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Honors Thesis

LINGUISTIC AND CULTURAL BARRIERS TO HISPANIC IMMIGRANT
VACCINATION

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Submitted to Brigham Young University in partial fulfillment of graduation requirements
for University Honors

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Brigham Young University
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LINGUISTIC AND CULTURAL BARRIERS TO HISPANIC IMMIGRANT VACCINATION

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Bachelor of Science

ABSTRACT

Though vaccines decrease incidence of their associated diseases, vaccination rates among Hispanics are lower than their White non-Hispanic counterparts for almost all vaccines. In this study, we identify linguistic and cultural barriers to vaccination of Hispanic Immigrants (HI). An electronic survey was administered among HI parents living in the United States. Using structural equation modeling, we found that a lower language barrier increases the trust in patient-physician relationship (+0.487) and increases HPV knowledge (+0.450). Mistrust because the health care was not in Spanish led to negative vaccine attitudes (-0.104), while trust due to a lower language barrier led to positive vaccine attitudes (+0.306). Additionally, we found that high religious practice and positive religious beliefs towards vaccination correspond with positive vaccine attitudes (+0.20 and +0.587, respectively). Trust in institutions is strongly correlated with strong positive vaccine attitudes (+0.734). While trusting one's folk practitioner more than a medical doctor leads to negative vaccine attitudes (-0.596), the use of home remedies is associated with positive vaccine attitudes (+0.486). The cultural competence of a medical practitioner, especially regarding folk medicine, is essential to lower cultural barriers HI patients face in vaccination. Physicians should consider increasing Spanish proficiency in order to improve the vaccine attitudes of their HI patients.

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Introduction

Vaccination has become one of the simplest and most cost-effective strategies in preventing serious disease outbreaks around the world. Though inoculation has a long history, modern vaccines have been used since Edward Jenner created the smallpox vaccine in 1796 [1]. It is estimated that 2-3 million children's lives are saved each year because of vaccines [2]. Currently, there are over 70 vaccines available to prevent or treat diseases caused by nearly 30 pathogens [3,4].

Due to reasons not yet fully understood, vaccine uptake has decreased significantly over the last decade in the United States, as increasing numbers of parents are choosing not to vaccinate their children against a wide range of diseases [5]. One study cites that in 2021, upwards of 25 million children were not vaccinated. This was an increase in 5.9 million children from 2019, marking the largest increase in lack of childhood vaccination numbers since 2009 [6]. Between 2019 and 2021, global vaccine coverage decreased by 5%, from 86% to 81% [7]. Although lack of vaccine uptake has historically been attributed to lack of access to safe and effective vaccines, vaccine hesitancy has recently been recognized as an important factor in explaining why more and more parents choose not to vaccinate their children [8, 9, 10, 11, 12].

Despite the widespread availability of safe and effective vaccines, national vaccination rates among Hispanics rank lower than their White non-Hispanic counterparts [13]. For example, even though cervical cancer rates have decreased nationwide since the release of the Human Papillomavirus (HPV) vaccine, Hispanic women are still 40% more likely to get cervical cancer than Whites [14]. This is a significant problem, as persons of Hispanic descent comprise about 16% of the US population and are the largest ethnic minority group in the USA [14]. Several studies have examined this discrepancy in vaccination rates among the Hispanic immigrant (HI) population. Some have cited a lack of a medical "home" (meaning the absence of a consistent healthcare provider) and decreased insurance rates in comparison to non-Hispanic Whites as reasons for the deficit [16, 17]. Others have attributed it to effects

from the COVID-19 pandemic, concerns about vaccine safety, lack of medical knowledge, and less acculturation to American culture [14, 18, 19].

Few studies have examined how language barriers impact intent to vaccinate in HI communities [20]. Several papers have suggested an increased need for data on this subject [11, 14, 16, 17, 21]. Studying language barriers is especially important, as identifying shortcomings can help medical providers to better care for and educate their HI patients and lower their risk of contracting serious diseases. To better understand how language barriers among the HI community influence parental intent to vaccinate their children, we surveyed parents directly (see **Section 1: Linguistic Barriers to Vaccination**).

The cultural reasons behind vaccine hesitancy among Hispanics in the United States remain difficult to establish because Hispanic Immigrant communities are extremely diverse. Although it has been shown that vaccine uptake among Hispanics falls behind those of Whites nationwide, there is little evidence regarding reasons behind hesitancy among Hispanic Immigrants, specifically in relation to religious and folk influences [12, 14, 15, 18, 21]. To our knowledge, a study has yet to examine how these specific cultural factors influence vaccine hesitancy among Hispanics. Studying religious factors is especially important, as religious affiliation among the Hispanic community varies and many people cite religious exceptions to avoid vaccinating themselves or their children [22, 23]. Additionally, previous studies found that culturally focused educational interventions are effective at influencing vaccine attitudes; understanding cultural influences would assist in the creation of culturally specific vaccine interventions. To better understand how cultural factors influence parental intent to vaccinate among Hispanic Immigrant communities across the nation, we surveyed parents directly (see **Section 2: Cultural Barriers to Vaccination**).

Section 1: Linguistic Barriers to Vaccination

Materials and Methods

Survey Description

HI parents living in the United States were invited to complete our survey. We used Qualtrics (Provo, UT, USA) to distribute the survey nationwide. Participants who did not have children, who did not identify as Hispanic or Latino, or who were born in the United States were excluded from the survey. Participants born in the US territory of Puerto Rico were included.

We used a cross-sectional study design in which participants completed a 116-question survey. The survey measured vaccine attitudes, HPV knowledge, English proficiency, language barriers, trust in medicine/institutions, financial barriers, and demographics. Some questions were contingent on answers to previous questions; for example, only female participants were asked if they received regular pap smears. Questions were arranged in thirteen sections. The first section addressed demographic questions. The second section asked about the participant's comfort speaking English and had a short English language evaluation. The third section requested information about the respondent's access to healthcare in their preferred language. The fourth section assessed their knowledge of HPV. The fifth section asked questions regarding acculturation and assimilation to American culture. The sixth section determined financial and logistic barriers to vaccination. The seventh and eighth sections covered religious and social views, including a previously validated religiosity metric [21]. The ninth section measured the participants' trust in institutions. The tenth and eleventh sections evaluated the respondent's use of and attitudes toward traditional medicine. The twelfth section measured general vaccine attitudes (GVA). The last section asked questions about their HPV vaccination status.

The survey was administered both in English (231 responses) and Spanish (626 responses). 404 responses were discarded due to low data quality or because the participants did not fit the inclusion criteria (most of the excluded responses were not parents). 453 responses were used in the analysis. Prior to distribution, the study received

approval from the institutional review board at Brigham Young University (IRB2023-120).

Confirmatory Factor Analysis and Structural Equation Modeling

Confirmatory factor analysis (CFA) was used to validate the latent variables. We performed CFA with a request for standardized fit statistics and modification for each latent variable. Items with low standardized p-values were removed until fit indices (Tucker–Lewis index (TLI), comparative fit index (CFI), root mean square error approximation (RMSE), and standardized root mean square residual (SRMR)) showed acceptable model fit. Three or more items represented each latent variable. We used structural equation modeling (SEM) to find the relationship between latent variables and build a cohesive model. We ran two models with income, education, and sex as covariates. CFA and SEM were done using Mplus software, ver 8 (Munthen and Munthen, 1998-2001, Los Angeles, CA, USA).

Results

Demographics of Survey Respondents

Prior to formal analysis of survey data, we summarized the demographic characteristics of our sample (Table 1). Of the 453 survey responses in our data set, approximately three-fifths were female (61.5%) and two-fifths were male (37.9%). One respondent identified as nonbinary/other, and one respondent preferred not to answer. All respondents were of Hispanic, Latino, or Spanish origin with the largest plurality specifically indicating they were of Mexican, Mexican American, or Chicano origin (45.2%). Survey responses indicated the participants were predominantly born in Mexico (34.4%), Puerto Rico (10.4%), Cuba (6.8%), Venezuela (5.7%), Colombia (4.8%), El Salvador (3.5%), Argentina (3.5%), or Dominican Republic (3.3%).

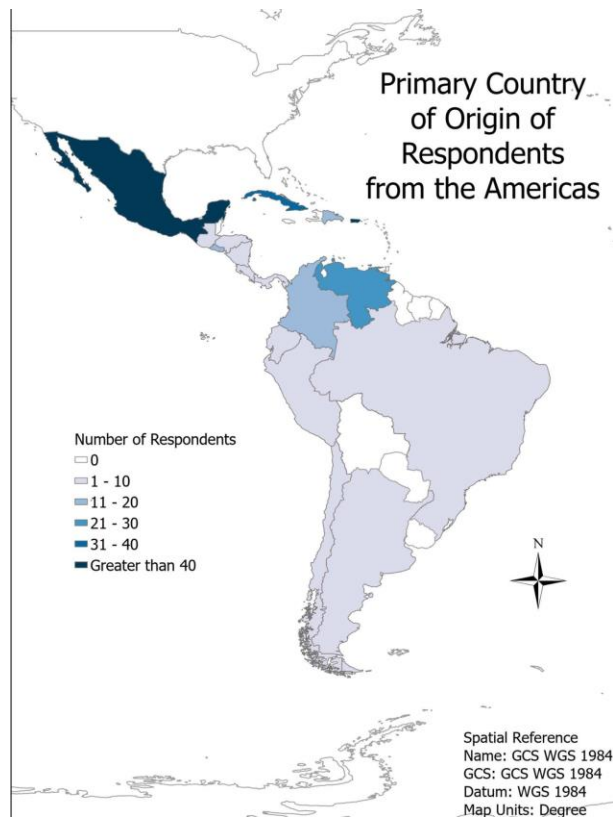


Figure 1: Map of participant birthplaces. This choropleth map shows frequencies of the birthplaces of the respondents in the Americas. The most common countries of birth were Mexico (163 respondents), Puerto Rico (46 respondents), Cuba (31 respondents), Venezuela (25 respondents), and Colombia (22 respondents). 52 other countries were also represented.

The majority of respondents were between ages 26-35 (43.7%) and ages 36-45 (30.7%). Approximately three-fourths of participants were either married (51.3%) or partnered (21.2%); one-fourth were either single (19.5%), divorced (5.8%), or widowed (2.2%). All survey respondents reported having children, as it was an inclusion criterion for participation in the study. The greatest number of respondents report having either 2 children (43.7%) or 1 child (30.9%). Our population had a lower average number of children than the average number of children Hispanic mothers have over a lifetime, which is 2.6 children [24]. This is consistent with a sample predominantly containing young parents. Over half of participants indicated the majority of their family lives in the US (57.2%) while approximately two-fifths responded most of their family lives in their

home country (37.8%). Educational levels had notable variation, as participants had advanced degrees (13.0%), bachelor's degrees (30.5%), associate degrees (15.2%), some college or a vocational certification (17.4%), high school diploma (18.8%), or no high school diploma (5.0%). Annual household income had the greatest response percentages at \$76,000-\$100,000 (17.2%) and \$26,000-\$35,000 (14.4%).

Table 1: Demographics Table

	Count	Percentage
Sex*		
Male	172	38.1
Female	279	61.7
Non Binary/Other	1	0.22
Race (select all that apply)		
Hispanic/Latino	383	84.5
White	98	21.6
Black	40	8.8
Native American or Alaskan	17	3.8
Native		
Asian	15	3.3
Other	3	0.7
Age		
18-25	90	19.9

26-35	198	43.7
36-45	139	30.7
46+	26	5.7
Income Level*		
Less than \$5,000	40	8.8
\$5,000-\$15,000	34	7.5
\$16,000-\$25,000	39	8.6
\$26,000-\$35,000	65	14.4
\$36,000-\$45,000	46	10.2
\$45,000-\$60,000	59	13.1
\$61,000-\$75,000	47	10.4
\$76,000-\$100,000	78	17.3
Over \$100,000	44	9.7
Marital Status*		
Single	88	19.5
Partnered	96	21.2
Married	232	51.3
Divorced	26	5.8

Widow/Widower	8	1.8
Education		
Have not finished high school	22	4.9
Finished high school	85	18.8
Some college or vocational certificate	79	17.4
Associate's degree	69	15.2
Bachelor's degree	138	30.5
Advanced degree (masters, MD, DDS, PhD, etc)	59	13.0
Number of Children		
1	140	30.9
2	198	43.7
3	80	17.7
4	20	4.4
5+	15	3.3
*responses do not add up to 453; not all participants responded to every question.		

