

## **Final report**

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# **KNOWLEDGE, BELIEFS, AND PRACTICES REGARDING HUMAN PAPILLOMAVIRUS (HPV) VACCINATION AMONG WOMEN AND HEALTH CARE PROVIDERS IN CUERNAVACA AND OXNARD**

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## INTRODUCTION

Cervical cancer is a significant public health problem in both the United States (U.S.) and Mexico. In 2010, there were 11,818 new cases of cervical cancer and 3,939 cervical cancer related deaths in the U.S. (Cancer Statistics Working Group, 2013) Ethnic minority women in Los Angeles County are diagnosed with cervical cancer at higher rates than the national average, with Latinas and Korean women having the highest rates. (Liu et al., 2009) In 2008, cervical cancer was the 12th leading cause of death for women in Mexico, and there were 4,031 deaths. (SINAIS, 2008) Although there has been a national cervical cancer screening program in Mexico since 1974, (Lazcano-Ponce, et al., 1999) and despite technological and scientific advances, this disease is the second leading cause of death due to cancer for Mexican women. (Palacio-Mejía et al., 2009)

The recognition of human papillomavirus (HPV) infection as a necessary cause of cervical cancer and the subsequent development of an HPV vaccine have brought about significant changes to cervical cancer prevention efforts in Mexico and the U.S. In June 2006, the U.S. Advisory Committee on Immunization Practices (ACIP) recommended that the quadrivalent HPV vaccine be routinely given to girls 11 to 12 years old (and to girls as young as 9), with a catch-up vaccine for girls aged 13 to 26 who were not previously vaccinated. In 2009, the bivalent HPV vaccine was approved and recommended by ACIP. Under the Vaccines for Children Program girls who are 18 years or younger and qualify for Medicaid or are uninsured or have insurance that does not cover HPV vaccination, can receive the vaccine for free. In Mexico, the first HPV pilot vaccination program was implemented during 2008 at 109 health centers in Mexico City, which provided the HPV vaccine free of charge to approximately 100,000 uninsured girls between the ages of 11 and 13 years. Universal HPV vaccine coverage for girls aged 9 to 11 was announced in January 2012, and over 1 million school girls aged 10 to 12 received the HPV vaccine in Mexico as part of National Vaccination Week in October 2012.

The availability of HPV vaccines represents a landmark breakthrough in the primary prevention of cervical cancer, which continues to be a major cause of morbidity and mortality in developing countries. While HPV vaccines show high efficacy in preventing the HPV-types that cause over 70% of cervical cancer cases, limited research has been conducted on HPV vaccination uptake among minority, low-income and other underserved populations in the U.S. There are few published studies that report the process of clinician offering and patient uptake of the recently implemented HPV vaccine programs in Mexico. (Ramírez-Rios, 2013, Sánchez Anguiano, 2013)

This bi-national study aimed to compare and contrast the knowledge, beliefs, and practices regarding human papillomavirus (HPV) vaccination among mothers of vaccine eligible girls in Cuernavaca, Mexico and Oxnard, California. The specific aims of this research project were:

1. To identify the knowledge, beliefs, and practices regarding HPV vaccination in a

sample of 200 women in Cuernavaca and 200 Mexican women living in Oxnard, who have daughter(s) of vaccinating age.

2. To determine the knowledge and information that clinicians and program administrators have about HPV and the HPV vaccine at two clinics in Cuernavaca and two clinics in Oxnard.

3. To compare and contrast the information about the knowledge, beliefs, and practices regarding HPV vaccination obtained from the women and health care providers in Cuernavaca to the results obtained from the sample of women and health care providers in Oxnard.

We hypothesized that HPV vaccination rates would be greater in Mexico than in the U.S. based on evidence that the three-dose coverage estimate among girls aged 13 to 17 years in the U.S. (32%) is lower than uptake reported in Canada (50%–85%) and Mexico (67%) in 2010. (Jemal, 2013)

