barriers in access to medical care is becoming increasingly important (Shi, Lebrun, & Tsai, 2009). Numerous studies have investigated the influence of limited English language proficiency on access to health care, identifying multiple consequences of language barriers. Compared to individuals with high English proficiency, those with limited English proficiency experience “worse access to care, including obtaining health insurance coverage, necessary medical care, physician visits, and preventive services such as mammography, Pap test, and immunizations” (Shi et al., p. 626). The researchers used cross-sectional data from 2006 National Health Interview Survey (n=29,868) to show that individuals with limited English proficiency were more likely to forgo needed medical care and less likely to have a health care visit compared to individuals who were proficient in English. There was no significant association between language proficiency and reports of delayed care, an individual’s health, or socio-economic status (Shi et al., 2009).

In the United States, Spanish-speaking Hispanic individuals had lower immunization rates than did English-speaking Hispanic individuals (Larson, 2003). Farmer et al. (2010)

examined the influence of primary language on the receipt of influenza and pneumococcal immunizations on multiethnic, linguistically diverse, and low-income populations. The study demonstrated that having a primary language other than English played a pivotal role in the acceptance of the vaccines. These researchers concluded that language remained a significant predictor of vaccination status independent of gender, education, physician visit, type of insurance, physical health rating, chronic conditions, and preventive health behaviors (Farmer et al., 2010). The results of the systematic review conducted by Timmins (2002) regarding language barriers in health care for Latino populations indicated that language barriers can adversely affect quality of care.

Lack of knowledge. In the United States, health disparities exist among ethnic minority groups, the uninsured, and those with other barriers to health care access. Health disparities occur for many diseases, but are especially pronounced for preventive health services and preventable diseases. Persons affected by disparities experience higher incidences of vaccine-preventable disease (Logan, 2009). Although vaccines are relatively safe, inexpensive, and effective in reducing infection and disease complications, many groups in the United States do not yet benefit from this potentially lifesaving intervention (Logan, 2009). Logan described several reasons for disparities in the use of influenza vaccination: barriers to access such as cost, insurance status, and language differences; underestimation of personal risk and misunderstanding of vaccination risk; and mistrust toward the health care system. Shavell, Moniz, Gonik, and Beigi (2012) reported that patient barriers to maternal influenza vaccination are: safety concerns, lack of knowledge about influenza and its serious nature during pregnancy, fear of needles, vaccination history, general mistrust of the medical establishment, discomfort with obstetrician-gynecologist as vaccinators, and issues surrounding access to care.

Miller, Kretsinger, Euler, Lu, and Ahmed's (2011) review of the 2007 National Immunization Survey (NIS) by the CDC regarding barriers to early acceptance of Tdap among adults in the United States from 2005 to 2007 provided evidence of the need for educating the public about the merits of the vaccine. The results of the review showed that overall, 3.6 % of adults ages 18 to 64 years reported receipt of a Tdap vaccination. Of unvaccinated respondents, 18.8% had heard of Tdap, of which 9.4% reported that a healthcare provider had recommended this vaccination, and 44.7% were unwilling to receive the vaccine. Most unvaccinated adults (81.8%) indicated a willingness to receive Tdap if it was recommended by a provider (Miller et al., 2011). The researchers concluded that during the first two years of availability, Tdap acceptance was likely inhibited by a low collective awareness of Tdap and low perceived risk of contracting pertussis among U.S. adults as well as a paucity of provider to patient vaccination recommendations (Miller et al., 2011).

Instrumentation

This project was a retrospective study using electronic medical record (EMR) review and selective data extraction. The intended sites for the study were 10 maternal-infant clinics, one complications clinic and the obstetrical triage unit within a large southwestern public health care system. Based on the a priori power analysis described below, a sequential sampling of 182 (minimum) to 400 (maximum) evaluable cases were to be obtained. The plan was to include the first 33 evaluable cases at each site beginning with those charts dated June 1, 2013. The data collection plan was to retrieve pertinent information from the EMR database at each of the twelve aforementioned sites to provide 396 total samples. However, three sites were excluded. The complications clinic and triage unit were excluded to avoid duplication of participants; one ambulatory clinic was eliminated because of insufficient number of pregnant clients. Therefore,

42 to 43 participants' records were extracted from nine separate clinics to yield a total of 386 participants. The independent and dependent variables along with the covariates were manually extracted from the EMRs of women who were eligible for vaccination beginning with initiation of Tdap guideline at the study sites from June 1, 2013, through December 2, 2013.

The medical records of participants were alpha-numerically coded to protect privacy (refer to Appendix F). The Tdap best practice advisory (BPA) was created by the study entity to remind providers to offer the Tdap vaccine. Schwartz (personal communication, June 1, 2013) explained that if a patient has not received a Tdap during the current pregnancy, the BPA will start appearing in the Electronic Medical Record when a provider opens a new pregnant (NOB) or return pregnant (ROB) encounter once the pregnant woman reaches 31 weeks gestation (refer to Appendix D).

Subsequently, the covariates of the study, which are age, number of pregnancies, number of clinic visits during the third trimester, educational level, marital status, risk factors, how often the vaccine was offered, and charted reasons for lack of vaccine acceptance, were explored in terms of relationships to the dependent variable. Thereby, techniques used in this section were dependent on the nature of the bivariate relationship under study, and included crosstabs, correlations, and independent t-tests. The regression model analyzed the effect of the independent variable (preference to communicate in English versus Spanish) on the dependent variable (decision to accept or reject the Tdap vaccine), while controlling for previously identified statistically significant covariates.

Population and Sample

The target population for this clinical inquiry project was Hispanic pregnant women receiving prenatal care through a large public health system in the southwestern United States. The inclusion criteria were the following: self-identified as Hispanic, designation of English or Spanish as preferred language on EMR, and charted gestational age of between 27 and 36 weeks gestation. The exclusion criteria were the following: did not self-identify as Hispanic, did not specify language preference on the EMR, charted gestational age of less than 27 weeks or more than 36 weeks gestation, and the occurrence of no health visits recorded in the EMR during third trimester of pregnancy.