Table 2 shows the exposure variable, English Proficiency (in a 3-category scale of Low, Mid-level, and High Proficiency) against each demographic measure (race/ethnicity was included as it was a “choose all that apply” variable.) Females had a higher percentage of respondents who were low or mid-level proficiency than males. There was a clear trend that the older the participants, the more respondents were in higher proficiency levels (and fewer in lower levels). A similar imbalance can be seen with income and education; the higher the income or education, the greater the percentage of participants in that category scored in the high proficiency level. The exception to this trend was that those with bachelor’s Degrees (76.1%) had a higher percent of respondents in high proficiency than those with Advanced Degrees (69.5%). There was no clear imbalance of English proficiency according to marital status.

Table 2: English Proficiency and Demographics

	English Proficiency					
	Low Proficiency		Mid-level Proficiency		High Proficiency	
	Count	%	Count	%	Count	%
Sex						
Male	10	5.81	48	27.91	114	66.28
Female	18	6.45	105	37.63	156	55.91
Age						
18-25	7	7.78	37	41.11	46	51.11
26-35	12	6.06	68	34.34	118	59.6
36-45	8	5.76	42	30.22	89	64.03
46+	1	3.85	7	26.92	18	69.23
Income Level						
Less than \$5,000	4	10	23	57.5	13	32.5
\$5,000-\$15,000	4	11.76	20	58.82	10	29.41
\$16,000-\$25,000	3	7.69	14	35.9	22	56.41
\$26,000-\$35,000	4	6.15	31	47.69	30	46.15
\$36,000-\$45,000	5	10.87	18	39.13	23	50
\$45,000-\$60,000	1	1.69	17	28.81	41	69.49
\$61,000-\$75,000	2	4.26	8	17.02	37	78.72
\$76,000-\$100,000	4	5.13	17	21.79	57	73.08
Over \$100,000	1	2.27	6	13.64	37	84.09
Marital Status						
Single	4	4.55	36	40.91	48	54.55
Partnered	9	9.38	35	36.46	52	54.17
Married	15	6.47	69	29.74	148	63.79
Divorced	0	0	9	34.62	17	65.38
Widow/Widower	0	0	3	37.5	5	62.5
Education						
Have not finished high school	7	31.82	10	45.45	5	22.73
Finished high school	5	5.88	38	44.71	42	49.41
Some college or vocational certificate	6	7.59	32	40.51	41	51.9
Associate’s degree	4	5.8	28	40.58	37	53.62
Bachelor’s degree	5	3.62	28	20.29	105	76.09
Advanced degree (masters, MD, DDS, PhD, etc)	1	1.69	17	28.81	41	69.49

Confirmatory Factor Analysis

Confirmatory Factor Analysis (CFA) models were run to validate each latent variable in the survey in preparation for Structural Equation Modeling (SEM). Models were constructed to analyze language barriers to vaccine uptake (**Model 1**) and socio-economic and linguistic barrier's influence on general vaccine attitudes (**Model 2**). In Model 1, the items (Q24, "Higado in English is;" Q25 "Corazón in English is;" Q27 "Sarampión in English is;" Q28 "Tos in English is;" and Q29 "Dolor in English is") were removed from the latent variable *English proficiency* because CFA indicated that they did not fit with the other items. Confirmatory factor analysis concerning *HPV Knowledge* showed that item Q35_5 ("HPV causes cancer in women but not men") did not fit, therefore it was removed from the latent variable.

In Model 2, items Q31_3 ("When my doctor does not speak Spanish, I still feel like he/she understands me,") Q31_11 ("I am skeptical about the health information I read online,") Q31_12 "Online websites in Spanish offer the information necessary for my health needs," Q32_1 ("When I visit a doctor, they speak Spanish,") Q32_2 ("My doctor provides an interpreter when he/she does not speak Spanish,") and Q32_3 ("I know where to go to get health information") were removed from the latent variable *Trust Due to Lower Language Barrier* due to lack of fit. Confirmatory factor analysis of *Barriers to Vaccination* led to item Q42 ("What is your mode of transportation to get medical care?") being removed from the latent variable due to lack of fit. All items in HPV vaccine attitudes did not fit and had to be removed. *HPV Vaccine Attitudes* showed a robust fit, however, when combined with *General Vaccine Attitudes (GVA)* (RMSEA = 0.63, CFI = 0.959, TLI = 0.943, SRMR = 0.043, see **Supplementary Material 1** for full table).

Table 3: Fit Statistics for structural equation models General Vaccine Attitudes Variable.

Model (Latent Variables)	RMSEA	CFI	TLI	SRMR
Model 1	0.050	0.926	0.916	0.080
Model 2	0.041	0.944	0.935	0.042

Figure 2: Higher English proficiency is predictive of higher GVA by means of both higher trust due to a lower language barrier and higher HPV knowledge. Latent variables *English Proficiency*, *Trust due to lower language barrier*, *HPV knowledge*, and *GVA* were combined in a structural model. Higher English proficiency leads to higher HPV knowledge, which increases GVA. Likewise, higher English proficiency also leads to higher trust due to lower language barrier, which increases GVA. English proficiency does not directly impact GVA. Income, education, and sex did not impact GVA. Values shown are standardized beta coefficients. Values with one asterisk are significant at $p=0.05$. Values with two asterisks are highly significant, at $p\leq 0.01$.

SEM for Model 2 reflects the relationship between various linguistic and logistic barriers and *GVA*. According to Model 2, the variable *Trust due to lower language barrier* (+0.306) is the strongest predictor of positive *GVA*. Variable *Affordability* (+0.217) is the second strongest predictor of positive *GVA*. Lastly, *Mistrust because the health care was not in Spanish* (-0.104) has a mild negative relationship with positive *GVA*. There was no significant relationship between *Location* and *GVA*. Additionally, there was no significant relationship between *GVA* and the covariates *Sex*, *Education*, or *Income*.

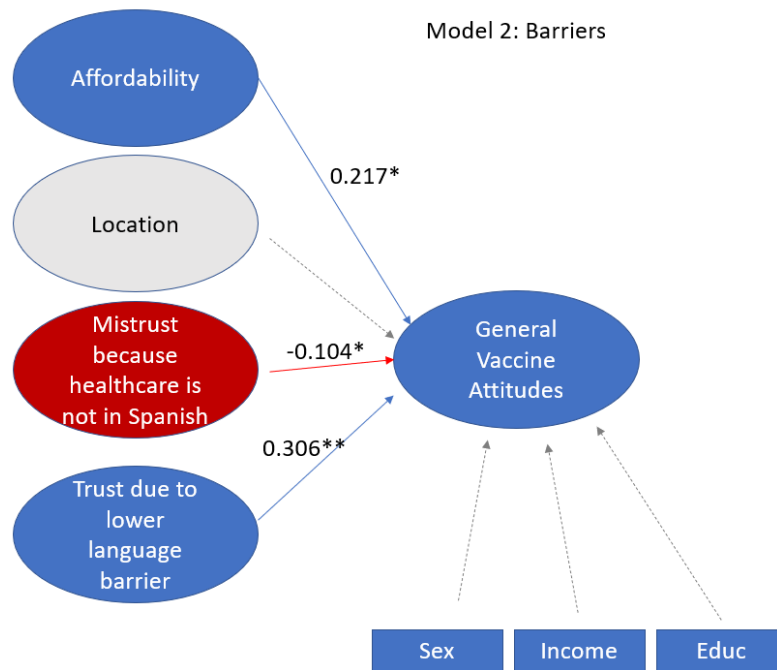


Figure 3: Variables *Affordability* and *Trust due to lower language barrier* have a positive correlation with *GVA*, and have a negative correlation with variable *Mistrust because the healthcare is not in Spanish*. Latent variables *Affordability*, *Location*, *Mistrust because healthcare is not in Spanish*, and *Trust due to lower language barrier*; and *GVA* were evaluated in a structural model. The more affordable the vaccines were to the participant, the higher their *GVA*. While mistrust because the healthcare was not in Spanish was negatively correlated with *GVA*, the opposite was also true: trust due to lower language barrier was positively correlated with *GVA*. The variable *Location* was not significantly related to *GVA*. Covariates *Income*, *Education*, and *Sex* did not impact *GVA*. Values shown are standardized beta coefficients. Values with one asterisk are significant at $p \leq 0.05$; two asterisks are highly significant at $p \leq 0.01$. Values in red show a negative correlation.

Six survey items were used to represent *GVA*. The proportions of answers to each question are shown in **Figure 4**. Three of the questions tested the participant's perception of the efficacy of vaccines ("Vaccines are more helpful than harmful," "Vaccines are effective at preventing disease," and "Vaccination efforts have reduced infectious diseases in the US.") More than 50% of participants somewhat agreed or strongly agreed with each of those statements; between 16%, 13%, and 10% responded "Somewhat disagree" or "Strongly disagree" to each of the questions, respectively. Two questions evaluated the respondent's perception of the safety of vaccines ("Vaccines are extensively tested to ensure their safety," and "Vaccines contain dangerous toxins"). 64% of participants somewhat agreed or strongly agreed that vaccines are tested to ensure their safety, and only 12% somewhat disagreed or strongly disagreed. 33% responded "Strongly disagree" or "Somewhat disagree" that vaccines contain dangerous toxins. 31% somewhat agreed or strongly agreed. "Vaccines contain dangerous toxins" was reverse-coded.

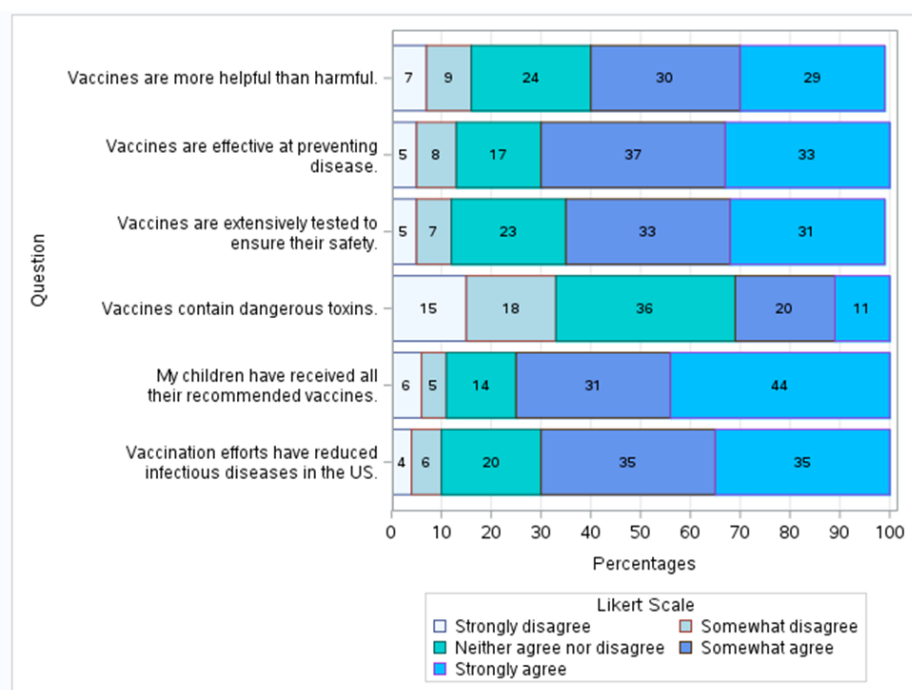


Figure 4: The majority of respondents agreed with pro-vaccine statements. Six survey items were used to measure *GVA*. Respondents tended to have pro-vaccination attitudes, with about 30% of respondents responding, "strongly agree" to the statements "Vaccines are more helpful than harmful," "Vaccines are

effective at preventing disease,” “Vaccines are extensively tested to ensure their safety,” and “Vaccination efforts have reduced infectious diseases in the US.” Only a small percentage (4-7%) responded “strongly disagree” to those four statements. The question “Vaccines contain dangerous toxins” had a higher percentage of participants respond, “strongly disagree,” and more than a third (36%) responded “Neither agree nor disagree.” 44% responded “strongly agree” to the question “My children have received all of their recommended vaccines.” Only 11% responded “strongly disagree” or “somewhat disagree.”