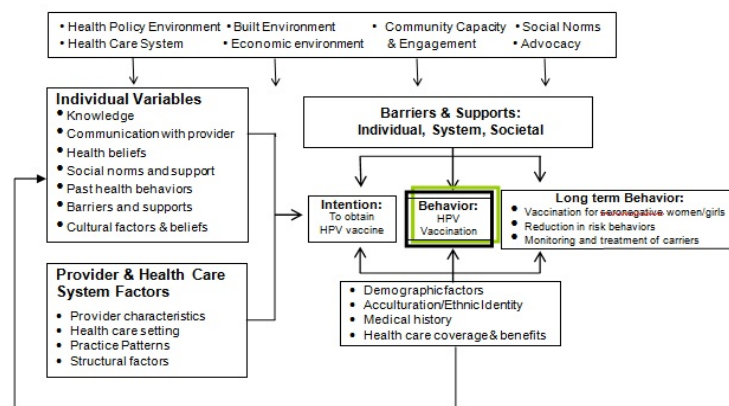
This study was awarded a grant on November 10, 2010, under the PIMSA 2010-2011 cycle. Although the funds for this study were received by IMSS in July 2011, due to unforeseen administrative problems, we did not have access to these funds until January 2012. Likewise, the PIMSA funds were not available for us to use at UCLA until October 2011. Due to this delay in having access to the funds needed to carry out this study and an unexpected death in Dr. Flores' family, we requested an extension to complete the study during the 2013 calendar year.

## **METHODS**

We collected primary data to examine the knowledge, beliefs, and practices regarding HPV vaccination among women, health care providers, and program administrators in separate samples of Mexicans living in Cuernavaca, Mexico and Oxnard, California. In-person interviews were conducted with a sample of mothers of vaccine eligible girls to obtain information about their knowledge regarding that association between HPV and cervical cancer, as well as the mechanism of HPV transmission. Information was also collected about their attitudes and beliefs concerning the acceptability of the HPV vaccine, perceived susceptibility to disease, communication with providers and family/friends about the vaccine, and general vaccination attitudes. Medical anthropological research methods were also be used to generate and analyze qualitative data on the cultural logics of vaccine acceptance (Lambert and McKeivitt, 2002). A sample of the women who were interviewed in Cuernavaca and Oxnard also participated in a more in-depth ethnographic interview, designed to elicit narratives about their vaccine-related decision-making and values. In-person interviews were also conducted with a sample of health care providers, and program administrators to discuss their HPV vaccine promotion practices as well as their attitudes and beliefs about vaccines in general.

The theoretical perspective of the Health Behavior Framework, developed by Dr. Bastani and colleagues at UCLA, (Bastani et al., 2010) was used to develop the study questionnaires and analyze the resulting data. (Figure 1)

**Figure 1. Health Behavior Framework.**



Drs. Bastani and Flores have previously developed and tested survey instruments to measure components of this Framework. They have also analyzed and interpreted prior study results in terms of the Framework’s constructs and components for other bi-national studies (Flores, 2012). Since the focus of this study was on women and health care providers, a greater emphasis was placed on individual level variables such as: knowledge, communication between patient and provider, perceived susceptibility, perceived severity, acculturation, patient barriers to seeking preventive services and medical care, health care setting, demographic factors, medical history, and health care coverage and benefits.

### Study Sites

The original study sites for this research project were intended to be Mexico City and Los Angeles, however, the study locations were changed to Cuernavaca and Oxnard for practical and logistical reasons. The U.S. interviews were conducted at two *Clinicas del Camino Real* clinics: (1) the Oxnard Clinic, and (2) the Maravilla Clinic, which offer the HPV vaccine to low income girls and women in Oxnard County. *Clinicas del Camino Real, Inc.* is a Federally Qualified Health Center (FQHC) and a 501(c)(3) nonprofit organization that delivers a fully integrated system of health care services, at 13 health center locations. Clinicas’ bilingual and bicultural staff reaches out to members of the community who are traditionally underserved due to limited income, resources, cultural and language barriers. The majority of their patient population is Latinos. The UCLA CPRC has previously collaborated with *Clinicas del Camino Real* on other research studies. The interviews in Mexico were conducted at two IMSS clinics in Cuernavaca. The Mexican Institute of Social Security (IMSS) is the health services and health policy research arm of the federal Department of Social Services. The IMSS is also the main social security institution in Mexico, offering health insurance coverage to current or formally employed workers and their dependants, and providing care to approximately half of the

Mexican population. Approval for this study was obtained from the UCLA and IMSS IRBs prior to beginning any of the data collection activities.

### **Study Population**

A sample of 200 Mexican women 18 to 65 years of age who are the medical decision-makers for at least one girl who is eligible to receive the HPV vaccine were interviewed at two separate IMSS clinics in Cuernavaca, Mexico from July to October 2012. A similar sample of 200 Mexican-born, Spanish-speaking women with a daughter(s) of vaccinating age were also interviewed at two separate community-based clinics in Oxnard, California from August to November 2013. A sample of health care providers who are actively participating in the HPV vaccination activities were also interviewed at the study clinics in Oxnard (n=11) and Cuernavaca (n=15). The directors of the vaccine programs at each of the study clinics were also interviewed in the U.S. (n=2) and Mexico (n=4).