An *a priori* power analysis was conducted using G*Power version 3.1.6 to determine the minimum sample size required to find significance, with a desired level of power set at .80, an α -level at .05, and a moderate effect size of 1.60 (*Odds Ratio*). Based on the analysis, it was determined that a minimum of 182 participants would be required to ensure adequate power for the logistic regression. Ultimately data from 321 cases were analyzed.

Implementation

Project Objectives

This study compared two groups of self-identified pregnant Hispanic women who were classified according to their preference to speak either English or Spanish; their decisions to accept or reject third-trimester Tdap vaccination was the primary area of inquiry. Results from this project will guide health care providers as they strive to implement evidence-based care to pregnant Hispanic population.

Timeline of Project Phases

The timeline for the study ranged from September 2013 to April 2014. IRB application was filed in October 2013 and was approved in December 2013. Starting in January 2014, data was collected. Data analysis and project completion were completed from March to April 2014 (Refer to Appendix E).

Project Requirements

Institutional review board (IRB) approval from two public health care entities was obtained prior to extraction of data from the EMR. The research protocol was created and approved by physician sponsor (Dr. David Hemsell) and Texas Woman's University (TWU) Chairperson (Dr. Barbara McAlister). Formal permission for use of the participating clinic sites for research was obtained, as well. After IRB approval from the public health care entities was obtained, a dual IRB application was filed at TWU. A statistician was utilized for statistical analysis of the data. Additional support, motivation, and approval were needed for the whole project from the principal investigator's (PI) professional mentor from the public health care entity and TWU Doctor of Nurse Practice capstone committee.

Evaluation

Results from statistical analysis of data are presented below. The section is divided into two subsections: preliminary analyses and primary analysis. In the first subsection, descriptive statistics for all variables used in this study are presented, and bivariate relationships are explored. The purpose of the preliminary analyses was to select potential covariates to control for when exploring the relationship between the independent and the dependent variables. In the second subsection, primary analysis, logistic regression was used to answer the proposed

research question and to examine the corresponding hypothesis. The statistical significance level throughout this analysis was fixed at $\alpha = .05$.

Preliminary Analyses

Frequencies and percentages for selected categorical descriptive and demographic variables are displayed in Table 3. The majority of participants had been offered the Tdap vaccination only once (89.7%) and had no risk factors (78.8%). The two most common reasons patients provided for declining the vaccine were “unsure” (54%) and “plan to obtain after delivery” (post-partum) (33.6%). Most participants visited the clinic a total of 6 to 10 times (47.0%). A recoded version of the variable, *total number of clinic visits*, was used in the analysis; the participants who attended the prenatal clinic 1 to 5 times were combined with the cohort who had attended 6 to 10 clinic visits. This merged group representing those with 1 to 10 visits ensured a more balanced distribution. In a similar manner, a recoded version of the same variable was used in the analysis in which 11 to 15 and 16 to 20 clinic visits were merged into 11 to 20 clinic visits throughout the entire pregnancy. The majority of participants visited the clinic 6 to 10 times in the third trimester (69.2%). A recoded version of this variable was also used in the analysis in which 6 to 10 and 11 to 15 clinic visits were merged into 6 to 15 third trimester visits. Most participants were married (58.6%) and reported having completed their education between grades 7–12. For both the marital status and education variables, categories were merged again to ensure more balanced distributions.

Table 3
Frequencies and Percentages for Categorical Descriptive and Demographic Variables

	<i>n</i>	%
Total Number of Clinic Visits		
1–5	33	10.3
6–10	151	47.0
11–15	105	32.7
16–20	32	10.0
Missing	0	.0
Total Number of Clinic Visits (Recoded)		
1–10	184	57.3
11–20	137	42.7
Missing	0	.0
Number of Clinic Visits in 3rd Trimester		
1–5	82	25.5
6–10	222	69.2
11–15	17	5.3
Missing	0	.0
Number of Clinic Visits in 3rd Trimester (Recoded)		
1–5	82	25.5
6–15	239	74.5
Missing	0	.0
Marital Status		
Married	188	58.6
Single	129	40.2
Divorced	4	1.2
Missing	0	.0
Marital Status (Recoded)		
Married	188	58.6
Unmarried (Single/Divorced)	133	41.4
Missing	0	.0

Note. Frequencies not summing to $N = 321$ and percentages not summing to 100 reflect missing data.

Table 3, *continued**Frequencies and Percentages for Categorical Descriptive and Demographic Variables*

	<i>n</i>	%
Educational Level		
Grades 1–6	72	22.4
Grades 7–12	223	69.5
Some College	15	4.7
College Degree	5	1.6
Technical School Graduate	4	1.2
GED	2	.6
Missing	0	.0
Educational Level (Recoded)		
Grade 7 through college degree	249	77.6
Grades 1–6	72	22.4
Missing	0	.0

Note. Frequencies not summing to $N = 321$ and percentages not summing to 100 reflect missing data.

Participants' ages ranged from 15 to 45 ($M = 26.58$, $SD = 7.01$), and numbers of total pregnancies (gravidity) ranged from 1 to 7 ($M = 2.60$, $SD = 1.56$). Additionally, numbers of previous births (parity) ranged from 0 to 7 ($M = 2.21$, $SD = 1.29$). Crosstab analyses using Pearson's chi square and Cramer's V tests were conducted to examine relationships between total number of clinic visits and several other categorical variables.

A significant relationship was shown between total number of clinic visits and education level, $\chi^2(1) = 5.58$, $p = .018$, Cramer's $V = .132$. A greater proportion of participants whose total number of clinic visits ranged from 11 to 20 had high school or college degrees (83.9%), compared to participants whose total number of clinic visits was 1 to 10 (72.8%). In contrast, a greater proportion of participants whose total number of clinic visits ranged from 1 to 10 had 1 to

6 years of education (27.2%), compared to participants whose total number of clinic visits ranged from 11 to 20 (16.1%).