Five survey items were used to represent the variable *English Proficiency*. The proportions of answers to each question are shown in **Figure 5**. Participants were asked how comfortable they felt speaking English at school, at work, at home, and in public. They were also asked how comfortable they were in understanding English. The majority of participants responded “Totally comfortable” or “Moderately comfortable” to all of the questions, though the question that the most people responded “Totally comfortable” to was speaking English at work. 24% to 19% of participants said they were “Not at all comfortable” or “Somewhat comfortable” speaking English in the various environments or understanding English. The place where the most people were “Not at all comfortable” or “Somewhat comfortable” speaking English was at home (24%).

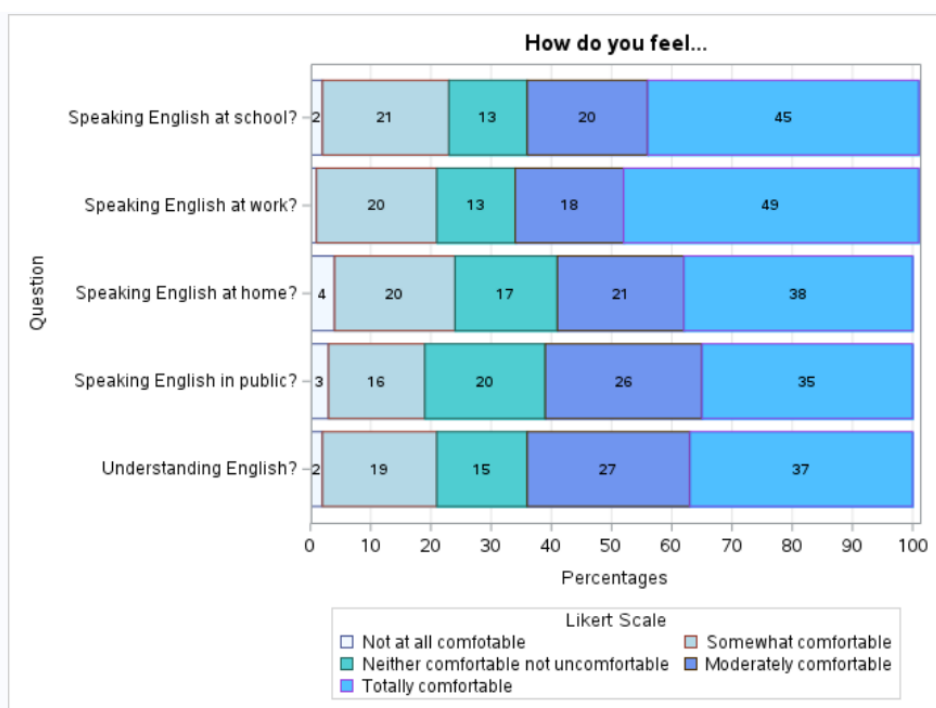


Figure 5: The majority of our respondents were comfortable speaking and understanding English. Five survey items were used to measure *English Proficiency*. 35% - 49% of respondents reported that they are “Totally comfortable” speaking English at school, work, home, and in public, as well as understanding English. Only a small percentage (1%-4%) described themselves as “Not at all comfortable” speaking English at school, work, home, and in public, as well as understanding English.

Eleven survey items were used to represent the variable *Trust due to lower language barrier*. The proportions of answers to each question are shown in **Figure 5**. Participants reported a good relationship with their doctor (68% answered “Strongly agree” or “Somewhat agree”) and reported to trust their doctor’s instructions (75% selected “Strongly agree” or “Somewhat agree”). Most respondents were confident that their doctor understood their healthcare needs (73% said “Strongly agree” or “Somewhat agree”). Generally, doctors were trusted more than online resources (66% reported “Strongly agree” or “Somewhat agree”). Interestingly, a majority of participants (60%) said they were most comfortable when their doctor speaks Spanish. The question “The care I receive isn’t as effective when my doctor only speaks English” had a plurality of respondents who responded, “Strongly agree” or “Somewhat agree” (42%), but was the question with the largest number of respondents answering “Strongly disagree” or “Somewhat disagree” (31%). Additionally, 56% of respondents strongly agreed or somewhat agreed that it would be easier to trust their doctor if he or she spoke Spanish (19% strongly disagreed or somewhat disagreed).

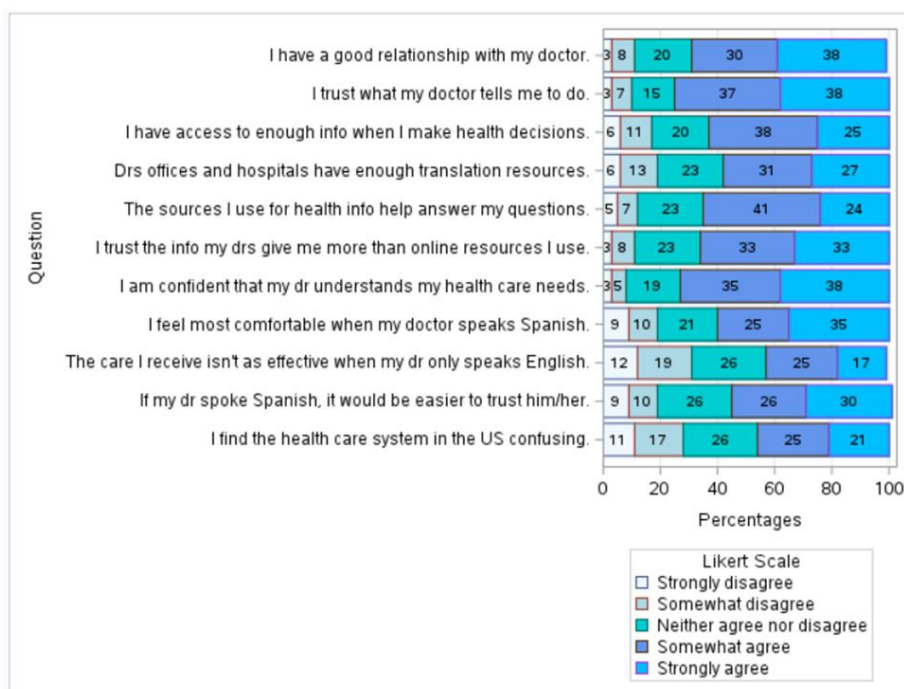


Figure 6: The majority of respondents trust their doctor, though they prefer if their doctor spoke Spanish. Eleven survey items were used to measure the variable *Trust due to lower language barrier*. The questions that more than a third of participants “Strongly agree[d]” with were “I have a good relationship with my doctor” (38%), “I trust what my doctor tells me to do” (38%), “I trust the information my doctors give me more than the online resources I use” (33%), “I am confident that my doctor understands my healthcare needs” (38%), and “I feel most comfortable when my doctor Speaks Spanish” (35%).

Discussion

English Proficiency increases Trust and HPV Knowledge

The model in **Figure 2** suggests that a high predictor of trust due to a lower language barrier is English proficiency. A majority (56%) of respondents strongly agreed or somewhat agreed that it would be easier to trust their doctor if he or she spoke Spanish. Our study suggests that a lack of a language barrier, whether because the patient speaks English or because the physician speaks Spanish, increases trust in physicians. Increasing the patient-physician relationship of trust is especially important among the HI community, which has reportedly lower levels of trust in the medical community due to historical mistreatment and fears regarding documentation [25]. A 2023 study conducted in California found that patients were more comfortable with Spanish speaking

physicians (even those who had only taken a few courses in Spanish) than English speaking doctors with the aid of a translator [26]. Our study confirms these findings and stresses the importance of instructing physicians in the Spanish language.

English Proficiency increases Vaccine Attitudes

The model in **Figure 2** also demonstrates that higher English proficiency increases the patient's HPV knowledge, which in turn increases general vaccine attitudes. In a previous study [21], high HPV knowledge was shown to be predictive of intent to vaccinate among religious people in Utah. Parents who understand the risks of HPV are more willing to protect their children through vaccination. Our current study confirms these findings and stresses the importance of providing HPV information to Spanish-speaking clients in their native language. Perhaps it would lower the need for English proficiency to have high HPV knowledge, effectively helping more native Spanish speakers develop pro-vaccine attitudes.

Trust Due to Lower Language Barrier is Predictive of High GVA

In both models in **Figure 2** and **Figure 3**, trust due to a lower language barrier is the greatest indicator of higher GVA. The Model in **Figure 3** showed a negative association between mistrust due to a language barrier and GVA. Previous studies have found a strong link between trust in physicians and pro-vaccine attitudes [21, 27]. In a 2022 survey of more than 3000 adults from South Dakota, Viskupič, Wiltse, and Meyer found a positive and statistically significant relationship between trust in doctors and COVID-19 vaccination [28]. Our study adds to the conversation regarding patient-physician trust and vaccine attitudes, adding that a lack of a language barrier increases trust, thereby increasing vaccine attitudes.

Affordability increases GVA

Model 2 (**Figure 3**) establishes that affordability, which includes having health insurance that covers vaccination, improves GVA. Many HIs find barriers to acquiring health insurance coverage due to their immigration status. A previous study of almost 30,000 participants found that more children living in extended-Medicaid states (states

that allow undocumented children to have Medicaid) had lower rates of uninsurance and higher rates of preventative healthcare, such as vaccination [29]. Our study highlights the importance of policies that increase Medicaid and other health insurance coverage to undocumented immigrants, especially children, to increase vaccine attitudes and vaccination uptake. The Federally funded Vaccines for Children (VFC) Program provides free or reduced cost vaccines to all children without health insurance, regardless of immigration status. Since the program started, vaccination uptake has increased and ethnic disparities in vaccination have decreased [30]. However, this program is not widely advertised, leaving many HI parents still concerned about the affordability of their children's vaccines. More advertisements of the VFC Program could lead to higher perceived affordability, increasing GVA.

Limitations

A limitation of our study was that many participants had to be excluded from the analysis, limiting sample size. Additionally, our survey was distributed online, potentially excluding those who do not have internet access. Several Spanish-speaking countries were not represented at all in our sample, or in very small numbers, which limits the external validity of our results. Lastly, this project originally attempted to measure attitudes towards the HPV vaccine, but several of the variables measuring HPV attitudes did not fit well in the models and had to be discarded. Therefore, our findings are not HPV-specific.

Conclusions

A lower language barrier (either due to the patient's English proficiency or the physician's Spanish proficiency) increases the trust in the patient-physician relationship, thereby improving vaccine attitudes. As the rates of HIs in the US increase over the next few years, it will be increasingly essential for physicians to develop Spanish proficiency and adequate translation services to better serve their patients.

Additionally, an expansion of Medicaid for undocumented immigrant children and more advertisements of the VFC Program targeted to the Spanish speaking population could increase perceived affordability, which would in turn increase vaccination uptake among Hispanic immigrants.

Section 2: Cultural Barriers to Vaccination

Materials and Methods

Survey Description

Respondents completed a survey consisting of 116 questions. The survey measured vaccine attitudes, HPV knowledge, English proficiency, language barriers, trust in medicine/institutions, financial barriers, and demographics. Some questions were contingent on answers to previous questions; for example, only female participants were asked if they received regular pap smears. Questions were arranged in thirteen sections. The first section addressed demographic questions. The second section asked about the participant's comfort speaking English and had a short English language evaluation. The third section requested information about the respondent's access to healthcare in their preferred language. The fourth section assessed their knowledge of HPV. The fifth section asked questions regarding acculturation and assimilation to American culture. The sixth section determined financial and logistic barriers to vaccination. The seventh and eighth sections covered religious and social views, including a previously validated religiosity metric [21]. The ninth section measured the participants' trust in institutions. The tenth and eleventh sections evaluated the respondent's use of and attitudes towards traditional medicine. The twelfth section measured general vaccine attitudes (GVA). The last section asked questions about their HPV vaccination status. The entire survey is included in the supplementary materials (**Appendix 2**).

