

Factors Influencing Mexican Women's Decisions to Vaccinate Daughters Against HPV in the United States and Mexico

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Mexican and Mexican-American women bear high cervical cancer burdens, yet relationships between mothers' experiences of vaccinating daughters against cervical cancer-causing human papillomavirus (HPV) on both sides of the border are unknown. We surveyed 400 Mexican-born women in Oxnard, California, United States and Cuernavaca, Morelos, Mexico, about their beliefs and practices regarding daughters' HPV vaccination, conducting in-depth interviews with 35 participants. Contextualizing interview findings in survey data, we identify key factors influencing mothers' experiences regarding daughters' HPV vaccination in both countries. Although US acculturation influenced some participants' concerns, US and Mexico participants overwhelmingly desired eventual vaccination; structural rather than cultural barriers limited vaccine uptake.

Key words: binational, HPV, Mexico, qualitative, vaccination

BOTH MEXICAN and Mexican-American women bear a high cervical cancer burden.^{1,2} Although cervical cancer prevention efforts in the United States and Mexico incorporate vaccination against human papillomavirus (HPV), the virus which causes the disease, vaccine provision and cultural responses to it differ widely in the 2 countries. HPV vaccination in Mexico began in 2008 and in 2011 was expanded to school-based vaccination of all girls aged 9 in the country.³ The HPV vaccine has been uncontroversial in Mexico, with debate focused on equity in vaccine distribution.⁴ In the United States, vaccination for girls as young as 9 has been recommended since 2006.⁵ Unlike in Mexico, these recommendations and (now abandoned) state attempts to mandate universal coverage sparked controversy regarding parental rights to refuse vaccination, social fears regarding vaccine

safety, and concern that vaccinating girls would promote youthful promiscuity.^{6,8} Although HPV vaccination remains nonmandatory in the United States, girls aged 18 years or younger who lack insurance coverage for vaccination or qualify for Medicaid can receive the vaccine for free as part of the Vaccines for Children Program.⁵ Girls in both countries theoretically have cost-free access to HPV vaccination, although financial, structural, and social barriers limit coverage. Given the mobility of people and ideas between Mexico and its American Diaspora, understanding similarities, differences, and interrelated changes in people's experiences and beliefs regarding HPV vaccination is necessary for offering socially acceptable and effective cervical cancer prevention programs on both sides of the border.

US-based vaccine acceptance studies that include multiple racial and ethnic populations have found that the main factors regulating girls' vaccination are parents' knowledge and safety and efficacy beliefs regarding the HPV vaccine, the convenience and accessibility of vaccination, and whether a doctor recommends vaccination^{9,10}; findings differ regarding whether concerns about promiscuity affect parents' vaccination beliefs and practices¹¹ or do not.¹² Low-income and underserved US Latino/a parents' responses to these issues are well-studied. Latino/a parents are generally more likely to view the HPV vaccine as safe and acceptable for their daughters than members of other racial/ethnic groups.^{10,13-15} Lacking knowledge or information about the vaccine appears to be the major barrier to vaccination,¹⁶ in addition to—and sometimes correlating with—lack of a regular health care provider¹⁷ or lack of vaccination and/or education opportunities during clinical visits.¹⁰ However, several studies show that Latina mothers are likely to desire vaccination for their daughters despite

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lack of knowledge or doubts,^{18,19} stating protection against disease as a key benefit that generally outweighed vaccination-related risks to health or promotion of promiscuity.²⁰ Whether acculturation influences vaccine acceptability and uptake remains unclear. A Florida farm worker study suggests that greater American acculturation is associated with vaccination predictors including vaccine awareness and getting a physician recommendation,²¹ but research from the urban Northeast indicates that immersion in media debates regarding the vaccine's health and promiscuity-related side effects might hamper uptake.²²