### **Data Collection Activities**

Trained interviewers recruited eligible participants in the waiting room areas of the clinics in Oxnard and Cuernavaca. Clinic staff provided women who met the eligibility criteria with a study flyer, and women were also approached by members of the study team who informed them about the study. Potentially eligible women who met the inclusion criteria were invited to participate in the study. All study materials indicated that we were recruiting women who between the age of 18 and 65, who were born in Mexico, who are the medical decision-makers for at least one vaccine age-eligible girl, and whose primary language is Spanish, to participate in a study of the HPV vaccine. The same identification and recruitment procedures were followed at the clinics in Oxnard and Cuernavaca. Participants were provided with a detailed explanation of the study while emphasizing the voluntary and confidential nature of the study. All subjects that expressed an interest in participating were asked to provide informed consent before they were interviewed. Participants were interviewed in a separate room or in a private area of the waiting room in order to ensure confidentiality. Most of the interviews were conducted at the time of initial contact; however, we were able to accommodate subjects who wished to be interviewed at a later time. The interviews with the health care providers and the clinic administrators also took place at the clinics.

## **RESULTS**

### **Knowledge, Attitudes and Practices of Mothers/Caregivers in Mexico vs. the U.S.**

Table 1 presents the sociodemographic characteristics of the mothers/caregivers who were interviewed at the clinics in Cuernavaca and Oxnard. There was a significant difference in the mean age of the participants in Mexico (36.8 years) as compared to the mean age of participants in the U.S.

(39.6 years), participants in Mexico were also significantly more likely to have insurance and were more educated than the participants in the U.S.

**Table 1. Comparison of sociodemographic characteristics of study participants at the IMSS and Oxnard clinics. (n=400)**

	IMSS Hospital n=100	IMSS Clinic n=100	Total n=200	Oxnard n=100	Maravillas n=100	Total n=200
<b>Parents/Caregivers</b>						
Age (mean)	37.5	36.0	36.8	39.9	39.3	39.6**
Uninsured	7%	4%	5.5%	68%	75%	71.5%**
Household Income (<\$25,000 USD/year)	99%	100%	99.5%	85%	97%	91.0%**
Education (mean)	9.9	10.4	10.1	7.9	6.9	7.4%**
< High school	49%	52%	50.5%	77%	86%	81.5%**
Completed high school	32%	35%	33.5%	15%	6%	10.5%*
> High school	19%	13%	16.0%	8%	8%	8.0%*
<b>Daughters</b>						
Age (mean)	10.4	10.8	10.6	12.9	13.3	13.1**

\* P value < 0.05; \*\* P value < 0.01

A comparison of the knowledge, access and HPV vaccine uptake reported by the study participants at the IMSS and Oxnard clinics is presented in Table 2. The mothers/caregivers who were interviewed in Mexico had a significantly greater level of knowledge regarding HPV and the HPV vaccine, but the mothers/caregivers in the U.S. were significantly more likely to have discussed the HPV vaccine with a clinician. A higher proportion of mothers/caregivers in the U.S. reported that their daughters have been offered the HPV vaccine by a clinician, and that their daughters have received at least one dose of the HPV vaccine. However, these differences were not statistically significant. (Table 2) A significantly higher percentage of mothers/caregivers in the U.S. reported that they think it

**Table 2. HPV knowledge, access and vaccine uptake at IMSS and Oxnard clinics.**

	IMSS Hospital n=100	IMSS Clinic n=100	Total n=200	Oxnard n=100	Maravillas n=100	Total n=200
<b>Awareness:</b> Has heard of HPV (yes)	96%	93%	94.5%	64%	66%	65%**
<b>Knowledge:</b> HPV is transmitted sexually (yes)	87%	96%	91.5%	57%	56%	56.5%**
<b>Knowledge:</b> HPV causes cervical cancer (yes)	86%	93%	89.5%	62%	59%	60.5%**
<b>Awareness:</b> Has heard of HPV vaccine (yes)	76%	84%	80%	70%	74%	72%
<b>Knowledge:</b> HPV vaccine is most effective if given before a girl starts having sex (yes)	85%	97%	91%	66%	62%	64%**
<b>Access:</b> Has discussed HPV vaccine with daughter's MD	34%	45%	39.5%	42%	58%	50%*
<b>Access:</b> Daughter has been offered the HPV vaccine by a doctor or nurse	49%	52%	50.5%	54%	56%	55%
<b>Receipt:</b> Initiated HPV Vaccine (received ≥ 1 dose)	39%	40%	39.5%	45%	52%	48.5%