Crosstab analyses using Pearson’s chi square and Cramer’s *V* tests were conducted to examine relationships between marital status and several other categorical variables. As shown in Table 4, the relationship between marital status and education level was significant, $\chi^2 (1) = 8.66, p = .003$, Cramer’s *V* = .164. A greater proportion of participants who were unmarried also reported having attended Grade 7 through obtaining a college degree (85.7%), compared to participants who were married (71.8%). In contrast, a greater proportion of participants who were married had 1 to 6 years of education (28.2%), compared to participants who were unmarried (14.3%).

Table 4

Frequencies and Percentages for Total Number of Clinic Visits, Number of Clinic Visits in 3rd Trimester, and Educational Level by Marital Status

	Marital Status				χ^2	<i>p</i>
	Unmarried (Single/Divorced)		Married			
	<i>n</i>	%	<i>n</i>	%		
Total Number of Clinic Visits					.16	.686
1–10	78	58.6	106	56.4		
11–20	55	41.4	82	43.6		
Number of Clinic Visits in 3rd Trimester					.28	.599
1–5	36	27.1	46	24.5		
6–15	97	72.9	142	75.5		
Educational Level					8.66	.003
Grade 7 through college degree	114	85.7	135	71.8		
Grades 1–6	19	14.3	53	28.2		

Independent sample *t* tests were conducted to compare the means of participants who had 1 to 6 years of education compared to participants who had a higher level of education on age, gravidity, and parity. As shown in Table 5, independent sample *t* tests revealed that participants who had 1 to 6 years of education were significantly older ($M = 31.14, SD = 7.87$) than participants who had a higher level of education ($M = 25.26, SD = 6.15$), $t(319) = -5.84, p < .001$. Independent sample *t* tests also revealed that participants who had 1 to 6 years of education had significantly higher gravidity scores ($M = 3.54, SD = 1.79$) than participants who had higher levels of education ($M = 2.33, SD = 1.37$), $t(319) = -6.13, p < .001$. Finally, independent sample *t* tests revealed that participants who had 1 to 6 years of education had significantly higher parity scores ($M = 3.04, SD = 1.46$) than participants who had higher levels of education ($M = 1.96, SD = 1.13$), $t(319) = -6.65, p < .001$. All results were checked using the nonparametric Mann-Whitney test and confirmed.

Table 5

Means and Standard Deviations for Age, Gravidity, and Parity by Educational Level

	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>U</i>	<i>p (U)</i>
Age				5.844	< .001	4966.50	< .001
Educational Level (Grade 7 to college degree)	247	25.26	6.15				
Educational Level (Grades 1–6)	72	31.14	7.87				
Gravidity				5.293	< .001	5367.00	< .001
Educational Level (Grade 7 to college degree)	249	2.33	1.37				
Educational Level (Grades 1–6)	72	3.54	1.79				

Table 5, *continued**Means and Standard Deviations for Age, Gravida, and Parity by Educational Level*

	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>U</i>	<i>p (U)</i>
Parity				6.653	< .001	5052.00	< .001
Educational Level (High School or College)	249	1.96	1.13				
Educational Level (Grades 1–6)	72	3.04	1.46				

Frequencies and percentages for the independent variable participants' preferred language are displayed in Table 6. As shown, the majority of participants' preferred language was Spanish (64.5%).

Table 6

Frequencies and Percentages for Preferred Language

	<i>n</i>	%
Spanish	207	64.5
English	114	35.5
Missing	0	.0

Note. Frequencies not summing to $N = 321$ and percentages not summing to 100 reflect missing data.

Crosstab analyses using Pearson's chi square and Cramer's V tests were conducted to examine relationships between preferred language and several other categorical variables. As shown in Table 7, the relationship between preferred language and marital status was significant,

$\chi^2 (1) = 31.66, p < .001$, Cramer’s $V = .314$. A greater proportion of participants whose preferred language was not Spanish were unmarried (62.3%), compared to participants whose preferred language was Spanish (30.0%). In contrast, a greater proportion of participants whose preferred language was Spanish were married (70.0%), compared to participants who did not prefer Spanish (37.7%). The relationship between preferred language and education level was also significant, $\chi^2 (1) = 29.94, p < .001$, Cramer’s $V = .305$. A greater proportion of participants whose preferred language was not Spanish had high school or college education (94.7%), compared to participants who preferred Spanish (68.1%). In contrast, a greater proportion of participants who preferred Spanish had 1 to 6 years of education (31.9%), compared to participants who did not prefer Spanish (5.3%).

Table 7

Frequencies and Percentages for Total Number of Clinic Visits, Marital Status, and Educational Level by Preferred Language

	Preferred Language				χ^2	<i>p</i>
	Spanish		English			
	<i>n</i>	%	<i>n</i>	%		
Total Number of Clinic Visits					.02	.877
1–10	118	57.0	66	57.9		
11–20	89	43.0	48	42.1		
Marital Status					31.66	< .001
Unmarried (Single/Divorced)	62	30.0	71	62.3		
Married	145	70.0	43	37.7		
Educational Level					29.94	< .001
Grade 7 through College degree	141	68.1	108	94.7		
Grades 1–6	66	31.9	6	5.3		

Independent sample *t* tests were conducted to compare the means of participants who preferred Spanish and participants who preferred English on age. Independent sample *t* tests revealed that participants whose preferred language was Spanish were significantly older ($M = 28.39, SD = 7.11$) than were participants who preferred English ($M = 23.29, SD = 5.48$), $t(283) = 7.128, p < .001$.

Frequencies and percentages for the dependent variable participants' accepted Tdap vaccine are displayed in Table 8. As shown, the majority of participants accepted the Tdap vaccine (64.8%).