However, this US-based literature tends to group Latinos/as together, obscuring the beliefs and practices specific to Mexican migrant and Mexican-American parents. This is problematic because these groups have health experiences and needs distinct from other Latino/a populations.²³ Furthermore, although Mexican girls in the United States and Mexico face high cervical cancer risk, research on this topic has been based almost exclusively in the United States.²⁴ Almost all of the few studies of parents' beliefs and practices regarding daughters' HPV vaccination in Mexico pre-date school-based vaccination programs. Early studies from different regions revealed that mothers generally did not know about HPV but were in favor of vaccination for daughters, with only mothers in a US border city expressing fears about religious inappropriateness.^{25,26} The only Mexican study of parents' responses done after the implementation of school-based vaccination found mothers to be largely in favor of cost-free vaccination; lack of knowledge about the vaccine and sexually transmitted infections played a major role in women's concerns about vaccination, with a few voicing fears of promiscuity.²⁷ From the existing literature, it is thus unclear whether similar social factors influence parents' decisions to vaccinate in Mexico and the United States, and whether differing cultural discourses and state mandates might foster different beliefs regarding the acceptability of the HPV vaccine.

The aim of this qualitative study was to assess and compare the knowledge, beliefs, and practices regarding HPV vaccination among mothers of vaccine-eligible girls in Oxnard, California, United States and Cuernavaca, Morelos, Mexico. Our goal was to better understand the similarities and differences in the HPV vaccine uptake process among Mexican-born women in the United States and Mexico, and discern specific local cultural and/or structural factors that might influence mothers' decisions to vaccinate their daughters in both contexts.

METHODS

Here, we draw on data from a survey-based study of knowledge, beliefs, and practices regarding HPV vaccination among Mexican mothers and health professionals in 2 urban areas: Oxnard, California, United States and Cuernavaca, Morelos, Mexico. In both countries, recruitment and interviews were performed at clinical sites where HPV vaccination is offered cost-free to age-eligible girls, so that all respondents had access to vaccination for their daughters. The US interviews took place at the Oxnard and Maravilla sites of the *Clínicas del Camino Real*, a nonprofit, federally funded health care organization that provides services to Latino/as and other individuals who are traditionally underserved because of limited income and other access barriers. In Mexico, interviews were conducted at 2 clinics of the *Instituto Mexicano del Seguro Social* (IMSS), a federal agency that offers health care to formally employed workers and their dependants (approximately 40% of the Mexican population).

A total of 400 women, 200 in each country, participated in the study. Most of the US respondents did not have health insurance (71.5%), in contrast with 5.5% of participants in Mexico who lacked IMSS access. The average age of the women was 39.6 years in the United States and 36.8 years in Mexico, and the average years of education in the United States were 7.4 and 10.1 in Mexico. From 2012 to 2013, women were recruited by study staff in clinic waiting areas, and all who met the inclusion criteria of being aged 18 to 65 years, being born in Mexico, being the medical decision makers for at least one vaccine age-eligible girl (meaning that the study included some nonmother caregivers; participants are glossed as "mothers" here), and speaking Spanish as one's primary language were invited to participate. Eligible participants received a detailed explanation of the study emphasizing its voluntary and confidential nature, and provided informed consent. All research protocols and study materials were approved by the IMSS and University of California, Los Angeles (UCLA) Internal Review Boards before data collection. Interviewers verbally administered a Spanish-language questionnaire collecting data on women's knowledge about HPV, cervical cancer and the HPV vaccine, attitudes and beliefs regarding HPV and other vaccine acceptability, history of daughters' HPV vaccination, and communication with family, friends, and health providers regarding the vaccine. These quantitative results were analyzed using STATA and SPSS, and are reported in a separate article.

Using survey findings to provide context, here we focus on qualitative data obtained from a

subset of 35 study participants. Fifteen women in Mexico and 20 in the United States participated in in-depth, semistructured interviews eliciting participants' narratives regarding their HPV and other vaccine-related decision making and values for their children and themselves. Consent was obtained in person before beginning the study interviews. A purposive convenience sampling technique was used to recruit the women who participated in the in-depth interviews. Seeking to obtain a sample that represented the diverse experiences reported in the survey, we generally selected one woman from each group of 10 women who were interviewed, and aimed to recruit an equal number of participants who had and had not vaccinated their daughters against HPV. After completing their quantitative interviews, the selected women were asked whether they would like to participate in a longer, more in-depth interview, so they could elaborate on their responses. Likely because they had already agreed to participate in the survey, women voiced enthusiasm about interview participation, with those declining citing time constraints. There were no significant differences between the mean age, education level, and income of the women who were interviewed in Mexico and those in the United States, although participants in Mexico were significantly more likely to have health insurance (Table 1).