\* P value < 0.05; \*\* P value < 0.01

would be a serious problem if their daughter became infected with HPV (93.5%), as compared to Mexico (75%). Interestingly, a significantly greater proportion of mothers/caregivers in Mexico stated that the HPV vaccine is effective/ very effective in preventing cervical cancer (84%) than those in the U.S. (65%). (Data not shown)

Some of the decision factors reported by the mothers/caregivers who have not vaccinated their daughters in both the U.S. and Mexico are compared in Table 3. Mothers/caregivers in the U.S. were significantly more likely to indicate that they did not have enough information about the HPV vaccine, that their daughters would think it was ok to begin having sex if they were vaccinated, that the HPV vaccine might cause future health problems, including trouble getting pregnant, than those in Mexico. The mothers/caregivers in Mexico were significantly more likely to report that they would have their daughter vaccinated if their clinician recommended it, that they know of other parents who are vaccinating their daughters, and that getting the HPV vaccine for their daughters would be a good idea.

**Table 3. Decision factors among mothers of unvaccinated girls at IMSS and Oxnard clinics.**

	IMSS Hospital n=61	IMSS Clinic n=60	Total n=121	Oxnard n=55	Maravillas n=48	Total n=103
<b>Need more Information</b>						
Does not have enough information to make a decision to get the HPV vaccine	57.4%	38.3%	47.9%	61.8%	68.8%	65.1%*
<b>Health care provider</b>						
Would have daughter get the vaccine if doctor recommended it	100%	97%	98.4%	90.9%	93.8%	92.2%*
<b>Social Norms/Influences</b>						
Agree other parents are giving their daughters the HPV vaccine	90.2%	96.7%	93.4%	41.8%	79.2%	59.2%**
<b>Self-Efficacy</b>						
Very sure could get the HPV vaccine for daughter if she wanted	42.6%	35.0%	38.8%	30.9%	29.2%	30.1%
<b>Decision Role Preference</b>						
Decision to vaccination should be made by my daughter's MD or by MD and me	54.1%	70%	62%	72.9%	69.1%	70.9%
<b>HPV Vaccine Barriers</b>						
1. Daughter may think it's okay to have sex if vaccinated	3.3%	1.7%	2.5%	10.4%	18.2%	14.6%**
2. Thinks the HPV vaccine may cause problems getting pregnant later	1.6%	0%	0.8%	14.6%	25.0%	20.4%**
3. The HPV vaccine may cause future health problems	3.3%	0%	1.7%	8%	12%	19.4%**
<b>Safety of the HPV vaccine</b>						
Not worried about vaccine side-effects	3.3%	1.7%	2.5%	7.3%	4.2%	5.8%
<b>Vaccine Acceptability</b>						
Agree that getting the HPV vaccine is a good idea for my daughter	98.4%	96.7%	97.5%	83.6	83.3%	83.5%**

\* P value < 0.05; \*\* P value < 0.01

Table 4 presents a comparison of the decision factors reported by the mothers/caregivers of vaccinated vs. not vaccinated girls in Mexico and the U.S. The only significant difference observed among the study participants in Mexico is that the mothers/caregivers of non-vaccinated girls were more likely to indicate that vaccines cause more harm than good, than those of vaccinated girls.

**Table 4. Comparison of decision factors between vaccinated vs unvaccinated in Mexico and U.S.**

	Mexico			U.S.		
	Not vac. n=121	Vaccinated n=79	Total n=200	Not vac. n=103	Vaccinated n=97	Total n=200
<b>HPV vaccine is effective</b> Think HPV vaccine is effective/very effective	80.2%	89.9%	84.0%	39.8% <sup>++</sup>	91.8% <sup>**</sup>	65%
<b>Vaccine Attitudes</b>						
1. Vaccination to prevent disease is a good idea	98.4%	98.7%	98.5%	98.1%	100%	99%
2. Vaccines cause more harm than good	3.8%	0% <sup>*</sup>	1.5%	13.6% <sup>++</sup>	5.2% <sup>*,++</sup>	9.5%
3. Vaccination to prevent serious diseases should be required by law	69.4%	65.8%	68%	82.5% <sup>+</sup>	89.7% <sup>++</sup>	86%
<b>Safety of the HPV vaccine</b> Is not worried about the vaccine side-effects	64.5%	57%	34%	31.1%	0%	16%
<b>HPV Vaccine Policies</b> HPV vaccine should be mandatory to attend school	29.8%	26.6%	28.5%	56.3% <sup>++</sup>	75.3% <sup>**,++</sup>	65.5%

\* P value < 0.05; \*\* P value < 0.01 for differences between vaccinated vs not vaccinated in Mexico and the differences between vaccinated vs not vaccinated in U.S.