Table 8

Frequencies and Percentages for Responses to the Offer of Tdap Vaccine

	<i>n</i>	%
Accepted	208	64.8
Declined	113	35.2
Missing	0	.0

Crosstab analyses using Pearson's chi square and Cramer's *V* tests were conducted to examine relationships between whether participants accepted the Tdap vaccine and several other categorical variables. As shown in Table 9, the relationship between participants who accepted the Tdap vaccine and total number of clinic visits was significant, $\chi^2(1) = 20.64, p < .001$, Cramer's *V* = .254. A greater proportion of participants who did not accept the Tdap vaccine visited the clinic a total of 1 to 10 times (74.3%), compared to participants who accepted the Tdap vaccine (48.1%). In contrast, a greater proportion of participants who did accept the Tdap

vaccine visited the clinic a total of 11 to 20 times (51.9%), compared to participants who did not accept the Tdap vaccine (25.7%). The relationship between participants who accepted the Tdap vaccine and education level was also significant, $\chi^2 (1) = 14.63, p < .001$, Cramer's $V = .214$. A greater proportion of participants who did accept the Tdap vaccine had high school or college degrees (84.1%), compared to participants who did not accept the Tdap vaccine (65.5%). In contrast, a greater proportion of participants who did not accept the Tdap vaccine had 1 to 6 years of education (34.5%), compared to participants who did accept the Tdap vaccine (15.9%).

Table 9

Frequencies and Percentages for Total Number of Clinic Visits, Number of Clinic Visits in 3rd Trimester, Marital Status, and Educational Level by Accepted Tdap Vaccine

	Accepted Tdap Vaccine		n	%	χ^2	p
	Yes	No				
	n	%	n	%		
Total Number of Clinic Visits					20.64	< .001
1–10	100	48.1	84	74.3		
11–20	108	51.9	29	25.7		
Number of Clinic Visits in 3rd Trimester					.71	.401
1–5	50	24.0	32	28.3		
6–15	158	76.0	81	71.7		
Marital Status					.00	.966
Unmarried (Single/Divorced)	86	41.3	47	41.6		
Married	122	58.7	66	58.4		
Educational Level					14.63	< .001
Grade 7 to college degree	175	84.1	74	65.5		
Grades 1–6	33	15.9	39	34.5		

Crosstab analyses using Pearson’s chi square and Cramer’s *V* tests were conducted to examine relationships between participants’ accepting the Tdap vaccine and their preferred language. As shown in Table 10, a relationship between the two variables could not be confirmed ($p = .445$).

Table 10

Frequencies and Percentages for Preferred Language by Accepted Tdap Vaccine

	Accepted Tdap Vaccine				χ^2	<i>p</i>
	Yes		No			
Preferred Language	<i>n</i>	%	<i>n</i>	%		
Spanish	131	63.0	76	67.3	.59	.445
English	77	37.0	37	32.7		

Primary Analysis

A logistic regression model was conducted to predict the odds of participants’ accepting the Tdap vaccine, using the independent variable preferred language and the control variables marital status, education level, age, gravida, parity, and total number of clinic visits. These results are displayed in Table 11. Overall, the model was statistically significant, $\chi^2 (7) = 40.22$, $p < .001$, but with a relatively low predictive power, Nagelkerke $R^2 = .163$. Of all variables in the model, only education level and total number of clinic visits were significant predictors of the odds of participants’ accepting the Tdap vaccine. Education level had an odds ratio of .458, and the number of total clinic visits had an odds ratio of 2.803. This finding indicates that Hispanic women who had lower levels of education (GR 1–6) were less likely to accept a Tdap vaccine,

compared to Hispanic women who had higher levels of education. However, Hispanic women who had higher total numbers of clinical visits were more likely to accept the Tdap vaccine. The independent variable of preferred language, however, was not a significant predictor of the odds of participants' accepting Tdap vaccination ($p = .785$).

Table 11

Summary for Logistic Regression Model Predicting the Odds of Accepted Tdap Vaccine using Preferred Language, Marital Status, Educational Level, Age, Gravidity, Parity, and Total Number of Clinic Visits

	<i>B</i>	<i>SE</i>	<i>Wald</i>	<i>OR</i>	<i>p</i>	95.0% CI	
Preferred Language (Spanish, compared to English)	.080	.29	.074	1.083	.785	.611	1.919
Marital Status (Married, compared to Unmarried - Single/Divorced)	.398	.30	1.75	1.489	.186	.825	2.687
Education Level (Grades 1–6, compared to Grade 7 to college degree)	-.781	.32	6.09	.458	.014	.246	.851
Age	.009	.03	.13	1.009	.720	.959	1.062
Gravidity	.312	.16	3.63	1.366	.057	.991	1.883
Parity	-.125	.19	.42	.882	.516	.605	1.288
Total Number of Clinic Visits (11–20, compared to 1–10)	1.031	.27	15.04	2.803	< .001	1.665	4.718

Note. $\chi^2(7) = 40.22, p < .001$, Nagelkerke $R^2 = .163$.

Summary of Analyses

Statistical analyses provided a thorough exploration of the independent, dependent, and co-variables. As shown in the descriptive tables, some variables had to be recoded due to the unbalanced nature of their distributions. After preliminary analyses, the variables: marital status, education level, age, gravida, parity, and total number of clinic visits were identified as potential covariates and were included in the primary analysis as control variables. Logistic regression was used to examine the main research question of this study. Results of the model showed a fairly low fit (Nagelkerke's $R^2 = .163$), which indicates that other potential predictors besides the ones measured and used in this study should be considered to better predict the dependent variable participants' accepting Tdap vaccination. In particular, the independent variable preferred language was not seen to be a significant predictor of participants' accepting Tdap vaccination. It can thus be concluded that there is no reason to reject the null hypothesis asserting no relationship exists between preferred language and the decision to accept Tdap vaccination.

Discussion

Hypothesis

The alternative hypothesis and research question were not supported by the analysis of this clinical project.

Relationship to Theoretical Framework

The outcome of this study is supported by the theoretical framework of Madeleine Leininger. Based on the Sunrise Enabler conceptual model, the acquisition of transcultural knowledge is derived from examining the social structure, worldview, cultural values, language, and environmental context (Nursing Theories, 2013). Language preference alone does not fully

characterize an individual. Predictions and assumptions regarding patients' health care decisions cannot be made solely on patient's stated language preference. Rather, as the transcultural model suggests, there are multiple factors that must be explored when seeking understanding of influences on a population's health care decisions. This study suggests that two of the factors related to patients' decisions to accept or decline offers of Tdap vaccine are educational level and compliance with health care appointments.