These Spanish-language interviews provided context for the questionnaire responses and shed light on the ways that the specific elements of the participants' cultural and structural settings influenced their attitudes, beliefs, and practices regarding HPV vaccination. Interviewers solicited further information about participants' questionnaire answers regarding HPV vaccination decision making and practice, women's own HPV or HPV-related disease experiences, experiences of getting vaccinations for other diseases for their children and themselves, and their experiences with local health care systems. In-

terviewers followed ethnographic best practices for eliciting reliable, in-depth information, including generating rapport, asking participants to describe concrete experiences, and allowing participant interests to guide the interview to reveal relevant but unanticipated themes.²⁸ Interviews lasted approximately 45 minutes, and were audio recorded with participants' permission and then transcribed for analysis. Interviews were performed by women to increase participants' comfort discussing mothering and sexual health. The first author and a Cuernavaca research nurse performed interviews in Mexico, and a trained qualitative interviewer and, in some cases, the second author, did so in the United States. Most interviews took place in private spaces at clinical sites, with 3 Mexico-based interviews held at participants' homes at their request (interview content did not differ significantly by clinical vs home site). Interviews in Mexico took place several months after administration of the survey, whereas US interviews occurred either directly after survey administration or several weeks later. Time elapsed between survey administration and interview did not appear to significantly affect qualitative results, although longer intervals led some participants to remember the survey experience less clearly. Most Mexican participants' daughters were vaccinated against HPV in the interval between the survey and interview.

Transcripts were analyzed using a thematic approach.²⁹ The first author generated codes inductively by identifying common themes in the narratives (drawing on her prior research familiarity with cultural and medical norms in both interview settings), and then applied the codes to transcribed data using NVIVO software (version 9, QSR International). Patterns of relationships between specific codes and topics of interest (ie, vaccine acceptance) were evaluated to reveal the relationships between particular cultural or structural factors and

TABLE 1. Demographic Characteristics of the Sample (n = 35) and Total Study Population (n = 400)

	Cuernavaca, Morelos		Oxnard, California	
	Sample n = 15	Total n = 200	Sample n = 20	Total n = 200
Parents/caregivers				
Age (mean)	37.9	36.8	39	39.6
Uninsured (US)/lacked IMSS access (Mexico)	0.0%	5.5%	65.0%	71.5%
Income at or below poverty level	13.3%	26.1%	15.0%	19.0%
Education (mean)	9.9	10.1	8.4	7.4
Daughters				
Age (mean)	10.3	10.6	12.9	13.1

Abbreviation: IMSS, Instituto Mexicano del Seguro Social.

individual health behaviors and beliefs, and data saturation was assessed.³⁰ These patterns were assessed within the semistructured interview data and compared with survey findings. This single coder, thematic analytic procedure reflects the humanistic orientation of the first author's discipline of cultural anthropology, in which validity derives from supporting identified patterns with representative data. Accordingly, below we present the key themes relating to mothers' decisions regarding vaccination, illustrated with representative interview data.

Overwhelming desire to vaccinate

Interview participants in both countries universally described vaccination in general as desirable, with most voicing enthusiasm for the HPV vaccine. In Mexico, 97% of the survey participants whose daughters were not vaccinated ($n = 121$) said that getting the HPV vaccine would be a good idea, as did 99% of the US mothers with unvaccinated daughters ($n = 103$). Table 2 reports the main reasons respondents identified for vaccinating their daughters in the total study population and the subsample. In Mexico, most women indicated that they vaccinated their daughters to prevent cervical cancer and because their medical provider recommended the vaccine. In the United States, the 3 main reasons in order of importance were because a doctor or nurse recommended the HPV vaccine; to prevent HPV infection; and because the vaccine is required to attend school.

The vast majority of women in both countries got their daughters vaccinated for HPV either immediately when their health care provider offered it, or after a brief period of consideration. The importance of having a doctor or nurse recommend the vaccine was also reported by the mothers with un-

vaccinated daughters. In Mexico, 97.5% of mothers said their daughter would get the HPV vaccine if their doctor recommended it, as did 92% of the US mothers with unvaccinated daughters. Most mothers saw getting the recommended vaccinations as a routine element of school attendance or medical check-ups; several mentioned that if they did not want their daughter to get shots, they would not have brought her in for her physical. Below, we present the main reasons mothers articulated for accepting vaccination, illustrated with representative quotations.