The survey was administered both in English (231 responses) and Spanish (626 responses). 404 responses were discarded due to low data quality or because the participants did not fit the inclusion criteria (most of the excluded responses were not parents). 453 responses were used in the analysis. The survey was distributed in the United States through Qualtrics (Provo, UT, USA). The study was approved by the Brigham Young University institutional review board (IRB2023-120).

Confirmatory Factor Analysis and Structural Equation Modeling

In order to validate the latent variables in the survey, we used confirmatory factor analysis (CFA). For each latent variable, CFA was performed with a request for modification indices and STDYX standardization. Survey items with low standardized p -values were removed until fit statistics (root mean square error approximation (RMSE), comparative fit index (CFI), Tucker–Lewis index (TLI) and standardized root mean square residual (SRMR)) were found to be in an acceptable range. All latent variables were represented by at least three items. To build a model and test the relationships between latent variables, we used structural equation modeling (SEM). Two SEM models were run with sex, income, and education as covariates. CFA and SEM were done using Mplus software, ver 8 (Munthen and Munthen, 1998-2001, Los Angeles, CA, USA).

Results

Demographics of Survey Respondents

Prior to formal analysis of survey data, we summarized the demographic characteristics of our sample. Of the 453 survey responses in our data set, approximately three-fifths were female (61.5%) and two-fifths were male (37.9%) (see **Table 1** in section 1 for more details). One respondent identified as nonbinary/other, and one respondent preferred not to answer. All respondents were of Hispanic, Latino, or Spanish origin with the largest plurality specifically indicating they were of Mexican, Mexican American, or Chicano origin (45.2%). Survey responses indicated the data set was predominantly born in Mexico (34.4%), Puerto Rico (10.4%), Cuba (6.8%), Venezuela (5.7%), El Salvador (3.5%), Argentina (3.5%), or Dominican Republic (3.3%) (see **Figure 7**).

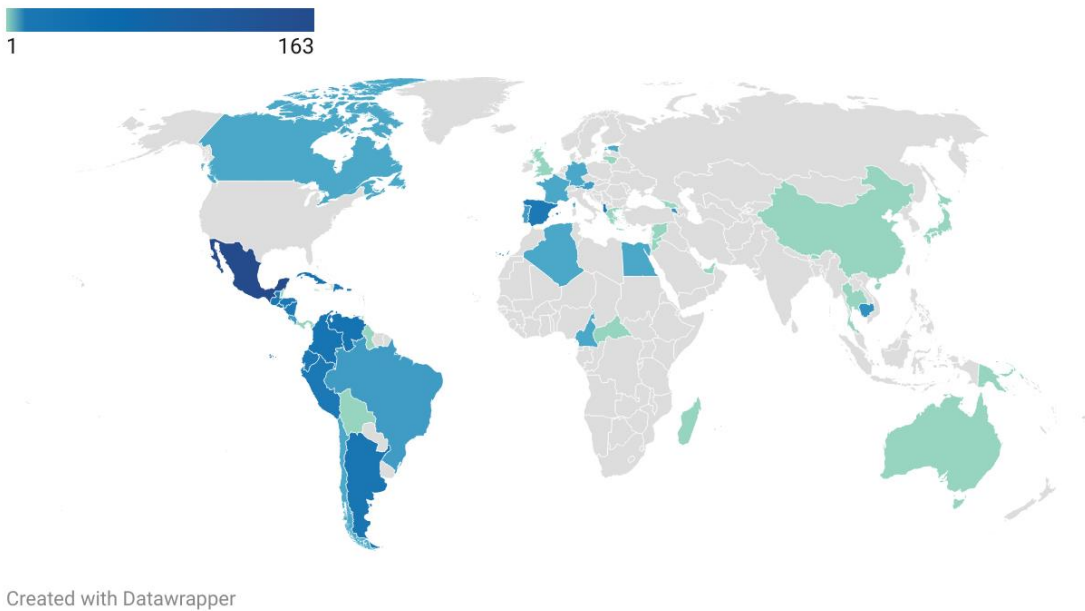


Figure 7: Map of participant birthplaces. This choropleth map shows frequencies of the birthplaces of the respondents. The most common countries of birth were Mexico (163 respondents), Puerto Rico (46 respondents), Cuba (31 respondents), Venezuela (25 respondents), and Colombia (22 respondents). 52 other countries were also represented.

The majority of respondents were between ages 26-35 (43.7%) and ages 36-45 (30.7%). Approximately three-fourths of participants were either married (51.3%) or partnered (21.2%), and one-fourth were either single (19.5%), divorced (5.8%), or widowed (2.2%). Furthermore, the majority of the sample were young parents, which is likely related to the greatest number of respondents reporting having either 2 children (43.7%) or 1 child (30.9%). This is lower than the average number of children in Hispanic families, which is consistent with a sample predominantly containing young parents. Over half of participants indicated the majority of their family lives in the US (57.2%) while approximately two-fifths responded most of their family lives in their home country (37.8%). Educational levels had notable variation, as participants had advanced degrees (13.0%), bachelor's degrees (30.5%), associate degrees (15.2%), some college or a vocational certification (17.4%), high school diploma (18.8%), or no high school diploma (5.0%). Annual household income had the greatest response percentages at \$76,000-\$100,000 (17.2%) and \$26,000-\$35,000 (14.4%). While all of our sample

were born in a foreign country, many of the respondents have lived in the United States for a substantial period of time (see **Figure 8**). A majority of our participants (62%) have lived in the United States for more than 6 years. 44% have lived in the US for more than 10 years. Only 5% have lived in the US for less than 1 year. Our participants are more recent immigrants than the population of immigrants in the US; 77% of Hispanic immigrants in the US have been in the country for 10 years or longer [31].

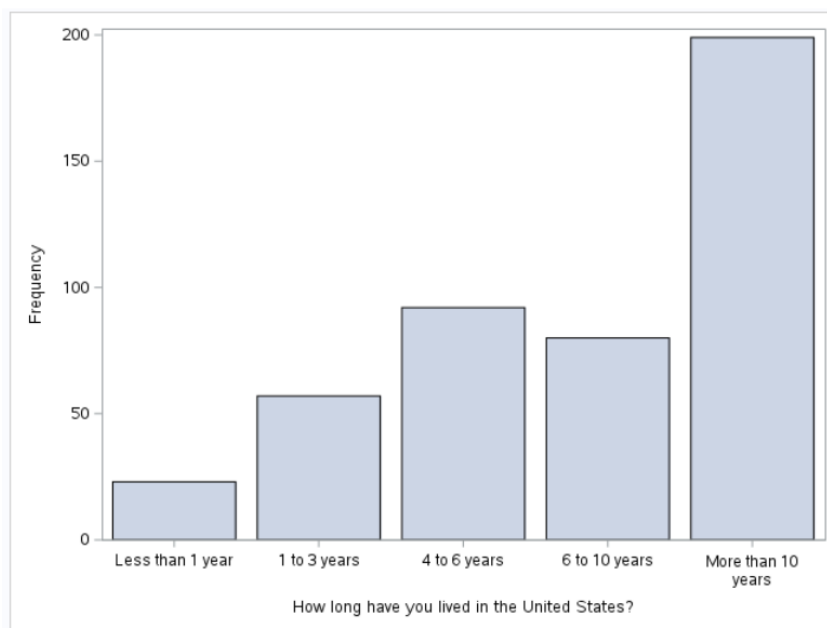


Figure 8: The plurality of respondents who have immigrated to the United States more than 10 years ago. A bar graph showing the frequency of responses to the question, “How long have you lived in the United States?” The most common response was “More than 10 years” (44%). 18% of respondents said that they have lived in the US for 6 to 10 years, 20% have lived in the US for 4 to 6 years, 13% for 1 to 3 years, and 5 percent have only lived in the US for less than 1 year.

Table 4 shows the exposure variable, Religiosity (categorized in the Low Religiosity, Medium Religiosity, and High Religiosity Categories) against demographics. Males had slightly higher religiosity than females. Younger participants (18-25 and 26-35) had more responses in the High and Medium Religiosity category than older participants. There was not a clear trend between income and religiosity, with the exception that those who made over \$100,000 a year had a higher percentage of respondents in the low and medium categories. Interestingly, widows and widowers were by far the more religious

group, with 37% of respondents scoring in the highly religious category, and 50% of respondents scoring in the medium religious category. Similar to income, there was no clear trend between education and religiosity, with the exception that those who had advanced degrees had a higher percentage of respondents in the low and medium categories.

Table 4: Religiosity and Demographics

	Religiosity					
	Low		Medium		High	
	Count	%	Count	%	Count	%
Sex						
Male	38	22.22	90	52.63	43	25.15
Female	73	26.35	153	55.23	51	18.41
Age						
18-25	13	14.61	51	57.3	25	28.09
26-35	43	21.83	109	55.33	45	22.84
36-45	48	34.78	70	50.72	20	14.49
46+	8	30.77	13	50	5	19.23
Income Level						
Less than \$5,000	7	17.5	23	57.5	10	25
\$5,000-\$15,000	4	12.12	21	63.64	8	24.24
\$16,000-\$25,000	14	35.9	21	53.85	4	10.26
\$26,000-\$35,000	20	30.77	28	43.08	17	26.15
\$36,000-\$45,000	9	20	26	57.78	10	22.22
\$46,000-\$55,000	16	27.12	36	61.02	7	11.86
\$56,000-\$65,000	9	19.15	26	55.32	12	25.53
\$66,000-\$75,000	17	21.79	42	53.85	19	24.36
Over \$76,000	16	37.21	20	46.51	7	16.28
Marital Status						
Single	19	21.84	50	57.47	18	20.69
Partnered	26	27.37	52	54.74	17	17.89
Married	58	25.11	118	51.08	55	23.81
Divorced	7	26.92	17	65.38	2	7.69
Widow/Widower	1	12.5	4	50	3	37.5
Education						
Have not finished high school	5	23.81	10	47.62	6	28.57
Finished high school	22	25.88	47	55.29	16	18.82
Some college or vocational certificate	23	29.11	40	50.63	16	20.25
Associate's degree	14	20.59	39	57.35	15	22.06
Bachelor's degree	27	19.57	78	56.52	33	23.91
Advanced degree (masters, MD, DDS, PhD, etc)	21	36.21	29	50	8	13.79

Confirmatory Factor Analysis

Confirmatory Factor Analysis (CFA) models were run for each latent variable in the hypothetical models for Structural Equation Modeling (SEM). Models were constructed to analyze cultural influences such as religious influence on vaccine attitudes (**Model 1**) and folk influence on vaccine attitudes (**Model 2**). In Model 1, item Q49_3 “I

trust in folk (traditional medicine, curanderismo” was not included with the items pertaining to Folklore due to lack of fit. In Model 2, items Q49_1 “My medical provider cares about my health”, Q49_2 “My medical provider only cares about making money”, and Q54 “The companies that make vaccines want to make money at the expense of my health” were removed from the latent variable Trust in Institutions due to lack of fit. Otherwise, Confirmatory Factor Analysis confirmed each latent variable in Model 1 and Model 2 to fit the data well with all other items. Items Q33_6 “The HPV vaccine is effective at preventing almost all cancers caused by HPV,” Q33_7 “People do not need to vaccinate their children against HPV because HPV is sexually transmitted, so my family’s values will protect my children from HPV,” and Q35_8 “There are more potential side effects of the HPV vaccine than benefits” were removed because they did not fit with other survey factors pertaining to HPV Vaccine Attitudes. However, HPV Vaccine attitudes was run with GVA and showed a robust fit (RMSEA = 0.63, CFI = 0.959, TLI = 0.943, SRMR = 0.043).

Table 5: Fit Statistics for structural equation models General Vaccine Attitudes Variable.

Model (Latent Variables)	RMSEA	CFI	TLI	SRMR
Model 1	0.052	0.928	0.915	0.055
Model 2	0.053	0.923	0.912	0.051

Structural Equation Modeling

SEM for Model 1 (**Figure 9**) indicates *Religious beliefs about Vaccines* (+0.587) was the strongest predictor of greater GVA. Additionally, greater *Religious Practice* predicts greater GVA (+0.200). There was no significant relationship shown between *Religious Fatalism* and GVA as well as between *Religious influence* and GVA. There was no significant relationship between GVA and Sex, Education, or Income.