<sup>+</sup> P value < 0.05; <sup>++</sup> P value < 0.01 for differences between not vaccinated in Mexico vs not vaccinated in the U.S., and the differences between vaccinated in Mexico vs vaccinated in the U.S.

Among the U.S. study participants, the mothers/caregivers of vaccinated girls were significantly more likely to think that the HPV vaccine is effective or very effective, that the HPV vaccine should be mandatory for girls to attend school, and they were less likely to think that vaccines cause more harm than good, than the mothers/caregivers of non-vaccinated girls. The mothers/caregivers of non-vaccinated girls in the U.S. were significantly less likely to think that the HPV vaccine is effective or very effective and they were significantly more likely to indicate that the HPV vaccine causes more harm than good, than the mothers/caregivers of non-vaccinated girls in Mexico. In the U.S., the mothers/caregivers of vaccinated girls were significantly more likely to think that vaccination to prevent serious diseases should be required by law and that the HPV vaccine should be mandatory for girls to attend school, than the mothers/caregivers of vaccinated girls in Mexico.

### Themes Emerging from the In-Depth Interviews

Participants in both countries valued vaccines, and tended to get whatever vaccines were offered for their children. Many saw vaccines as broadly useful for all people, although some made decisions about the appropriateness of vaccination for adults depending on whether they seemed necessary – or likely to do harm – given their idea about the adult’s bodily state. Participants placed great trust in healthcare providers and institutions, in both Mexico and the U.S. Some interviewed in the U.S. preferred American healthcare because of shorter waits for scheduled appointments than in Mexico, and a feeling that health professionals treated them with greater respect. Due to their trust of health professionals, most participants followed provider recommendations regarding vaccination and other treatments, even if they did not fully understand them.

Participants in both sites overwhelmingly felt like they had enough information to make decisions about daughters’ HPV vaccination. However, those interviewed in the US were more likely to have medically correct understandings of HPV. Overall, respondents were happy with the care their



children had received in both the US and Mexico. While some individuals critiqued delivery of specific kinds of treatment, especially for adults, the majority said that children's vaccination programs in both countries were done effectively and well.

Participants' discussions of their reasons for vaccinating children often took on a moral weight, with getting the vaccinations representing a way to be a good parent. Narratives regarding good parenting ran throughout the interviews. Many participants said their children were afraid of injections or did not like the pain. In these cases, participants discussed the ways that they talked children through the vaccination experience; narratives focused on distracting children, and explaining the importance of preventative medicine including how minor pain now would prevent greater future pain. Some participants also discussed the importance of vaccination to society with their children. Participants tended to prefer injections to pills because they saw them as faster, and more effective, due both to their mode of delivery and to the fact that one could forget to take pills.

While participants overwhelmingly supported childhood vaccination including against HPV, they often discussed unspecified others who did not support it. In these narratives, they cast themselves as knowledgeable or morally correct in contrast to non-vaccinators. These narratives tended to differ by site: in Mexico, participants often discussed how non-vaccinators saw vaccines as a government plot to use citizens as guinea pigs, while in the U.S. participants tended to discuss non-vaccinators as inadequate parents. This difference likely relates to widespread cultural understandings of the Mexican government as corrupt.

In both sites, mothers who had suffered from HPV-related disease mentioned this as a reason to get daughters vaccinated. However, they also said that they believed they would support vaccination even without this experience. Participants in both countries often called for more open discussions with children about sex and sexual health. They often mentioned that communication about sexuality was lacking with their own parents, and that they hoped to redress this with the next generation. In some cases, HPV vaccination provided an arena for such education, but in others parents stated that vaccinated children were still too young for such discussions. Reflecting this discrepancy, some participants (especially in Mexico) discussed how they wanted sexual health information or treatment for themselves, but experienced shame as a barrier to gynecological treatment.

In the U.S., language differences between parents, doctors and children shape some parents' experiences of vaccination; some children ask English language questions that their parents could not understand. When asked about their reasons for participating in the present study, most participants in Mexico revealed that they understood participation primarily as a way for them to get desired information about HPV, rather than to participate in research. They approached or agreed to talk with the nurses giving the questionnaires because they heard the topic was HPV and wanted more knowledge about it. Conversely, in the US many women participated because they felt that HPV

vaccination was an important topic that they supported, and wanted to further support it through this interaction. In short, participation seemed more linked to knowledge gathering in Mexico and assertions of selfhood in the US.