For prevention

Interview participants—even those who had not vaccinated daughters against HPV—frequently identified “prevention” and “protecting” their children as reasons for vaccinating; a US participant summed this attitude up by explaining that she vaccinates her children “so they don't get sick.” Mothers frequently expressed gratitude for the existence of vaccines, which they saw as marking technological and social progress. For example, a Mexican participant stated that vaccines including against HPV are important “to prevent, right? It's good, because before there weren't these vaccines ... now that there are, you have to take advantage of them.”

Given this general acceptance, women rarely needed convincing to accept any vaccine that was offered to their children. Women's own experiences with HPV-related disease provided additional incentive for vaccination. A participant in Mexico called her experience “traumatic, because they tell you ‘papilloma’ and you feel that now you're going to get cancer. So it scares you, it worries you. And given that circumstance, well, when they told me there were vaccines for my daughter I didn't think

TABLE 2. Reasons for Vaccinating Their Daughters Against HPV (Among Vaccinated)

	Cuernavaca, Morelos		Oxnard, California	
	Sample n = 3	Total n = 79	Sample n = 10	Total n = 97
Requirement to attend school	–	9 (11.4)	2 (20.0)	4 (4.2) ^a
Doctor/nurse recommended the vaccine	1 (33.3)	14 (17.7)	4 (40.0)	43 (44.3)
Wanted to prevent cervical cancer	2 (66.7)	38 (48.1)	1 (10.0)	20 (20.6)
Wanted to prevent genital warts	–	2 (2.5)	–	–
Wanted to prevent HPV infection	–	14 (17.7)	3 (30.0)	23 (23.7)
Know other parents who have vaccinated their daughters	–	1 (1.3)	–	–
To protect my daughter	–	–	–	5 (5.2)
No response	–	1 (1.3)	–	–

^a $P < .05$.

twice.” Similarly, a US participant said although she would have vaccinated her daughter even without personal experience, “What they did to me hurt so much, and because of that I said I don’t want my daughter to suffer like I have.”

To be a good parent

Wanting to be a good parent also motivated mothers to vaccinate. Just as they saw vaccines as a modern good, participants in both countries sometimes discussed the advent of new diseases, like HIV, as the downside of modernity. In this context, some mothers implicitly described themselves as good, modern parents by vaccinating their daughters. For instance, a mother in Mexico contrasted herself with straw-man vaccine rejecters, saying, “There are really closed-minded people, who even in this day and age don’t want to get vaccinated ... But, for me it’s for the best, because it’s a way to prevent something forever, to have physical wellbeing.”

School attendance

School-based vaccination programs or requirements provided additional reasons for HPV vaccination. In Mexico, the HPV vaccine program is largely school-based, with vaccination of appropriately-aged girls also offered at government health clinics including those in the IMSS system. One third of the HPV-vaccinated girls whose mothers participated in the Mexican arm of the study were vaccinated at school, and mothers generally saw this as a convenient and appropriate facilitator of vaccination. For example, one woman said her daughter did not always understand what she was being vaccinated for, but she instructed her to accept the vaccines without question: “My daughter says, ‘no, it’s that I don’t know what they’re going to give me’... I tell her, ‘well get it anyway daughter, it’s for your own good because they wouldn’t be doing harm to a child.’” The few Mexican mothers

who saw school-based vaccination as chaotic in practice took their children to the clinic for their vaccines.

In California, some mothers identified their belief that HPV vaccination was required for school attendance as an additional reason to vaccinate. One woman said that even though she did not have much information about mandatory vaccines and thought that not all would be relevant for her children, she agreed to them because they were required: “I don’t want problems because the first thing when you go to the school is, ‘Do you have this vaccination?’... Like now they made the vaccine against tuberculosis mandatory, no, the one for whooping cough. I got it for [my children] even though I didn’t want to because my daughters aren’t at risk for it, but when you see that it’s contagious ... I said well, it doesn’t matter, I have to do it. Now they made it the law, for a reason.” Although mothers universally desired vaccination for their children, some were unsure that every required vaccine prevented a disease for which their children were actually at risk. Nevertheless, almost all saw the broader goods of vaccinating to prevent contagion and following well-intentioned regulations as a reason to get all recommended vaccinations for their children.