Relationship to Prior Studies

A striking finding is that the participants who preferred the Spanish language to discuss their health issues accepted the Tdap vaccination during the third trimester of pregnancy in similar proportion to their English language preferring counterparts. These results are at odds with prior studies. Larson (2003) reported that in the United States, Spanish-speaking Hispanic individuals had lower immunization rates than English-speaking Hispanic individual. The finding of Farmer et al. (2010) concerning language as a significant predictor of vaccination was neither supported by this study.

The cohort of patients who accepted the Tdap vaccine attended more clinic visits than those who declined the vaccine. Therefore, the findings of this study did not support the study of Shi et al. (2006), in which individuals with low English proficiency experience worse access to care, including obtaining necessary medical visits, and preventative services such as immunization.

The study consistently supports the report from ACOG (2011), which states that individuals with specific educational or linguistic challenges may have limited health literacy. This study showed that a greater proportion of participants who did accept the Tdap vaccine had attended at least some middle school, when compared to participants who did not accept the

Tdap vaccine. The *ACOG Committee Opinion Number 491* noted that “adults with low health literacy are at increased risk of hospitalization, encounter more barriers to receiving necessary health care services, and are less likely to understand medical advice that can affect their disease progression” (ACOG, 2011, p. 1).

Limitations

Several limitations were noted and deemed to be valuable learning experiences. They are presented in order of significance to the study outcome.

Study Location

The intended sites for the study were 10 maternal-infant clinics, one complications clinic and the obstetrical triage unit within a large southwestern public health care system. The researcher excluded three sites to avoid bias of the study. The complications clinic and the obstetrical triage unit episodically serve the unique needs of the study population receiving prenatal care at one of the nine study site clinics. Inclusion of the complications clinic and obstetrical triage unit would have created the potential for duplication of cases. The third site was eliminated because of a disproportionately small population of pregnant clients.

Instrumentation

The number of evaluable cases from each clinic was also changed. Instead of extracting 33 evaluable cases at each site as proposed in the instrumentation, the researcher extracted data from 42 to 43 patient records in each clinic to obtain 386 total participants. Of the 386 participants, 65 were excluded from the study population when the PI discovered that these patients were never offered the Tdap vaccine. As a result, the final evaluable participants were 321, which exceed the minimum amount of clients based on the a priori power analysis.

Time Sensitivity of the Study

The implementation of administering Tdap vaccination during pregnancy started on June 2013 at the study sites. Data collection started simultaneously with the initiation of the new guideline and continued for six months. Had the study encompassed a longer time frame, more evidence would have been available to explore the independent and dependent variables.

Strengths

The location of the study was a large southwestern public health care entity with ambulatory women's clinics well distributed throughout the county. The study population (Hispanic) represented the majority population in the study county. Based on the a priori power analysis, the minimum sample size required to find desired level of power set at .80 was 182 participants. The researcher however collected 321 participants instead of 182. to increase power to 0.90. A post-hoc power analysis was performed which revealed an effect size of 0.99.

This timely study corresponds with Healthy People 2020 objective 11D-1.6 and Tdap recommendations by ACIP and CDC. National regulations such as those set by the Joint Commission and Title VI of the Civil Rights Acts of 1964 serve as a supplementary underpinning of the study. Fincham (2013) noted that one ancillary goal of the Affordable Care Act is to increase the education of the health work force in order to more effectively serve clients with limited English proficiency. Consequently, this study aligns with health literacy advocacy themes of the Affordable Care Act.

Validity and Reliability

The dependent variable being measured, *decision to accept or decline the offer of Tdap vaccine*, was directly extracted from the Tdap Best Practice Alert in the Electronic Medical Record, enhancing the validity of the study. Reliability of the study was fostered by the PI

servicing as the sole data extractor; this approach ensured that the data was obtained systematically and consistently from the EMR.

Recommendations

The results of this investigation will help the administrators of the study sites and the entire study system to engage in process improvement to better meet the immunization needs of pregnant Hispanic women. Findings indicate that limited education is one of the barriers to acceptance of the Tdap vaccine; as a result, different approaches and educational strategies should be developed to increase the rate of acceptance of the Tdap vaccination among Hispanic pregnant women within this health care system. This strategy will support both ACIP guidelines and Healthy People 2020 objectives. Through data analysis, the researcher observed that among the 386 cases evaluated, 65 of the participants who did not receive the Tdap vaccination were never offered the vaccine by their health care providers. This lack of attention to detail impacted 17% of the study population. Electronic medical records software needs to be purposefully reconfigured to effectively prompt health care providers to offer such important services as vaccinations. This unanticipated finding was not included in the formal results of the study since it was not germane to the proposed analysis; however, it needs to be addressed because of its obvious impact on patient care outcomes. The researcher also noticed that the Tdap Best Practice Advisory (BPA) of the institution did not have ability to create summary flow sheets on those who declined or accepted the Tdap vaccination. The researcher, therefore, recommends that the Tdap BPA should add functions to create a flow summary so that the providers can follow up on those clients that declined. Clients who declined the Tdap vaccination should receive targeted educational programs to enhance their understanding of the reasons for vaccination.

Future Research

Future research is highly recommended to identify the effectiveness of Tdap vaccination during pregnancy in mother-infant populations, such as those served by this large healthcare system in the southwestern United States. To be helpful, researchers should perform prospective research to compare the rate of infant pertussis cases prior to and after implementation of the vaccination protocol. Further investigation is needed to explore the reasons why the providers did not offer the Tdap vaccines to pregnant women. Since language was not a predictor of Tdap vaccination acceptance, future research should include cultural beliefs, insurance status, underestimation of personal risk, misunderstanding of vaccination risk, and mistrust toward the health care system. This study was limited by use of a homogeneous sample, which favored Hispanic pregnant women. Future studies should explore the topic of Tdap vaccination acceptance in pregnancy across an array of ethnicities and cultures.