### **Clinicians/Administrators Attitudes and Practices towards the HPV Vaccine**

Nearly 70% of U.S. providers believe they have enough time during the patient visit to discuss the HPV vaccine. Most of these providers (77%) spend 5-15 minutes with each patient, 22% of them spend 15 to 25 minutes with each patient. Of note, one provider who spends an average of 20 minutes with each patient still did not believe there was enough time to discuss the vaccine. The 15% who reported insufficient time to discuss the vaccine spent between 5 to 15 minutes with each patient. This differs quite significantly from the sentiments among providers in Mexico. Only 58% of providers in Mexico think there is enough time to discuss the HPV vaccine, while 42% agreed that there is not enough time to discuss the vaccine with their patients.

Various strategies are used in both Mexico and the US to promote the HPV vaccine. These include: vaccine fairs, mobile units providing vaccines, special health promotion weeks, educational talks, discussing the vaccines during the patient visit, call patients, informational flyers/posters, health educators, and informational talks offered by the vaccine manufacturers. Most clinics use health fairs to promote vaccines, others have health care educators, and 31% of clinicians said they talk about vaccines to their patients during their visit to the clinic. Other clinicians call patients when they are due for a vaccine, while others use a drug company provided reminder device. All of the U.S. providers indicated that they use visual aids to discuss the HPV vaccine, including brochures, flyers, and pictures of HPV infection, while only half of the clinicians in Mexico reported using the following visual aids: posters, flyers, or programs on the computer.

Whether or not a disease is perceived as a serious public health problem can impact how adamantly providers recommend the HPV vaccine. All of the U.S. providers agree that HPV is a serious public health problem, and 95% of Mexican providers agreed with this statement. At the clinics in Oxnard, only the Gardasil HPV vaccine by Merck is used 100% of the time, but the type of vaccine used at the IMSS clinics in Mexico varies, 21% of clinicians reported use of Cervarix (the GSK vaccine), 47% use both types of vaccine, and 31% do not know which vaccine is used. The HPV vaccine is offered to both boys and girls at the Oxnard clinics, but in Mexico, the vaccine is only offered to girls. Most of the clinicians interviewed in Mexico (84%) believe that vaccination against serious diseases that are preventable should be required by law.

Half of the U.S. clinicians believe parents are concerned about the safety of the HPV vaccines, and one third reported that parents do not have concerns (15% neither agreed nor disagreed). In Mexico 84% of clinicians believe patients are concerned about the safety of the vaccine, while 16%

disagreed. Most of U.S. providers (77%) indicated that talking about the HPV vaccine is a potentially sensitive subject that parents may object to discussing. However, none of the U.S. clinicians feel uncomfortable discussing the HPV vaccine with their patients. In Mexico, 58% of providers believe talking about the vaccine is a sensitive issue, while 42% disagreed. More than half of the IMSS clinicians (58%) reported that they are not uncomfortable discussing the HPV vaccine with their patients, and 42% had no opinion.

Only 8% of U.S. providers were concerned about the potential side effects of the HPV vaccine, 84% were not concerned, and the remaining 8% had no opinion. In Mexico, 16% of clinicians were concerned about the potential side effects of the HPV vaccine, 79% were not concerned, and 5% had no opinion. Most clinicians did not report a specific opinion about where the vaccine should be offered. However, most believe that the HPV vaccine should be given at schools, a doctor's office, or at a clinic. In both the U.S. and Mexico, half of the clinicians indicated that they do not believe the HPV vaccine should be required to attend school. All of the U.S. providers and 95% of the clinicians in Mexico think the HPV vaccine should also be offered to boys aged 9 to 18 years old.

Nearly 70% of U.S. providers reported that they are more likely to discuss the HPV vaccine with mothers than fathers, but they qualified this statement by saying that mothers tend to bring their daughters more frequently to the clinic than their fathers. In Mexico 53% of the clinicians indicated that they discuss the vaccine with mothers more frequently, 11% discuss it more with the fathers, and 37% discuss the HPV vaccine with both parents equally. Approximately 90% of U.S. providers reported that they discuss the HPV vaccine directly with girls aged 9 to 18 years old, and 69% stated that they are more likely to discuss the vaccine with older girls who are between 16 and 18 years of age. In Mexico, 79% of clinicians indicated that they discuss the HPV vaccine directly with their patients. A smaller percentage of clinicians (5%) discuss the vaccine with younger girls (aged 9 to 10 years), 16% discuss it with girls 11 to 12 years old, and 63% indicated that they discuss the HPV vaccine with all girls.