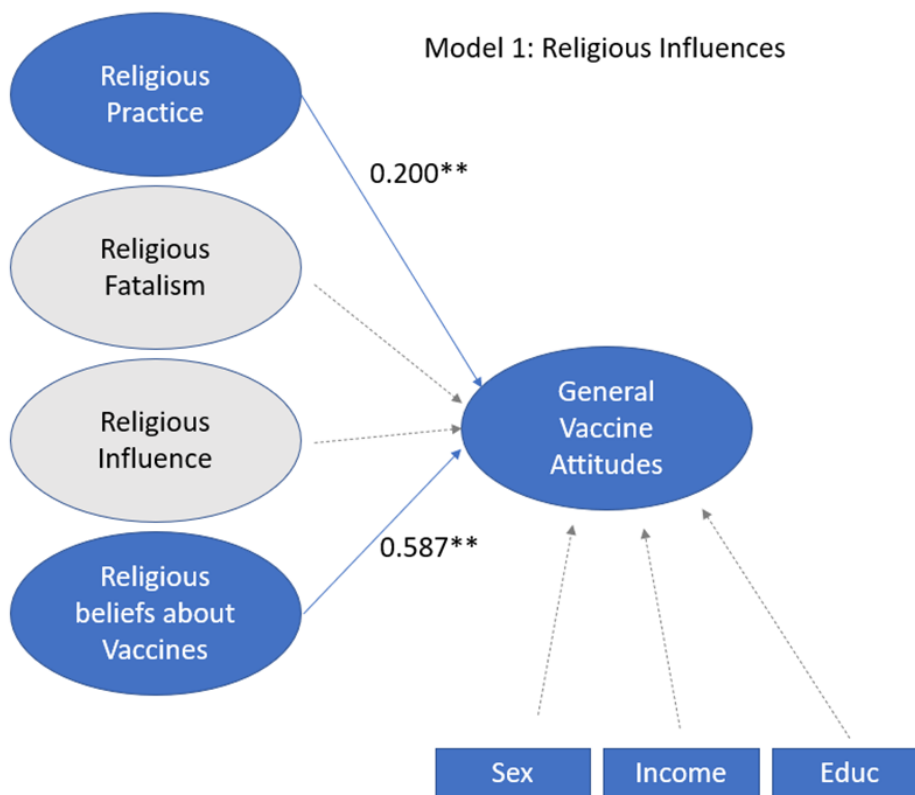


Figure 9: Religious practice and holding positive religious beliefs towards vaccines correlated with positive attitudes towards vaccination. Religious fatalism and religious influence had no significant effect. Latent variables *Religious Practice*, *Religious Fatalism*, *Religious Influence*, *Religious beliefs about Vaccines*, and *General Vaccine Attitudes* were combined in a structural model. Higher religious practice leads to more positive attitudes towards vaccination. Likewise, having religious beliefs that support vaccination is positively correlated with positive vaccine attitudes. Religious fatalism and religious influence on vaccination are not correlated with vaccine attitudes. Values shown are standardized beta coefficients. Values with one asterisk are significant at $p < 0.05$. Values with two asterisks are highly significant, at $p \leq 0.01$.

SEM on Model 2 (see **Figure 10**) reflects folk medicine influences on vaccine attitudes. Trust in Institutions (+0.734) was the strongest predictor of greater GVA. GVA was also related to Use of Home Remedies (+0.486). However, Model 2 supports an inverse relationship between GVA and trust in practitioners of folk medicine (-0.596). There was no significant relationship between the latent variable *Folk Medicine* and

GVA. Additionally, there was no significant relationship between GVA and Sex, Education, or Income.

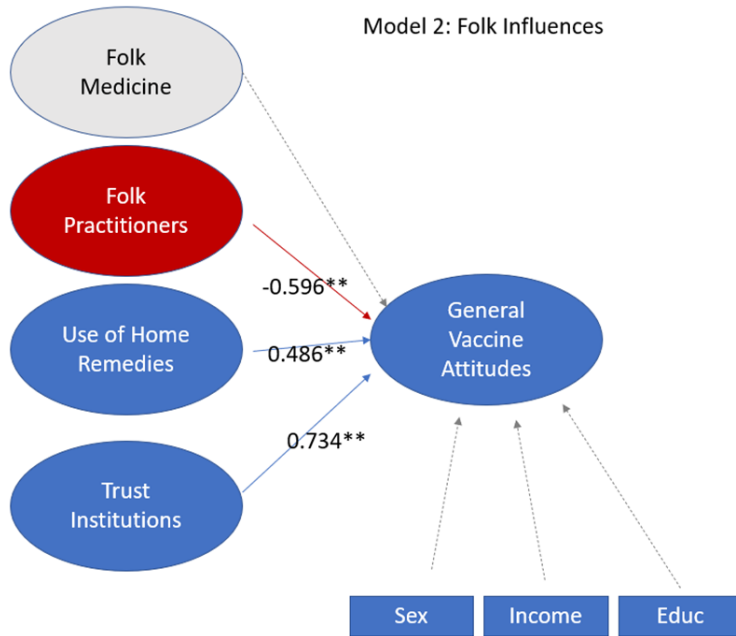


Figure 10: While the use of home remedies is correlated with positive vaccine attitudes, trusting one’s folk medicine doctor more than a modern medicine doctor was correlated with significantly lower vaccine attitudes. Latent variables *Folk Medicine*, *Folk Practitioners*, *Use of Home Remedies*, *Trust in Institutions*, and *GVA* were combined into a structural model. The belief in various Hispanic medicine folklore was not significantly related to vaccine attitudes. Participants having more trust in a practitioner of folk medicine than a medical doctor had a significant inverse relationship with positive vaccine attitudes. However, the use of home remedies was positively correlated with GVA. High trust in institutions led to high vaccine attitudes. Income, education, and sex did not impact GVA. Values shown are standardized beta coefficients. Values with one asterisk are significant at $p < 0.05$. Values with two asterisks are highly significant, at $p \leq 0.01$.

Six survey questions were used to develop the variable *General Vaccine Attitudes*; see **Figure 4** in section 1 for more details. Six survey questions were used to develop the variable *Religious Practice* (see **Figure 11**). Two of the questions, “How often do you attend religious services?” and “How often do you attend other activities besides formal services sponsored by a religious group?” aimed to evaluate the respondent’s participation in organized religion. Our sample is very active in organized

religion. Only 28% and 33%, respectively, of participants responded that they attend religious services or activities sponsored by a religious group less than once a month; 56% and 50%, respectively responded that they attend religious services or activities sponsored by a religious group once a week or more.

The other two questions, “How often do you read the scriptures?” and “How often do you pray?” measured the participants’ private worship habits. While 29% of respondents reported reading religious books less than once a month, 58% read once a week or more. Even more participants pray: only 14% reported praying less than once a month, and 75% pray once a week or more. 19% pray more than once a day.

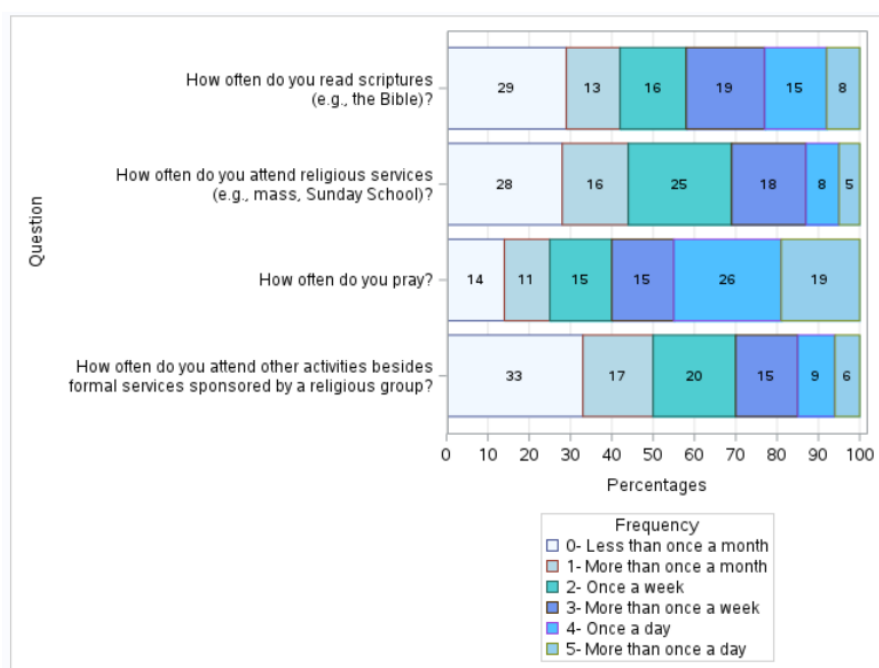


Figure 11: While the majority of respondents are not actively involved in a religious community, many of them pray frequently. Respondents were active in organized religion, with 56% and 50% responding that they attend religious services or other religious activities sponsored by a religious group, respectively. 42% of respondents reported reading scriptures more than once a week, once a day, or more than once a day. The religious activity most engaged in by our sample was prayer. 45% of the respondents reported praying once a day or more than once a day; an additional 30% prayed at least once a week.

Five questions were used to form the variable “Religious beliefs about vaccines” (**Figure 12**). Our sample, for the most part, tends to agree that their religious leaders, the

people who share their religion, and their families support vaccination. When asked if their religious leaders/dogma support vaccination, 52% agreed or strongly agreed; only 15% disagreed or strongly disagreed. Even more of the participants reported that they think God approves of them vaccinating their children: 57% of participants responded, “Strongly agree” or “Somewhat agree,” and only 10% responded “Strongly disagree” or “Somewhat disagree.” Similarly, most participants said that God wants them to use medical resources when they are sick. The religious acceptance of vaccines extends to social acceptance. 59% of individuals reported that they “Strongly agree” or “Somewhat agree” with the statement “People who share my religion vaccinate their children.” When asked if their family supports HPV vaccination, 62% agreed or strongly agreed.

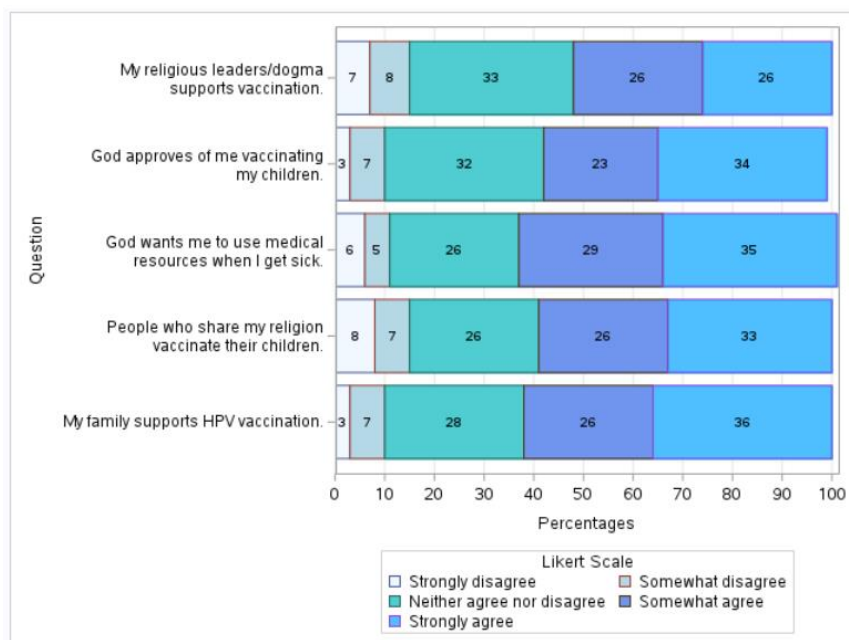
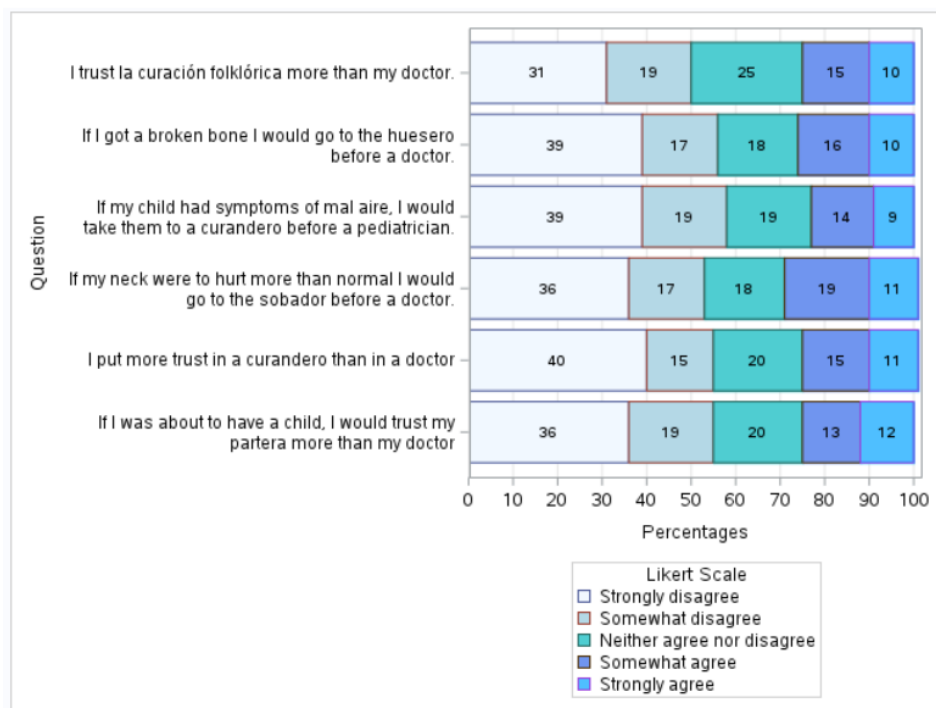