Reasons for not vaccinating daughters

Despite overwhelming support for vaccination, 80% of the daughters of interviewed mothers in Mexico ($n = 12$) and 50% of those in the United States ($n = 10$) had not been vaccinated for HPV at the time of survey, compared with 60.5% of unvaccinated girls in the Mexican survey and 51.5% in the US survey. Surveyed mothers’ 2 main reasons for not vaccinating their daughters against HPV in both countries were concern about vaccine side effects and needing more information to make a decision (Table 3). Interview data reveal that identification of these concerns might relate to incomplete

TABLE 3. Barriers to Vaccine Uptake Among Unvaccinated Girls

	Cuernavaca, Morelos		Oxnard, California	
	Sample n = 12	Total n = 121	Sample n = 10	Total n = 103
Believe daughter may think it is okay to have sex if vaccinated	0%	2.5% ^a	10.0%	14.6%
Think HPV vaccine may cause problems getting pregnant in future	0%	0.08%	10.0%	20.4%
Think HPV vaccine may cause future health problems	0%	1.7%	10.0%	19.4%
Need more information to make a decision	50.0%	47.9%	60.0%	65.1%
Worry about vaccine side effects	100%	95.9%	80.0%	93.2%

^a $P < .01$.

communication about vaccine purpose, side effects, and eligibility by health providers. Below, we discuss mothers' reasons for not vaccinating, illustrated with representative quotations.

Wanting but not getting vaccination

However, the fact that most daughters in Mexico were vaccinated between the survey and interview reveals that mothers were highly likely to accept the vaccine when offered. The three interview participants in Mexico whose daughters were unvaccinated at the time of interview attributed this to exclusively structural reasons. One woman said it would be valuable "for prevention" but was not offered to her granddaughters at school, despite her request for it. Another participant was turned away, explaining, "I wanted them to give the vaccine to my daughter, I even asked for an appointment to ask the doctor to authorize it" but that she was told her daughter was the wrong age. The third participant said that her daughter was too young, but she would vaccinate her when allowed. These 3 girls were in fact vaccine-eligible; communication problems between parents and health providers seem to have led to these misunderstandings.

Several mothers had not vaccinated their daughters but wanted to. For some, this was because the vaccine had not been offered; for example, a US mother said "they haven't offered it and I haven't had information, but it interests me a lot." Others learned of the HPV vaccine's existence through our survey, and now hoped that doctors would offer it or planned to request it for their daughters. In Mexico, 20% of the survey participants had not heard of the HPV vaccine, compared with 25% of US survey participants. For instance, a US interview participant said that she had not vaccinated, "because I didn't have the information about what this sickness is" but planned to get the vaccine because, "now I know. When one knows the best things to do, you can think about what you need to do for prevention."

Fears regarding sexuality

In a minority of cases, daughters in the United States went unvaccinated partly because of cultural fears of increased promiscuity or accelerated sexual maturity, or possible future health problems. Although no interview participants in Mexico linked the vaccine to promiscuity, one fourth of the US participants ($n = 5$) raised this issue. Two of those dismissed the idea, although one woman reported that this "debate" about the HPV vaccine had influenced her decision-making process: "Almost the majority of people don't want to use it for their daughter because they say that the vaccine brings more promiscuity to schools, more promiscuity for adolescents,

and now in these difficult times that we're in I was torn between yes and no. But then when I investigated more and saw it was beneficial for them, not because of promiscuity in schools but as protection for them ... So we reached the conclusion that it was better for them."

Her research process included internet searching and consultation with a psychologist, which led her to think of the vaccine as "a way to protect them in the future."

A small group ($n = 3$) of US mothers were influenced by these concerns about the relationship between vaccination and sexuality. They all wanted their daughters vaccinated eventually, but rejected vaccination at age 9. One mother thought the vaccine might cause children to begin precocious sexual behavior, so she decided to wait until she turned 12. She initially believed that the doctor had given her sufficient information about HPV and the vaccine, but had second thoughts, thinking "I need to find more information to make this decision." Having heard about relationships between HPV vaccination and promiscuity, she decided that she was unconvinced by the nurse's case for vaccinating at age 9. She noted, "Actually, she told me, 'I have two daughters and I vaccinated them.' Okay, but she is a nurse and has all the information, the pros and cons, and the patients' experiences. I don't! And they're my daughters, of course she's protecting her daughters, and that's great. But for myself I thought, better not!" She said that she intended to do further research on her own, "but I didn't do anything, really not until you came and gave me this information."