Most of the U.S. clinicians indicated that they discuss the HPV vaccine with their patients, with 62% reporting that they have done so with at least half of their patients and 23% have spoken with all of their patients. In Mexico, 16% of providers report that they have spoken to half of their patients about the HPV vaccine, 26% have talked to the majority of their patients, and 16% report that they have discussed the vaccine with all of their patients. All of U.S. clinicians indicated that they bring up the HPV vaccine with their patients, but only 79% of Mexican providers reported that they bring up the subject of the vaccine first, while 11% wait for their patients to bring up the vaccine. When discussing the vaccine, most clinicians state that the child is due for the vaccine in addition to discussing the fact that HPV is sexually transmitted.

One third of the U.S. clinicians and 68% of Mexican providers reported that there are some circumstances in which they do not discuss the HPV vaccine. These include not discussing it with 9 year old girls (just their parents), when the child has been sexually abused, and when it is inappropriate for the visit. Most of the clinicians in the U.S. (69%) and Mexico (68%) indicated that they offer the HPV vaccine to their patients as more of an expectation and less of a choice.

At the two Oxnard clinics, 92% of providers indicated that they have offered the vaccine to most of their patients (greater than 60%), with 75% reporting that they have offered the vaccine to all of their patients. At the two IMSS clinics in Cuernavaca, 53% of clinicians state that they have offered the vaccine to more than half of their patients, and 16% have offered it to most of their patients. Of the clinicians surveyed, 31% report between that 10% to 50% of their patients refuse the vaccine, and 69% report less than 10% refuse it. The most common reasons for refusal are fear that the child will become sexually active or that the child does not need the vaccine because she/he is not currently sexually active. Another common reason is side effects, like fainting. Most of the clinicians that were interviewed for this study (92%) indicated that they have a forum to discuss the HPV vaccine with other clinicians.

## **DISCUSSION**

Although we expected to find higher rates in Mexico, we observed lower HPV vaccination rates among the sample of women who were interviewed at two IMSS clinics in Cuernavaca, Mexico (39.5%) than among the participants at two clinics in Oxnard, CA (48.5%). Our study population at the Oxnard clinics consisted of women who were born in Mexico and whose primary language was Spanish. Since the HPV vaccine uptake among Latinas in the U.S. (56.2%) is significantly higher than among non-Hispanic whites (45.8%), we expected to observe higher rates than the national average among our Mexican-American study population. (Jemal, 2013) In the U.S., less than half (48.7%) of adolescent girls aged 13 to 17 years had received or more doses in 2010, and only 32.0% had received three doses of the HPV vaccine. (Jemal, 2013) We did not expect to find lower HPV vaccination rates in Mexico, especially at two clinics that offer medical services to those who have IMSS health insurance. Only 4% of the women interviewed in Mexico did not have health insurance, as compared to 71.5% of those interviewed in the U.S. This finding suggest that although most of the women who were interviewed at the Oxnard clinics did not have health insurance, they can vaccinate their daughters against HPV thanks to programs such as the Vaccines for Children Program and Medical, which allow girls who are 18 years or younger, who are uninsured or have insurance that does not cover HPV vaccination, to be vaccinated for free.

Another interesting finding was the higher levels of knowledge regarding the association between HPV and cervical cancer, as well as the greater awareness about the HPV vaccine among the

women in Mexico, as compared to the U.S. A significantly greater proportion of respondents in Mexico had heard of HPV (94.5% vs. 65%), knew that HPV is transmitted sexually (91.5% vs. 56.5%) and causes cervical cancer (89.5% vs. 60.5%), and that the HPV vaccine is most effective if administered before sexual debut (91% vs. 64%), than those in the U.S. This higher level of knowledge regarding HPV is to be expected among a population that is more educated, 49% of the participants in Mexico had a high school degree or greater, as compared to 18.5% among the U.S. respondents. What makes this finding more interesting is that despite a greater knowledge about HPV and the even the existence of the HPV vaccine (80% vs. 72%) the women in Mexico reported lower HPV vaccination rates than those in Oxnard. However, the women who were interviewed in the U.S. were significantly more likely to report that they had discussed the HPV vaccine with their daughter's physician/nurse and that they had been offered the HPV vaccine by a clinician. This finding indicates that having a clinician discuss and offer the HPV vaccine may be associated with a higher HPV vaccine uptake than a greater knowledge about HPV and the HPV vaccine.