End Products

The information gained from this project highlights the need for effective patient-provider communication to enhance patient understanding of important health care options, regardless of the client's preferred language. The study provided data which suggest the need for educating health care providers about their responsibility to offer Tdap in third trimester. The findings will be used to raise the awareness of the health care system leaders that the system's electronic medical record should be updated to foster immunization compliance. Deliverables to TWU included a complete capstone project, a podium presentation at the 2014 Student Creative Arts and Research Symposium and an article manuscript for possible publication describing the project and analyzed results.

Conclusions

Although the overall regression model was significant, of all the predictor variables, only education level and number of total clinic visits were significant predictors. This indicates that as the level of education increases, the likelihood of accepting the Tdap vaccine increases. Furthermore, the higher the total number of clinic visits, the likelihood of accepting the Tdap vaccine also increases. The independent variable Language however, was not a significant predictor of accepting Tdap vaccination. Although this study did not suggest a relationship between preferred language and Tdap vaccine compliance, it does suggest that much more research is needed regarding how to better serve our client population.

Vaccination has been found to play an important role for the health of the mother and the baby. Empirical research findings indicated that there were significant increased benefits of immunization for women and that vaccination reduced their personal risk and the risk of their newborns regarding morbidity and mortality from vaccine-preventable diseases, such as pertussis (ACOG, 2011). The reduction of immunization disparities among race-ethnicity, linguistically diverse, pregnant women remains a continuing health care challenge. To support the national ACA provision, Healthy People 2020 objective, Title VI of the Civil Rights Acts of 1964, and ACIP guidelines, health care providers should continuously seek culturally and linguistically appropriate evidence-based strategies to meet the needs of pregnant women in Hispanic and other ethnic groups who have limited English proficiency and low health literacy. The results of this study are particularly important given the rapid growth of the Hispanic population in the southwestern United States, especially in the study county. Identifying Hispanic individuals at the highest risk for not receiving recommended health care services is crucial so that health care providers and policy makers can design and implement interventions to reduce discrepancies in

health care (Cheng et al., 2007). The increased number of pertussis cases in the study county (based on the September 2013 health alert from Texas Department of Health) also provided us with a renewed sense of urgency to understand how to maximize vaccination efforts for pregnant women and their unborn, our most vulnerable population.

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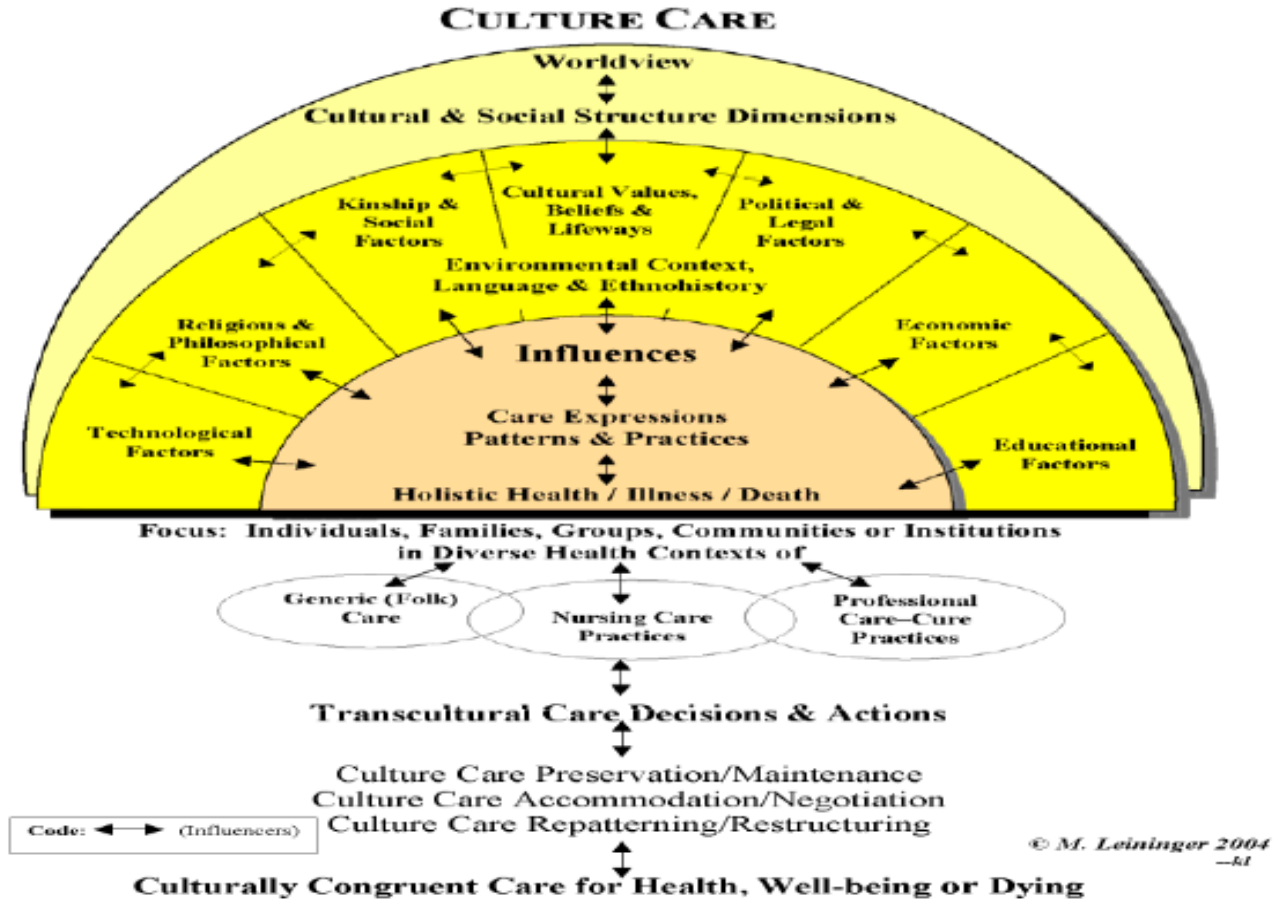
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Appendix A

Conceptual Framework

Leininger's Sunrise Enabler to Discover Culture Care



Source: Sagar (2012) retrieved from http://www.springerpub.com/samples/978082610780_chapter.pdf