Figure 12: Most respondents had positive religious and social views towards vaccination. 52% of respondents responded “Strongly agree” or “Somewhat agree” to whether their religious leaders support vaccination. 59% of participants either strongly agreed or agreed that people who share their religion vaccinate their children. To understand the participants’ theological view of vaccination and medical care, they were to rate their level of agreeance to the questions, “God approves of me vaccinating my children,” and “God wants me to use medical resources when I get sick.” Again, most participants either agreed or strongly agreed with these statements (57% and 64%, respectively). Lastly, the participants were asked if their family supports HPV vaccination. 62% responded “Strongly agree” or “Somewhat agree,” and only 3% responded “Strongly disagree.”

Six questions were used to develop the variable *Folk Practitioners*. The proportions of answers to each question are shown in **Figure 13**. When asked if they put more trust in folk medicine or folk practitioners than their doctors, 55% and 50%,

respectively, responded “Strongly disagree” or “Somewhat disagree.” About a quarter (25% and 26%) of respondents either agreed or strongly agreed with those two statements. The participants were also asked four questions about where they would go for medical help: “If I got a broken bone I would go to the huesero [folk practitioner specializing in bone fractures] before a doctor;” “If my child had symptoms of mal aire [bad aire], I would take them to a curandero [healer] before a pediatrician;” “If my neck were to hurt more than normal I would go to the sobador [masseur] before the doctor;” and “If I were about to have a child, I would trust my partera [midwife] more than my doctor.” Most participants responded “Strongly disagree” or “Somewhat disagree” to these statements. 30% to 25% agreed or strongly agreed.

Figure 13: While a majority of participants trust medical practitioners more than folk practitioners, about a quarter of individuals sampled do not. Participants were asked six questions to their level of trust towards medical doctors as opposed to folk practitioners. In response to the first question, “I trust curación folklórica [folk medicine] more than my doctor,” 50% of participants disagreed or strongly disagreed.



However, 25% agreed or strongly agreed. Similarly, when asked if the participants “put more trust in a curandero [healer] than in a doctor,” 55% disagreed or strongly disagreed; 26% agreed or strongly agreed. The rest of the questions listed symptoms (broken bones, mal aire, hurt neck, imminent childbirth), and were asked their level of agreeance on a statement that they would rather go to a specific folk medicine

doctor, or a medicine doctor. While most (58%-53%) reported that they disagreed or strongly disagreed with the statements, between 23% 30% agreed or strongly agreed.

Discussion

Religious Practice and Beliefs increases Vaccine Attitudes

The model in **Figure 9** suggests that high religious practice and religious belief are predictive of high general vaccine attitudes. Our study proposes that Hispanic immigrants with higher religiosity are more likely to have positive attitudes toward vaccination. Additionally, those who believe that their religion or people who share their religion support vaccination are also likely to support vaccination. Past studies have shown that the relationship between religion/faith and vaccination is complex, and some studies have found a negative or no association between religion and vaccine attitudes among Hispanics [23, 32, 33, 34]. However, in a study of religious individuals in the United States, Redd and colleagues found a complicated, yet positive, relationship between religiosity and pro-HPV vaccine attitudes [35]. This association between faith and medicine highlights the importance for health officials to partner with faith leaders in Hispanic communities to decrease vaccination disparities.

High Trust in Folk Practitioners decreases GVA

Trusting folk practitioners (curanderos) more than medical practitioners is correlated with significantly lower attitudes towards vaccination, as shown in **Figure 10**. This follows, as folk practitioners may be financially motivated to direct their patients away from traditional medicine. Similar findings have been explored in regard to Complementary Alternative Medicine (CAM) practitioners. Dr. William Bleser, PhD, found that children who visited with CAM practitioners were less likely to receive the influenza vaccine [36]. CAM practitioners have been shown to be less likely to recommend vaccination than non-CAM pediatricians [37]. Less research has been conducted regarding the vaccine attitudes of curanderos. More research needs to be performed to understand this relationship.

The Use of Home remedies increases GVA

Model 2 (**Figure 10**) shows that the use of home remedies is indicative of positive vaccine attitudes. Fowlet, et al found that 83% of Hispanic parents in their study used cultural remedies with their children; foreign-born parents were more likely than US-born parents to participate in home remedies. A common practice among the Hispanic immigrant community is “medical pluralism,” meaning that health beliefs and practices are a synthesis of cultural, traditional, religious, and scientific sources [38]. Our study provides an example of medical pluralism, in that the Hispanic immigrant parents sampled were likely to accept both home remedies and vaccination as acceptable and non-contradictory.

Trust in Institutions is strongly associated with high GVA

In model 2 (**Figure 10**), trust in institutions is the greatest indicator of GVA. This confirms previous findings that show trust in the scientific community and other institutions of authority to be the greatest or one of the greatest predictors of vaccination [39, 40, 41]. This trust may be more difficult to foster among undocumented immigrants, who may distrust and be fearful of the government. All institutions, though especially smaller institutions, such as schools and medical providers, must work to create relationships of trust with Hispanic immigrants and other vulnerable populations.

Limitations

A limitation of our study was that many participants had to be excluded from the analysis, limiting sample size. Additionally, our survey was distributed online, potentially excluding those who do not have internet access. Additionally, the most common country of nativity in our sample population was Mexico, representing 34% of responses. This underrepresents Mexican immigrants in the United States; 53% of Hispanic immigrants in the US are from Mexico [31]. Several Spanish-speaking countries were not represented at all in our sample, or in very small numbers. As the culture of every Spanish-speaking country is starkly different, we only were able to investigate the cultures of the countries from which we received responses. Though every participant of our survey responded that they identified as Hispanic or Latino, 57 countries were reported, many of them not

of Hispanic origin (see **Figure 7**). While there is a diaspora of Spanish-speaking immigrants from all over the world, meaning a person of Hispanic descent could be born in a country that is not Spanish speaking, our results could be due to participants either misrepresenting their ethnicity or birthplace. Lastly, this project originally attempted to measure attitudes towards the HPV vaccine, but several of the variables measuring HPV attitudes did not fit well in the models and had to be discarded. Therefore, our findings are not HPV-specific.

Conclusions

Religious practice and religious beliefs about vaccines are positively correlated with high vaccine attitudes. While having more trust in folk practitioners than medical doctors decrease vaccine attitudes, the use of home remedies is correlated with positive attitudes towards vaccination. High trust in institutions is predictive of high vaccine attitudes. The finding that using home remedies was correlated with positive attitudes toward vaccination should encourage medical professionals to become more familiar with and knowledgeable about traditional Hispanic remedies. As medical professionals become more culturally competent with the cultures of their patients, the relationship of trust will grow, therefore increasing vaccine attitudes.

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Appendix 1: CFA for Latent Variables

Supplementary Table 1. Confirmatory Factor and Reliability Analysis for Survey Latent Variables All factor loadings are significant at $p < .001$.

Constructs	Factor Loading
<i>English Proficiency* & Acculturation</i> Fit: RMSEA = 0.066, CFI = 0.962, TLI = 0.945, SRMR = 0.068 Correlated errors: Item 1 with Item 2 Scale	
<i>English Proficiency</i>	
¿Qué tan cómodo se siente hablando inglés en la escuela?	0.707
¿Qué tan cómodo se siente hablando inglés en el trabajo?	0.715
Elija la opción que mejor se adapte a su nivel de comodidad. - ¿Qué tan cómodo se siente hablando inglés en casa?	0.761
Elija la opción que mejor se adapte a su nivel de comodidad. - ¿Qué tan cómodo se siente hablando inglés en público?	0.899
Elija la opción que mejor se adapte a su nivel de comodidad. - ¿Qué tan cómodo se siente al entender inglés?	0.761
<i>Acculturation</i>	
¿Cuánto tiempo ha vivido en los Estados Unidos?	0.359

Sírvase indicar la mejor respuesta. - Me veo a mí mismo como parte de la cultura estadounidense.	0.896
Sírvase indicar la mejor respuesta. - Me veo a mí mismo como un estadounidense.	0.636
Sírvase indicar la mejor respuesta. - Continúo con muchas de las tradiciones o formas de mi país de origen.	-0.332
<i>Access to Healthcare in Preferred Language</i> Fit: RMSEA = 0.056, CFI = 0.953, TLI = 0.940, SRMR = 0.047	
<i>Receive Healthcare in Spanish</i>	
Sírvase indicar la mejor respuesta. - Me siento más cómodo cuando mi médico habla español.	0.688
Sírvase indicar la mejor respuesta. - Siento que la atención que recibo no es tan eficaz cuando mi médico sólo habla inglés.	0.642
Sírvase indicar la mejor respuesta. - Si mi médico hablara español, me resultaría más fácil confiar en él.	0.762
Sírvase indicar la mejor respuesta. - Me resulta confuso el sistema de atención médica en los Estados Unidos.	-0.514
<i>Trust in Language-Specific Healthcare</i>	
Sírvase indicar la mejor respuesta. - Tengo una buena relación con mi médico.	0.754
Sírvase indicar la mejor respuesta. - Confío en lo que mi médico me dice que haga.	0.785
Sírvase indicar la mejor respuesta. - Siento que tengo acceso a suficiente información cuando tengo que tomar decisiones de salud.	0.680

Sírvase indicar la mejor respuesta. - Los consultorios médicos y los hospitales cuentan con suficientes recursos de traducción.	0.612
Sírvase indicar la mejor respuesta. - Las fuentes que utilizo actualmente para la información de salud ayudan a responder mis preguntas.	0.727
Sírvase indicar la mejor respuesta. - Confío más en la información que me dan mis médicos que en los recursos en línea que utilizo.	0.710
Sírvase indicar la mejor respuesta. - Confío en que mi médico comprende mis necesidades de atención médica.	0.732
<i>HPV Knowledge* & General Vaccine Attitudes</i> Fit: RMSEA = 0.063, CFI = 0.959, TLI = 0.943, SRMR = 0.043	
<i>HPV Knowledge</i>	
Sírvase indicar la mejor respuesta. - El VPH es una infección potencialmente mortal.	0.744
Sírvase indicar la mejor respuesta. - La infección por VPH puede causar un sufrimiento físico grave.	0.820
Sírvase indicar la mejor respuesta. - Solo una pequeña minoría de personas contraerá el VPH durante su vida.	-0.396
Sírvase indicar la mejor respuesta. - El VPH causa una cantidad sustancial de cáncer en las mujeres y los hombres.	0.560
<i>General Vaccine Attitudes</i>	
Las vacunas son más útiles que dañinas.	0.706
Las vacunas son eficaces para prevenir enfermedades.	0.872