The interviews that were conducted with the clinicians in Cuernavaca and Oxnard corroborate our findings concerning the proportion of women who have discussed or been offered the HPV vaccine by their daughter's clinician. In the U.S., most clinicians said they have discussed the HPV vaccine with their patients, although there was some variation in the proportion of patients that the clinicians have reportedly spoken to about the vaccine. In Mexico, only 16% of providers indicated that they have discussed the HPV vaccine with their patients vs 62% in the U.S., and 16% report that they have discussed the vaccine with all of their patients vs. 23% in the U.S. Clinicians in the U.S. were also more likely to have offered the HPV vaccine to their patients than those in Mexico. At the Oxnard clinics 75% of providers indicated that they have offered the HPV vaccine to all their patients as compared to the far fewer 16% of clinicians in Mexico who report that they have offered the vaccine to most of their patients. A possible explanation for the differences that we observed in the discussion and offering of the HPV vaccine between mothers/caregivers and physicians is the fact that HPV vaccination activities are ongoing at the clinics in the U.S., whereas in Mexico, they only take place for a few weeks in the months of May and October, during the bi-annual National Vaccination Weeks. During these weeks, girls who are in the 5th grade (around the ages of 10 and 11 years) are either vaccinated at school, or they can also get the HPV vaccine at their clinic.

Less than half of the mothers/caregivers who were interviewed indicated that they have vaccinated their daughters against HPV. One of the goals of this research study was to investigate the reasons why certain mothers/caregivers choose not to vaccinate their daughters. The mothers/caregivers of unvaccinated girls in the U.S. were significantly more likely to report that they did not have enough information to make a decision about vaccinating their daughter (65.1% vs. 47.9%) and that they were concerned that the HPV vaccine might cause future health problems,

including trouble getting pregnant. In Mexico, the mothers/caregivers of unvaccinated girls were significantly more likely to indicate that they would have their daughter(s) vaccinated if their doctor recommended the vaccine (98.4% vs. 92.2%), that they know of other parents who are vaccinating their daughters against HPV (93.4% vs. 59.2%), and that they think getting the HPV vaccine is a good idea for their daughters (97.5% vs. 83.5%), than those in Oxnard. We expect that the in-depth interviews will provide us with additional information about why some women decide not to vaccinate their daughters.

We compared the responses of the mothers of vaccinated vs. non-vaccinated girls in both countries and found some significant differences. In both the U.S. and Mexico, the mothers of non-vaccinated girls were more likely to indicate that vaccines cause more harm than good, than those of vaccinated girls. However, the mothers of non-vaccinated girls in the U.S. were also less likely to think the HPV vaccine is effective and that getting the HPV vaccine should be a required for girls to attend school, than the mothers of vaccinated girls. We also compared the mothers of non-vaccinated girls in the U.S. to those in Mexico, and found that in the U.S. they were significantly less likely to indicate that the HPV vaccine is effective and were more likely to indicate that the HPV vaccine causes more harm than good, than the mothers of non-vaccinated girls in Mexico. Finally, the mothers of vaccinated girls in the U.S. were also more likely to think that vaccination should be required by law and that the HPV vaccine should be mandatory for girls to attend school, than the mothers of vaccinated girls in Mexico. These differences may help to explain the variation in vaccination rates that we observed as part of our study of HPV vaccination programs in the U.S. and Mexico.

## **CONCLUSIONS**

This bi-national study brought together established investigators with experience conducting Latino health research at UCLA, the University of Iowa, and the Mexican Institute of Social Security (IMSS) in Mexico. The data for this study were obtained from interviews with women, health care providers, and program administrators at two community clinics in Oxnard, CA and two IMSS clinics in Cuernavaca, Mexico. Although mothers in the U.S. had less knowledge and more negative attitudes towards the vaccine compared to their Mexican counterparts, vaccine uptake rates were higher in the U.S. sample. This suggests that factors other than knowledge and beliefs, (such as system, clinic or provider factors), may be the main drivers of vaccine receipt in our samples. The results of this study help us to better understand the process of clinician offering and patient uptake of the HPV vaccine among Mexican women in the U.S. and Mexico. Our study findings will be disseminated to researchers, policy makers and public health practitioners in the U.S. and Mexico, and we plan to publish at least three manuscripts in appropriate English and Spanish language peer-reviewed journals. We will also present our findings at the 2014 HPV conference.

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