Appendix B

Table B1

Critical Analysis of Quantitative Research Articles

1. Title	5. Patient Population	7. Intervention of Interest	10. Comparison of Interest	11. Outcome of Interest	14. Strengths
2. Principal Investigator or First Author	6. Sample Size	8. Design (Experimental, Observational, etc.)		12. Results of Study	15. Limitations
3. Date		9. Level of Evidence (I – VII)		13. Conclusion	
4. Country					
1. The Impact of Language Barriers on the Health Care of Latinos in the US: a review of the literature and guidance for practice	5. Latino 6. Not mentioned	7. Review impact of language barriers on healthcare system	10. Compared results of studies on language barrier	11. Solid evidence showed that language barriers could adversely affect quality of care.	14. Results supplied basic knowledge for providers in devising effective strategies for bridging the language barrier.
2. CL Timmins		8. Systematic review		12. Practical guidelines are needed to bridge language barriers in their practice.	15. Studies were as only limited to Latinos.
3. March 2002		9. Level of Evidence (IV)		13. Outcomes found language to be a risk factor for adverse outcomes.	
4. USA					

1. Title	5. Patient Population	7. Intervention of Interest	10. Comparison of Interest	11. Outcome of Interest	14. Strengths
2. Principal Investigator or First Author	6. Sample Size	8. Design (Experimental, Observational, etc.)		12. Results of Study	15. Limitations
3. Date		9. Level of Evidence (I – VII)		13. Conclusion	
4. Country					
1. Maternal effect on maternal and neonatal serum antibody levels	5. Newborn	7. Paired maternal and umbilical cords to determine Tdap concentration	10. Compared infant antibodies between mothers who received Tdap vaccine during pregnancy and mothers who did not receive vaccine	11. Significant higher concentration of Tdap on mothers who received Tdap vaccine during pregnancy	14. Strong implication to support importance of Tdap vaccination during pregnancy
2. SA Gail	6. Not identified	8. Retrospective Study		12. Administration of Tdap vaccine during pregnancy may prevent neonatal pertussis	15. Sample size was not identified.
3. April, 2011		9. Level 1 Evidence		13. Recommend Tdap vaccine during pregnancy	
4. USA					

1. Title	5. Patient Population	7. Intervention of Interest	10. Comparison of Interest	11. Outcome of Interest	14. Strengths
2. Principal Investigator or First Author	6. Sample Size	8. Design (Experimental, Observational, etc.)		12. Results of Study	15. Limitations
3. Date		9. Level of Evidence (I – VII)		13. Conclusion	
4. Country					

1. The Influence of English Proficiency on access to care	5. Limited English Proficiency	7. Extracted 2006 National Health Interview Survey Data	10. Compared results of studies on language barrier	11. Language barriers could adversely affect quality of care.	14. Results supplied basic knowledge for providers in devising effective strategies for bridging the language barrier.
2. Leiyu Shi	6. N= 29,868	8. Cross-sectional study		12. Practical guidelines are needed to bridge language barriers in their practice.	15. Study was only limited to Latinos.
3. August 2009		9. Level 1 Evidence		13. Outcomes found language to be a risk factor for adverse outcomes.	
4. USA					

1. Title	5. Patient Population	7. Intervention of Interest	10. Comparison of Interest	11. Outcome of Interest	14. Strengths
2. Principal Investigator or First Author	6. Sample Size	8. Design (Experimental, Observational, etc.)		12. Results of Study	15. Limitations
3. Date		9. Level of Evidence (I – VII)		13. Conclusion	
4. Country					
1. Barriers to early uptake of Tdap vaccines among adults in the United States, 2005 to 2007	5. Adults aged 18 years and older	7. Reviewed telephone survey	10. Compared and identified barriers to early uptake of Tdap	11. Most unvaccinated indicated willingness to receive vaccine if provider recommended it.	14. Presented a snapshot of barriers to Tdap vaccination among U.S adult.
2. Miller, Brady	6. N=3,866	8. Retrospective study			15. Vaccination status was self reported and may be subject to recall bias.
3. March 2011		9. Level 1			
4. U.S.A					

Appendix C

Table C1

Statistical Analyses

Questions Hypotheses	Independent Variable (IV) ¹	IV Level of Data ²	Dependent Variable (DV) ³	DV Level of Data ⁴	Covariate	Operational Definitions ⁵	Proposed Statistical Test	Power Analysis
There will be a significant difference in Tdap vaccination acceptance during the third trimester of pregnancy among Hispanic women who prefer to communicate in Spanish versus those who prefer to communicate in English.	Preference to speak Spanish or English	Nominal	Decision to receive vaccine	Nominal	Age, number of pregnancy, Number of clinic visits in third trimester, educational level, marital status, risk factors, how often vaccine was offered, declined and reasons.	Self-identified as Hispanic and checked English or not English speaking in the EMR at 27 to 36 weeks gestation age.	Logistic regression	Level of power set at .80, an alpha level at .05 and a moderate effect size of 1.60 (odds ratio)

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Appendix D

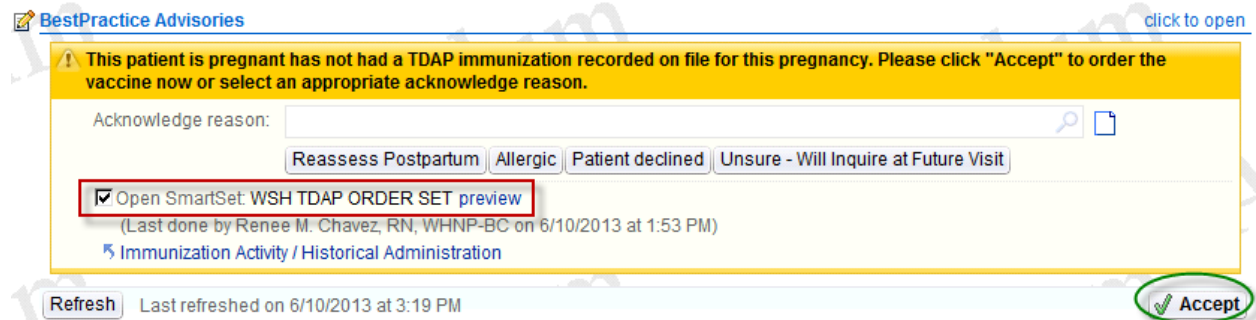
EPIC Best Practice Advisory for Tdap Vaccination

Epic Best Practice Advisories:

A new Best Practice Advisory (BPA) has been created to remind providers to offer the Tdap vaccine. If a patient has not received a Tdap during the current pregnancy episode, the BPA will start appearing when a provider opens a New OB or Return OB encounter once the patient reaches 31 weeks gestation.