Another mother had not heard of HPV and wanted to talk with her husband before her daughter received the vaccine. He had heard that it could lead children to engage in sex earlier than usual, so wanted to wait. They did more research, and she said, "We didn't decide until she was almost 10. But we were seriously considering it." Eventually, she decided that the vaccine was beneficial, noting: "Well, I had recently learned, for the first time in my 44 years, that there was a vaccine to prevent venereal disease. For adolescents, who are beginning their sexual lives. So it seems good to me, because boys especially when they're that young don't think about what they're doing. So we as parents have to think for them. But if we're not there, like when I didn't know about this vaccine, I can't help my daughter in that way. But now that I know, I can't ignore it."

They planned to vaccinate their daughter shortly

The third parent who discussed similar fears had initially tried to get the HPV vaccination for her

daughter, but was told that it would have a prohibitive cost. She explained, “Because she still doesn’t have medical coverage, and they told me it would cost, I don’t remember how much, but it was a little expensive and I have three other children. Now I’m buying diapers for three and all that. So I had to stop and think, although I do want to vaccinate her.” However, after putting vaccination on hold for economic reasons, this mother reported that she read on the internet that it might cause early onset of puberty. She said, “I think that now I have all the information, but I’ve decided to wait another year, because she still seems young to me. I don’t know if it will influence her development and all that, maybe not. You hear myths that people say, that they’ll develop faster and she will become a young woman sooner, and that. That’s why I prefer to wait.” Although she was unsure whether she believed these stories, they offered additional incentive—on top of her financial constraints—to delay vaccination.

In contrast, most participants in the United States saw the HPV vaccine as preventing the health consequences of sexual behavior rather than encouraging promiscuity. For example, one mother said that vaccination was “to prevent ... You never know, you don’t want them to have relations as an early age, but, this is just for prevention.” Another mother hypothesized that her daughter might be with someone who might lie or not know about his infection, so “It’s better to vaccinate her sooner than later so we don’t have regrets.” In this way, several mothers discussed social risks that could expose their daughters to HPV and viewed vaccination as one of the ways they could offer protection. One mother noted: “I’ve seen girls of age, more or less, 12, who are more advanced than my daughters... that go with boys and even sit in front of my house, hugging and kissing the boys. And my daughters see them, and so they ask me about, ‘Mom, they say that when you start menstruating you can have a baby.’ I tell them, yes if you get crazy like the girl sitting out front, you’ll probably have a baby. So, for that reason I got them the vaccine.”

Participants often discussed the importance of such parent-child interactions. Mothers in both countries frequently and proudly discussed educating children about safe sex, figuring vaccination as a way to amplify the protection this offered. For example, one participant in Mexico stated, “What I really want is to protect her from everything, and I think that vaccines are like a shield, right? A way to protect them in the future.” When asked if prevention was important to her, she replied, “Yes, yes. To explain a lot about every topic, every disease. It’s very important, I’d say.” For most study partici-

pants, vaccination and sex education were complementary activities that reduced future risk, rather than promoting promiscuity.

Side effects—a negligible concern

There was an even lesser effect from the American discourse about relationships between vaccination and health problems like autism. Participants never raised the issue of autism in Mexico, and only one mother in the United States linked it to children’s vaccinations. She said, “Many times the vaccines make [children] sick with autism.” However, she discussed this concern with the doctor providing the HPV vaccine, felt that her fears were allayed, and got her daughter vaccinated. Interview participants in both countries reported concern about other side effects of vaccination in general, but did not characterize these as barriers. Several participants described doctors’ monitoring of children for allergic reactions after penicillin shots as evidence both that injections could have side effects, and that doctors were providing good care to mitigate those risks.