Las vacunas son ampliamente evaluadas para garantizar su seguridad.	0.829
Mis hijos han recibido todas sus vacunas recomendadas.	0.698
Los esfuerzos de vacunación han reducido las enfermedades infecciosas en los Estados Unidos.	0.729
<i>Barriers to Vaccination</i> Fit: RMSEA = 0.058, CFI = 0.973, TLI = 0.957, SRMR = 0.036	
<i>Affordability Barriers</i>	
Tengo un seguro médico adecuado.	0.672
Sírvase indicar la mejor respuesta. - Mi seguro médico generalmente cubre la vacunación.	0.713
Sírvase indicar la mejor respuesta. - Mi seguro médico cubre la vacunación contra el VPH.	0.813
Sírvase indicar la mejor respuesta. - Recibir la vacuna contra el VPH sería asequible para mí.	0.722
<i>Location Barriers</i>	
Sírvase indicar la mejor respuesta. - Sé adónde ir para vacunarme.	0.874
Sírvase indicar la mejor respuesta. - Sé cómo encontrar mi departamento de salud local.	0.783
¿Cuánto tiempo le llevaría llegar a un lugar que ofrezca vacunas?	-0.220**
<i>Religiosity</i>	

Fit: RMSEA = 0.078, CFI = 0.933, TLI = 0.914, SRMR = 0.062	
<i>Religious Practice</i>	
Por favor, indique con qué frecuencia realiza estas prácticas. - ¿Con qué frecuencia lee escrituras (p. ej., la Biblia, el Corán)?	0.758
Por favor, indique con qué frecuencia realiza estas prácticas. - ¿Con qué frecuencia asiste a servicios religiosos (p. ej., misa, la mezquita, la escuela dominical)?	0.860
Por favor, indique con qué frecuencia realiza estas prácticas. - ¿Con qué frecuencia ora?	0.380
Por favor, indique con qué frecuencia realiza estas prácticas. - ¿Con qué frecuencia asiste a otras actividades además de los servicios formales patrocinados por un grupo religioso?	0.686
<i>Religious Influence</i>	
Por favor, indique cuánta influencia tienen sus creencias religiosas en estas decisiones. - ¿Cuánta influencia tienen sus creencias religiosas en lo que decide vestir?	0.776
Por favor, indique cuánta influencia tienen sus creencias religiosas en estas decisiones. - ¿Cuánta influencia tienen sus creencias religiosas en lo que decide comer y beber?	0.859
Por favor, indique cuánta influencia tienen sus creencias religiosas en estas decisiones. - ¿Cuánta influencia tienen sus creencias religiosas en sus decisiones sobre su salud?	0.874
Por favor, indique cuánta influencia tienen sus creencias religiosas en estas decisiones. - ¿Cuánta influencia tienen sus creencias religiosas en las actividades sociales que realiza?	0.824
Por favor, indique cuánta influencia tienen sus creencias religiosas en estas decisiones. - ¿En qué medida sus creencias religiosas afectan las decisiones importantes que toma?	0.801
<i>Religious Fatalism</i>	

Sírvase indicar la mejor respuesta. - Cuando alguien se enferma es porque Dios le dio esa enfermedad.	0.883
Sírvase indicar la mejor respuesta. - Cuando alguien se enferma es porque Dios lo está castigando.	0.902
Sírvase indicar la mejor respuesta. - Dios quiere que confíe principalmente en la fe y la oración para recuperarme de las enfermedades.	0.586
<i>Religious Influence on Vaccines</i> Fit: RMSEA = 0.042, CFI = 0.993, TLI = 0.985, SRMR = 0.019	
Sírvase indicar la mejor respuesta. - Mis líderes religiosos/el dogma apoyan la vacunación.	0.664
Sírvase indicar la mejor respuesta. - Dios aprueba que vacune a mis hijos.	0.807
Sírvase indicar la mejor respuesta. - Dios quiere que use recursos médicos cuando me enferme.	-0.823
Sírvase indicar la mejor respuesta. - Las personas que comparten mi religión vacunan a sus hijos.	0.777
Sírvase indicar la mejor respuesta. - Mi familia apoya la vacunación contra el VPH.	0.685
<i>Trust in Institutions</i> Fit: RMSEA = 0.058, CFI = 0.983, TLI = 0.967, SRMR = 0.026	
La escuela de mi hijo se preocupa por su salud.	0.635
El Gobierno de los Estados Unidos se preocupa por mi salud.	0.712

Cuando la Administración de Alimentos y Medicamentos (Food and Drug Administration, FDA) aprueba una vacuna, puedo confiar en que es segura.	0.703
Cuando el Gobierno de los Estados Unidos recomienda que reciba una vacuna, me la pongo.	0.752
Las compañías que producen vacunas se preocupan por mi salud.	0.759
<i>Folklore</i> Fit: RMSEA = 0.068, CFI = 0.937, TLI = 0.925, SRMR = 0.049	
<i>Trust in Folk Medicine</i>	
Creo que el bautismo puede prevenir el mal aire.	0.960
La limpia con huevo ha sido un tratamiento válido en mi vida.	0.787
He ido a un sobador varias veces en mi vida.	0.715
Alguien que conozco ha sufrido del mal de ojo.	0.767
El mal de ojo se puede curar usando una limpia con huevo.	0.826
Alguien que conozco ha sufrido de un susto.	0.726
En general, confío en la curación folklórica.	0.772
<i>Trust in Folk Practitioners</i>	
Confío más en la curación folklórica que en mi médico.	0.801

Si me fracturara un hueso, iría al huesero antes que al médico.	0.819
Si mi hijo tuviera síntomas de mal aire, lo llevaría a un curandero antes que al pediatra.	0.856
Si me doliera el cuello más de lo normal, iría al sobador antes que al médico.	0.851
Confío más en un curandero que en un médico.	0.897
Si estuviera a punto de tener un hijo, confiaría más en mi partera que en mi médico.	0.817
<i>Home Remedies</i>	
Creo que los remedios caseros son formas válidas de tratamiento para las enfermedades.	0.677
Mi familia tiene una tradición de remedios caseros.	0.674
Confío más en mis remedios caseros que en mi médico.	0.833

* Ran together with another latent variable due to a perfect-fitting model when run alone

** Despite the low factor loading, we chose to retain the item to maintain the latent variable

Appendix 2: English Survey

HI HPV survey

Start of Block: Consent

Q85

Title of the Research Study: HPV vaccine attitudes among Hispanic Immigrants

IRB ID#:

My name is Brian Poole, PhD I am a professor at Brigham Young University and I am conducting this research. You are being invited to participate in this research study about vaccination. I am interested to learn more about how you feel about the Human papillomavirus vaccine.

Being in this study is optional. If you choose to be in the study, you will be asked to complete a survey, that should take approximately 15 minutes of your time. You can skip questions that you do not want to answer or stop the survey at any time. The survey is anonymous, and no one will be able to link your answers back to you.

Please do not include your name or other information that could be used to identify you in the survey responses. You will receive your standard compensation from the survey provider for completing the survey.

Questions? Please contact Brian Poole at brian_poole@byu.edu or 801-442-8092. If you have questions or concerns about your rights as a research participant, you can call the BYU Human Research Protection Program at 801-422-1461 or BYU.HRPP@byu.edu.

If you want to participate in this study, click the Accept button to start the survey.

☐ Accept (1)

☐ Decline (2)

End of Block: Consent

Start of Block: Demographics

Q3 Are you of Hispanic, Latino, or Spanish Origin?

- ☐ No, not of Hispanic, Latino, or Spanish origin (1)
- ☐ Yes, Mexican, Mexican American, Chicano (2)
- ☐ Yes, Puerto Rican (3)
- ☐ Yes, Cuban (4)
- ☐ Yes, another Hispanic, Latino, or Spanish origin; for example Salvadorian, Dominican, Columbian, Guatemalan, Spaniard, Ecuadorian, Etc. (5)

Skip To: End of Block If Are you of Hispanic, Latino, or Spanish Origin? = No, not of Hispanic, Latino, or Spanish origin

Page Break

country What country were you born in?

▼ Afghanistan (1) ... Zimbabwe (196)

Skip To: End of Block If List of Countries = United States of America

Page Break

Q11 Do you have children

- ☐ Yes (1)

☐ No (2)

Skip To: End of Block If Do you have children = No

Page Break

Q1 Age

☐ Less than 18 (1)

☐ 18-25 (2)

☐ 26-35 (3)

☐ 36-45 (4)

☐ Over 55 (5)

Skip To: End of Block If Age = Less than 18

Page Break

Q2 Race: Please select all that apply

☐ Native American or Alaska Native (1)

☐ Asian (2)

☐ Black (3)

☐ Hispanic/Latino (4)

☐ White (5)

☐ Other (please specify) (6)

Page Break

Q4 Sex

☐ Male (1)

☐ Female (2)

☐ Non-binary / other (3)

Page Break

Q5 Which best describes your household income per year?

☐ Less than \$5,000 (1)

☐ \$5,000-15,000 (2)

☐ \$16,000-25,000 (3)

☐ \$26,000-\$35,000 (4)

☐ \$36,000-\$45,000 (5)

☐ \$45,000-\$60,000 (6)

☐ \$61,000-\$75,000 (7)

☐ \$76,000-\$100,000 (8)

☐ Over \$100,000 (9)

Page Break

Q6 Marital status

☐ Single (1)

☐ Partnered (2)

☐ Married (3)

☐ Divorced (4)

☐ Widow/Widower (5)

Page Break

Q7 Education:

☐ Have not finished high school (1)

☐ Finished high school (2)

☐ Some college or vocational certificate (3)

☐ Associate's degree (4)

☐ Bachelor's degree (5)

☐ Advanced degree (masters, MD, DDS, PhD, etc) (6)

Page Break

Display This Question:

If Do you have children = Yes

Q13 How many children do you have?

☐ 1 (1)

☐ 2 (2)

☐ 3 (3)

☐ 4 (4)

☐ 5+ (5)

Page Break

Q14 I visit the doctor...

☐ Less than every other year (1)

☐ Every other year (2)

☐ Once a year (3)

☐ Two times a year (4)

☐ More than two times a year (5)

- ☐ As needed/When I am sick or get hurt (6)

Page Break

Q15 Most of my family lives...

- ☐ In the United States (1)
- ☐ In my home country (2)
- ☐ In another country besides the United States or my home country (3)

End of Block: Demographics

Start of Block: Language

Q18 How comfortable do you feel speaking English at school?

- ☐ Not at all comfortable (1)
- ☐ Somewhat comfortable (2)
- ☐ Neither comfortable nor uncomfortable (3)
- ☐ Moderately comfortable (4)
- ☐ Totally comfortable (5)
- ☐ I do not attend school (6)

Page Break

Q19 How comfortable do you feel speaking English at work?

- ☐ Not at all comfortable (1)
- ☐ Somewhat comfortable (2)
- ☐ Neither comfortable nor uncomfortable (3)
- ☐ Moderately comfortable (4)
- ☐ Totally comfortable (5)
- ☐ I do not go to work (6)

Page Break

Q30 Choose the option that represents your comfort level

	Not at all comfortable (1)	Somewhat comfortable (2)	Neither comfortable nor uncomfortable (3)	Moderately comfortable (4)	Totally comfortable (5)
How comfortable do you feel speaking English at home? (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How
comfortable
do you feel
speaking
English in
public? (2)

☐☐☐☐☐

How
comfortable
do you feel
understanding
English? (3)

☐☐☐☐☐

How
comfortable
do you feel
following your
doctor's
instructions?
(4)

☐☐☐☐☐

How
comfortable
do you feel
making an
appointment
with your
doctor? (5)

☐☐☐☐☐

Page Break

Q24 "Asthma" is a disease that harms breathing.