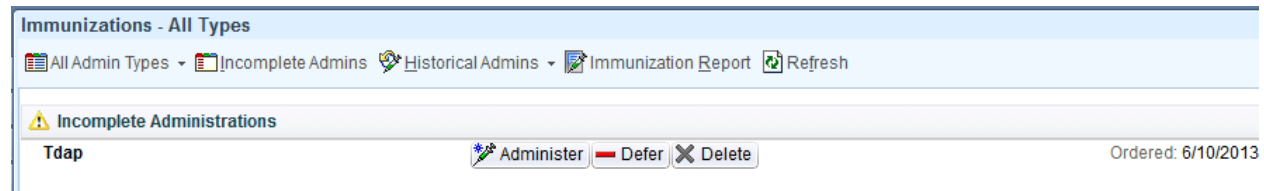
Patient is eligible and accepts the vaccine:

If the patient accepts the vaccine, the order is already attached to the BPA and the provider just needs to click Accept.



A SmartSet will open and the provider must select the appropriate Tdap order.

Once ordered, the Tdap appears in the Immunizations activity like all other vaccines.



Designated clinic staff will administer the Tdap vaccine according to clinic policy and procedure. Documentation in the Immunization Activity is similar to that entered for the Flu vaccine.

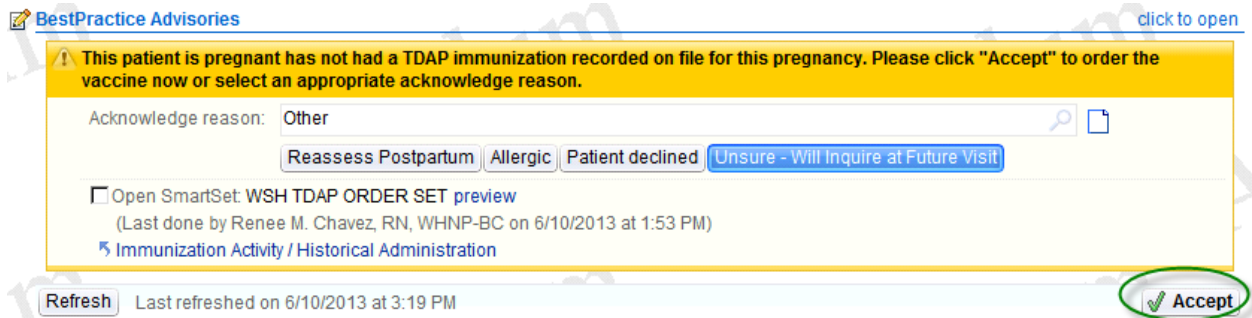
Patient is not eligible or does not accept the vaccine:

If the patient will not receive the Tdap vaccine during the encounter, the provider must still acknowledge the BPA. The following options are available as buttons on the BPA:

- Reassess Postpartum (for patients who do not want a vaccine during pregnancy but have not declined completely and will reconsider postpartum)
- Allergic

- Patient declined
- Unsure – Will Inquire at Future Visit (each time this option is selected, the BPA will reappear after 24 hours)

When the provider clicks on the desired option, the button will turn blue and an acknowledge reason automatically populates the response field. The check mark for the Tdap order is simultaneously removed. The provider will still need to click Accept to acknowledge the BPA.



When patients are admitted to the hospital:

If a clinic patient is admitted to the hospital during the antepartum period the Tdap BPA will also alert providers in those locations to offer the vaccine.

When a patient delivers, postpartum units will utilize the current workflow to assess vaccine status and will offer the Tdap vaccine if indicated.

Appendix E

Table E1

Capstone Timeline

Task	Projected Date of Completion
Capstone project proposal defense and approval from TWU capstone chairperson (Dr. Barbara McAlister)	December 6, 2013
IRB process UTSW/Study health care system	October to November 2013
IRB process TWU	December 2013
Data collection and entry	January 2013
Data analysis	February 2014
Report writing	February, 2014
Review and editing	March, 2014
Final report	March to April, 2014

Appendix F

Procedures to Maintain Confidentiality

Specific measures that were implemented by the PI to maintain confidentiality and to safeguard PHI were the following:

1. De-identification of subject was done to protect storage and transmission of electronic data and protect the code mechanism that links subject to data. Any protected health information was kept in a separate database, which was separated from the keyed database that contained the participant’s ID. Both databases were maintained and kept in separate locations by the primary investigator. The database with the PHI was locked in a secure location only accessible by the researcher. Any paper or computer research files were shredded or deleted within five years of the completion of the study. Excess copies of paper documents were also shredded.

2. The medical records of participants were alpha-numerically coded to protect privacy. The identification systems that this healthcare system uses were the following: Full name, Medical Record Number (MRN), and birthday. For the purpose of clinical inquiry of this project, the ID was coded as:

1. The first letter of the first and last name

2. The MRN was converted to an alpha-numerical ID. The following alphabets were assigned to corresponding numbers

0	1	2	3	4	5	6	7	8	9
Z	A	B	C	D	E	F	G	H	I

Example:

Maria Gonzales

MRN: 123456

Data Collection ID: MGABCDEF

3. The PI was the only person who had access to the identifiable information, and no other person was involved in this proposed study. The statistician used the de-identified information. It was anticipated that the result of this study was published in the investigator's capstone project as well as in other research publications. However, no names or other identifying information was included in any publication.