Following health provider recommendations

In this section, we discuss a key trend that influenced mothers’ decision making in light of the above-mentioned concerns—their overwhelming trust in health professionals. Interview participants in both countries generally did what health care workers suggested, despite desiring more information about side effects, vaccines, and the diseases they prevented. For example, a US mother said, “Look, this vaccine did concern me because I didn’t have sufficient information and I wonder why there are three doses and what the side effects are and all that. I still have questions.” However, she got her daughter vaccinated without asking for answers. Participants sometimes asked for further information but generally emphasized the health provider’s recommendation and accepted the vaccine regardless of that information’s depth or specificity. For instance, one mother said that when she decided to vaccinate her daughter for HPV, “I asked to see the pamphlets and for information about side effects. But really I was interested in the doctor’s opinion.” A mother in Mexico voiced similar questions, which received a general answer that she nevertheless found satisfactory. She said, “The nurses explain things well to us, they tell us it’s for prevention.” Others who accepted medical recommendations described fuller explanations. For example, a mother in the United States said that although she always agrees with “what the doctor recommends,” she appreciates being informed about side effects. She noted, “They explain what it’s for and what it is, or sometimes there are vaccines that they tell me have effects, like

for example they gave them a vaccination that they said might give them fevers. Whatever the case, I'm in agreement." In the broader survey, 50% of the women in Mexico whose daughters had not been vaccinated ($n = 6$) indicated that they needed more information about the vaccine (as compared with 48% in the total study population). In the United States, 60% of the participants with unvaccinated daughters ($n = 6$) felt they did not have enough information to make a decision, as compared with 65.1% in the total study population (Table 3). These interview findings suggest that such lacks refer to health providers' failures to make or explain recommendations.

The only interview cases in which lack of information appeared to preclude vaccination were those in which mothers did not know about the HPV vaccine and their daughters were not offered it. All the mothers of unvaccinated daughters who heard about the vaccine through our study said that they hoped for more information and, given widespread trust in health institutions, said they would likely get their daughters vaccinated even if this information were not forthcoming. One US mother, who said her low level of literacy made her unable to read the clinic's informational materials and who did not think that her daughter had been vaccinated for HPV, said that, "I don't understand this vaccine well ... because of that, I have some questions." Nevertheless, she thought she would likely accept it if it were offered at her daughter's next visit.

Their overwhelming acceptance of vaccination in the face of varying levels of information reflected trust in the institutions that served their children. Another US participant said, "I've always trusted in the doctors ... I say, if they're giving [my kids] something it's because it's good for them." Similarly, a mother in Mexico stated that she might be wary of vaccinations from private sources, but trusted state health professionals because, "It's the IMSS, right?" This trust enabled mothers to feel secure in accepting vaccinations that they did not fully understand. When asked why she had vaccinated her daughter given that in the survey she responded that she "did not have enough information" about the HPV vaccine, a participant in the United States explained that knowing and understanding what to do were different things. She said had been, "Sure, yes. Informed, no." In this way, participants in both countries adhered to medical advice regarding children's vaccinations despite a commonly shared feeling that they did not have enough information.

DISCUSSION

This study revealed great similarities between Mexican-born mothers' attitudes toward HPV vac-

ination for their daughters in 2 cities in the United States and Mexico. Participants in both countries viewed vaccines in general and the HPV vaccine quite positively. This finding mirrors prior results from studies with US-based Latinas and extends them to a specifically Mexican population.^{10,13-15} Given this attitude, lack of information about HPV or the vaccine almost never deterred study participants from accepting the vaccine when it was offered. This finding is also congruent with previous studies of (multinational) Latinas in the United States,^{18,19} but diverges somewhat with an earlier study from Mexico that showed women with low levels of HPV knowledge willing to vaccinate themselves but less willing to vaccinate their daughters.²⁶ The facts that study participants in both countries reported high levels of trust for the medical institutions that served their children, and that the Mexican government now provides HPV vaccination for girls, might explain this increased willingness to vaccinate despite lack of knowledge.

Also in contrast with prior findings from a border city in Mexico, in which about a third of mothers voiced concerns about religion or promiscuity,²⁶ participants in Cuernavaca, Mexico, saw vaccinating daughters for HPV as universally desirable and did not raise religious or sexuality-related concerns. This difference might similarly reflect the imprimatur of vaccination programs, and might also reflect local cultural mores. Before vaccination became standard, Cuernavaca-based research on acceptability of daughters' participation in an HPV vaccine study similarly found mothers to be unconcerned about religious inappropriateness or vaccine-induced promiscuity.²⁵ Our findings regarding vaccine acceptability in Mexico similarly reflect the opinion of mothers in the central Mexican city of Cuernavaca, whereas mothers in the border city of Juarez voiced opinions more similar to US-based critiques of vaccination.