☐ True (1)

☐ False (2)

Page Break

Q25 Hgado in English is:

- ☐ Liver (1)
- ☐ Mole (2)
- ☐ Kidney (3)
- ☐ Heart (4)
- ☐ Skin (5)

Page Break

Q26 Corazón in English is

- ☐ Liver (1)
- ☐ Cramp (2)
- ☐ Kidney (3)
- ☐ Heart (4)
- ☐ Skin (5)

Page Break

Q27 Sarampión in English is

- ☐ Measles (1)

☐ Pink Eye (2)

☐ Tetanus (3)

☐ Chart (4)

☐ Polio (5)

Page Break

Q28 Tos in English is

☐ Cough (1)

☐ Nose (2)

☐ Orgin (3)

☐ Skull (4)

☐ Cold (5)

Page Break

Q29 Dolor in English is

☐ Dental (1)

☐ Pain (2)

☐ Skull (3)

☐ Cold (4)

☐ Cough (5)

End of Block: Language

Start of Block: Access to Healthcare in Preferred Language

Q31 Choose the best option

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
I feel most comfortable when my doctor speaks Spanish. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel like the care I receive is not as effective when my doctor only speaks English. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When my doctor does not speak Spanish, I still feel like he/she understands me. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a good relationship	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

with my
doctor. (4)

I trust what
my doctor
tells me to do.
(5)

If my doctor
spoke
Spanish, I
would find it
easier to trust
him/her. (6)

I find the
health care
system in the
United States
confusing. (7)

I feel like I
have access
to enough
information
when I have
to make
health
decisions (8)

Doctors'
offices and
hospitals
have enough
translation
resources (9)



The sources I
currently use
for health
information
help answer
my questions
(10)

☐☐☐☐☐

I am skeptical
about the
health
information I
read online
(11)

☐☐☐☐☐

Online
websites in
Spanish offer
the
information
necessary for
my health
needs (12)

☐☐☐☐☐

I trust the
information
my doctors
give me more
than the
online
resources I
use (13)

☐☐☐☐☐

I am confident
that my doctor
understands
my health
care needs
(14)

☐☐☐☐☐

Q32 Choose the best option

	Never (1)	Rarely (2)	Sometimes (3)	Most of the time (4)	Almost Always (5)
When I visit a doctor, they speak Spanish (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My doctor provides an interpreter when he/she does not speak Spanish... (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know where to go to get health information. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Access to Healthcare in Preferred Language

Start of Block: Human Papillomavirus (HPV) Knowledge

Q33 Choose the best option

	Strongly Disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
HPV is a potentially life-	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

threatening
infection. (1)

HPV infection
can cause
severe
physical
suffering. (2)

Only a small minority of people will catch HPV during their lives. (3)

HPV causes a substantial amount of cancer in women and men. (4)

HPV causes cancer in women but not men. (5)

The Human Papillomavirus (HPV) vaccine is effective at preventing almost all cancers caused by HPV. (6)

People do not need to vaccinate their children against HPV because HPV is sexually transmitted, so my family's values will protect my children from HPV (7)

☐☐☐☐☐

There are more potential side effects of the HPV vaccine than benefits. (8)

☐☐☐☐☐

End of Block: Human Papillomavirus (HPV) Knowledge

Start of Block: Immigration status and assimilation (acculturation)

Q34 How long have you lived in the United States?

☐ Less than 1 year (1)

☐ 1-3 years (2)

☐ 4-6 years (3)

☐ 6-10 years (4)

☐ More than 10 years (5)

Page Break

Q35 What age were you when you arrived in the United States?

☐ Less than 5 years old (1)

☐ 6-10 years old (2)

☐ 11-18 years old (3)

☐ 18-29 years old (4)

☐ 30-39 years old (5)

☐ 40-49 years old (6)

☐ 50+ years old (7)

Page Break

Q36 Choose the best option

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
I see myself as a part of the US/American culture. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I see myself as
an
estadounidense.
(2)

☐☐☐☐☐

I continue with
many of my
country of
origin's
traditions or
ways. (3)

☐☐☐☐☐

End of Block: Immigration status and assimilation (acculturation)

Start of Block: Vaccine Accessibility/Imposed Barriers

Q37 I have adequate health insurance.

☐ Strongly disagree (1)

☐ Somewhat disagree (2)

☐ Neither agree nor disagree (3)

☐ Somewhat agree (4)

☐ Strongly agree (5)

Page Break

Q38 I have...

☐ Private Health Insurance (1)

☐ A Medical Share Plan (2)

☐ Medicaid/Medicare/CHIP (3)

☐ I don't know (4)

☐ I don't have health insurance. (5)

Page Break

Q40 Choose the best option

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
My health insurance usually covers vaccination. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't get vaccines because I don't have enough insurance. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My health insurance covers HPV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

vaccination.
(3)

Receiving the
HPV vaccine
would be
affordable to
me. (4)

I know where
to go to get
vaccinated.
(5)

I know how to
find my local
health
department.
(6)

When I get
sick or hurt, I
go to the
urgent care or
the ER rather
than a primary
care doctor.
(7)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Page Break

Q41 How long would it take you to get to a place that offers vaccinations?

☐ Less than 5 minutes (1)

☐ 6-15 minutes (2)

☐ 16-30 minutes (3)

☐ 31-60 minutes (4)

☐ More than an hour (5)

Q42 What is your mode of transportation to get medical care? (car, bike, walk, Lift/ Uber/Taxi, ride from friend/family, public transportation, etc)

☐ Car (1)

☐ Bike (2)

☐ Walking (3)

☐ Rides from friends or families (4)

☐ Public transportation (5)

☐ Lyft/Uber/Taxi (6)

☐ Other (7)

Q43 It is difficult for me to get off work to go to the doctor.

☐ Strongly disagree (1)

☐ Somewhat disagree (2)

☐ Neither agree nor disagree (3)

☐ Somewhat agree (4)

☐ Strongly agree (5)

Q44 I have been offered the HPV vaccine

☐ Never (1)

☐ Once (2)

☐ Several times (3)

☐ Every time I go to the physician (4)

☐ I don't know if I have been offered the HPV vaccine. (5)

End of Block: Vaccine Accessibility/Imposed Barriers

Start of Block: Religious and Social Views

Q45 Please indicate how often you do the following

	More than once a day (1)	Once a day (2)	More than once a week (3)	Once a week (4)	More than once a month (5)	Less than once a month (6)

How often do you read scriptures (e.g., the Bible)? (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you attend religious services (e.g., mass, Sunday School)? (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you pray? (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you attend other activities besides formal services sponsored by a religious group? (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q46 Please indicate how much the following religious beliefs influence your decisions

How much influence do your religious beliefs have on what social activities you undertake? (4)

☐ ☐ ☐ ☐ ☐ ☐

To what extent do your religious beliefs impact the important decisions that you make? (5)

☐ ☐ ☐ ☐ ☐ ☐

Q47 Choose the best option

	Strongly Disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
When someone gets sick, it is because God gave them the disease. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

When someone gets sick, it is because God is punishing them. (2)

☐ ☐ ☐ ☐ ☐

God wants me to rely primarily on faith and prayer to recover from illness. (3)

☐ ☐ ☐ ☐ ☐

End of Block: Religious and Social Views

Start of Block: Religious attitude questions/Social Attitudes towards vaccination

Q48 Choose the best option

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
My religious leaders/dogma supports vaccination. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
God approves of me vaccinating my children. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

God wants me to use medical resources when I get sick. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
People who share my religion vaccinate their children. (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My family supports HPV vaccination (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

End of Block: Religious attitude questions/Social Attitudes towards vaccination

Start of Block: Trust in Institutions

Q49 Please choose the best option about your medical provider

	Strongly disagree (1)	Somewhat disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
My medical provider cares about my health (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

My medical
provider only
cares about
making
money. (2)

☐☐☐☐☐

I trust in folk
(traditional
medicine,
curanderismo)
(3)

☐☐☐☐☐

Q50 My child's school cares about my child's health.

☐ Strongly disagree (1)

☐ Somewhat disagree (2)

☐ Neither agree nor disagree (3)

☐ Somewhat agree (4)

☐ Strongly agree (5)

Q51 The United States Government cares about my health.

☐ Strongly disagree (1)

☐ Somewhat disagree (2)

☐ Neither agree nor disagree (3)

☐ Somewhat agree (4)

☐ Strongly agree (5)

Q52 When the Food and Drug Administration (FDA) approves of a vaccine, I can rely on it being safe.

☐ Strongly disagree (1)

☐ Somewhat disagree (2)

☐ Neither agree nor disagree (3)

☐ Somewhat agree (4)

☐ Strongly agree (5)

☐ I don't know what the the FDA is. (6)

Q55 When the United States government recommends I receive a vaccine, I get the vaccine.

☐ Strongly disagree (1)

☐ Somewhat disagree (2)

☐ Neither agree nor disagree (3)

☐ Somewhat agree (4)

☐ Strongly agree (5)

☐ I don't know what the the FDA is. (6)

Q53 The companies that produce vaccines care about my health

☐ Strongly disagree (1)

☐ Somewhat disagree (2)

☐ Neither agree nor disagree (3)

☐ Somewhat agree (4)

☐ Strongly agree (5)

Q54 The companies that make vaccines want to make money at the expense of my health.

☐ Strongly disagree (1)

☐ Somewhat disagree (2)

☐ Neither agree nor disagree (3)

☐ Somewhat agree (4)

☐ Strongly agree (5)

End of Block: Trust in Institutions

Start of Block: Traditional/cultural medicine

Q56 I think baptism can prevent el mal aire.

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q57 Una limpia con huevo has been a valid treatment in my life.

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q58 I have visited el sobador multiple times in my life.

- ☐ Strongly disagree (1)

- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q59 Someone I know has suffered from el mal de ojo.

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q60 El mal de ojo can be cured usando una limpia con huevo.

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q61 Someone I know has suffered from el susto.

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

End of Block: Traditional/cultural medicine

Start of Block: Cultural vs modern medicine

Q63 In general, I trust la curación folklórica.

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q64 I trust la curación folklórica more than my doctor.

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q65 If I got a broken bone I would go to the huesero before a doctor.

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q66 If my child had symptoms of mal aire, I would take them to a curandero before a pediatrician.

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)

☐ Strongly agree (5)

Q67 If my neck were to hurt more than normal I would go to the sobador before a doctor.

☐ Strongly disagree (1)

☐ Somewhat disagree (2)

☐ Neither agree nor disagree (3)

☐ Somewhat agree (4)

☐ Strongly agree (5)

Q68 I put more trust in a curandero than in a doctor

☐ Strongly disagree (1)

☐ Somewhat disagree (2)

☐ Neither agree nor disagree (3)

☐ Somewhat agree (4)

☐ Strongly agree (5)

Q69 If I was about to have a child, I would trust my partera more than my doctor

☐ Strongly disagree (1)

- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q70 I think home remedies are valid forms of treatment for sickness.

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q71 My family has a tradition of home remedies.

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q72 I trust my home remedies more than my doctor

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

End of Block: Cultural vs modern medicine

Start of Block: General Vaccine attitudes

Q73 Vaccines are more helpful than harmful

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q75 Vaccines are effective at preventing disease

- ☐ Strongly disagree (1)

- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q76 Vaccines are extensively tested to ensure their safety

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q77 Vaccines contain dangerous toxins

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q79 My children have received all of their recommended vaccines

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

Q80 Vaccination efforts have reduced the infectious diseases in the United States.

- ☐ Strongly disagree (1)
- ☐ Somewhat disagree (2)
- ☐ Neither agree nor disagree (3)
- ☐ Somewhat agree (4)
- ☐ Strongly agree (5)

End of Block: General Vaccine attitudes

Start of Block: HPV

Q81 Have you been diagnosed with HPV?

- ☐ Yes (1)

☐ No (2)

☐ 3 (3)

Display This Question:

If Sex = Female

Q82 I have regular pap smears (if female)

☐ Strongly disagree (1)

☐ Somewhat disagree (2)

☐ Neither agree nor disagree (3)

☐ Somewhat agree (4)

☐ Strongly agree (5)

Display This Question:

If Do you have children = Yes

Q83 My child(ren) has been vaccinated against HPV.

☐ Yes (1)

☐ No (2)

☐ Some of my children have been vaccinated, but not all of them. (3)

☐ I don't know (4)

☐ I have no children. (5)

Q84 Have you been vaccinated against HPV?

☐ Yes (1)

☐ No (2)

☐ I don't know (3)

End of Block: HPV