Although all mothers in Mexico found the HPV vaccine socially unproblematic, a small group of US-based participants expressed fears that vaccination might encourage promiscuity or early puberty. Rather than causing them to reject vaccination, this belief led a few mothers to desire it at a slightly later age, as has been found with urban US Latinas.¹⁸ Thus, these concerns were not significant barriers to vaccination. In fact, mothers in both countries identified concerns about the health risks of young people's sexual experimentation as an important reason for vaccination, as found in a prior study of low-income, US minority parents.¹¹ However, the fact that these concerns were nonexistent in the Mexico study population but did arise in the US-based group suggests that American

acculturation might introduce social barriers to HPV vaccination, supporting prior findings from a Latino/a population in the Northeast,²² even though some degree of acculturation is needed to access US health care services.²¹ Interestingly, one of the US mothers who voiced concerns about promiscuity developed them only after she was unable to pay for the HPV vaccine she initially desired. This case suggests that social concerns about vaccination might sometimes mask, or be a symptom of, structural barriers to vaccination. Because this issue might be concealed in survey research focusing on parents' currently stated reasons for not vaccinating children, further research is needed to investigate relationships between parents' ability to access vaccination and their fears of its negative social consequences.

In the context of general social support for HPV vaccination, structural barriers represented the main reason daughters went unvaccinated in both Mexico- and US-based study populations. No participants rejected the HPV vaccine because they thought it was unnecessary or harmful, and all participants voiced a desire for daughters to be vaccinated before they began to have sex. Although a few US mothers desired slightly later vaccination, mothers always planned to accept vaccination when it was offered to their daughters. This reflects both mothers' positive opinion of vaccines in general, and their reports that they almost always trusted and followed health care providers' recommendations. Given these factors, the only mothers in either country who did not plan to ever vaccinate their daughters were those who believed they had been turned away by health care providers, and mothers of unvaccinated daughters overwhelmingly identified lack of opportunity to vaccinate as a key barrier. These binational findings extend prior results suggesting that being offered HPV vaccination at no or low cost is key for US Latina^{10,17} and Mexican²⁷ mothers' uptake of vaccination for their daughters.

Study limitations

Specific study limitations influence these findings and their generalizability. Participants recruited while obtaining preventative health care for children might view vaccination, including for HPV, more favorably than parents who do not seek such care. Similarly, study participants may be especially likely to be medically compliant by virtue of agreeing to participate in this research; many mothers reported that wanting to know more about HPV and vaccination was a key reason they decided to participate in our study. Although we tried to interview an equal number of women who had and had not vaccinated their daughters, this subsample may not be representative of the larger study pop-

ulation, or of Mexican-born women living in the United States or Mexico. This was not meant to be a population-based study, but rather an exploration of the knowledge, attitudes, and practices regarding HPV vaccination among a sample of Mexican mothers in Oxnard and Cuernavaca. Future research should compare the experiences of Mexican and Mexican-American mothers who do not seek or cannot access routine pediatric care, as their beliefs and practices may differ. Although study results may not be generalizable to that population, or to rural families, they demonstrate key shared attitudes regarding and commonly experienced barriers to daughters' vaccination among Mexican-born mothers living in urban areas of Southern California and central Mexico who use preventative pediatric health care.

CONCLUSION

Our findings of the structural rather than social barriers associated with lack of HPV vaccination in both the United States and Mexico suggest that a few simple changes in health care provision could increase vaccine coverage. Because mothers almost universally followed health care providers' recommendations and found cost-free HPV vaccinations acceptable for daughters, ensuring that mothers are offered the vaccine would result in increased uptake. In Mexico, the vaccine should be offered to girls at age 9 to catch those missed by school-based programs. In the United States, health care providers should offer vaccination to age-eligible Mexican-American girls and specify whether the cost would be covered by insurance, Medicaid, or the Vaccines for Children Program. Ensuring that the vaccine is provided in these ways would increase coverage in a group of girls whose mothers appear favorably disposed to accept HPV vaccination, especially when offered by health care workers.

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