

A Pilot Study: HPV Infection Knowledge & HPV Vaccine Acceptance among Women Residing in Ciudad Juárez, México

John Moraros¹, Yelena Bird¹, David D. Barney¹, Sasha C. King¹, Matthew Banegas¹, Enrique Suarez-Toriello²

¹*New Mexico State University*

²*FEMAP/SADEC & Hospital de la Familia*

Abstract

The human papillomavirus (HPV) is one of the most common sexually transmitted infections (STI) in the world and it is associated with cervical cancer. The development of a prophylactic HPV vaccine has proven effective in clinical trials and it is now available to the public. The HPV vaccine represents a viable prevention strategy against cervical cancer. However, parental preferences, perceptions, and willingness to use the HPV vaccine are crucial, and if not assessed accurately, may threaten the successful implementation of a broad HPV vaccination program. This pilot study explored the views of 60 adult, Mexican women, all of who were mothers of female children between the ages of ten to 14 years old on the following four areas of interest: HPV knowledge; HPV vaccine knowledge and attitudes; barriers to HPV vaccine use; and potential uses and side effects of the HPV vaccine. Only 7% of respondents knew that HPV was a virus or STI. Eighty-six percent had not heard of the HPV vaccine, but 62% felt that the HPV vaccine would prevent HPV infection. However, 38% said the church would not approve of the HPV vaccine use for 10-14-year-old girls. Twenty-seven percent thought that promiscuous behavior would increase following HPV vaccination. Overall, respondents had very little knowledge of the HPV vaccine, were willing to be vaccinated themselves (83%), but were lesser willing to vaccinate their daughters (63%). Ultimately, understanding the beliefs about and identifying the barriers of HPV vaccine use will influence the effectiveness of the vaccine and its potential impact in reducing cervical cancer incidence rates worldwide.

© 2006 Californian Journal of Health Promotion. All rights reserved.

Keywords: HPV vaccine, acceptability, adolescents, parents

Introduction

The human papillomavirus (HPV), a ubiquitous sexually transmitted virus is widely recognized as the most common sexually transmitted infection (STI) and cause of genital warts in the world (Rathus, Nevid & Ficher-Rathus, 2002). In the US alone, there are almost 20 million total cases of HPV with approximately 5.5 million new cases of HPV infections reported each year (Davis, Dickman, Ferris, & Dias, 2004). Genital HPV infection can cause genital warts and cervical cell abnormalities that produce abnormal Pap tests. Additionally, it is associated with various types of anogenital cancers, the most important of which is cancer of the cervix. While rates of HPV are high among all age

groups, the highest rates of HPV infections are seen in women 18-28 years old (Slomovitz et al., 2006).

Most genital HPV infections do not cause disease, but instead remain asymptomatic and clear up on their own without treatment, usually within one year. However, several epidemiological studies have shown that persistent infections with certain types of HPV are a necessary risk factor for the development of invasive cervical cancer (Bosch & Munoz, 2002; Munoz et al., 2003; Kjaer et al., 2002). Based on such studies, genital HPV types have been largely classified into two groups; the high-risk HPV types (mainly HPV 16 and 18) and the low-risk HPV types (mainly HPV 6 and 11),

reflecting their potential risk to induce invasive cancer. The high-risk types are widely acknowledged to be the cause of preinvasive cervical disease (i.e., cervical dysplasia or cervical intraepithelial neoplasia) and invasive cervical cancer (Walboomers et al., 1999).

Currently, there is no cure for HPV infection; therefore, once infected a person is infected for life. Prevention of HPV has been largely limited to intervention strategies promoting abstinence, monogamous sexual relations between uninfected individuals, and condom utilization during sexual encounters (Davis et al., 2004). The recent development of a prophylactic HPV vaccine with proven effectiveness in clinical trials, has given hope of reducing incidence of HPV and cervical cancer worldwide.

Koutsky and colleagues (2002) provided evidence of a highly efficacious vaccine against HPV 16 infection. In a three-dose regimen of the HPV-16 vaccine, incidence of both HPV 16 infection and HPV 16-related cervical intraepithelial neoplasia were reduced. Additionally, the incidence of persistent HPV 16 infection was 0 per 100 woman-years at risk in the vaccine group, compared to 3.8 per 100 woman-years at risk in the placebo group.

Furthermore, Villa and colleagues (2005) have demonstrated the effectiveness of a quadrivalent HPV (type 6, 11, 16, and 18) L1 VLP vaccine. In an efficacy trial of this quadrivalent HPV vaccine, combined incidence of persistent HPV 6, 11, 16, or 18 infections and their associated genital disease was reduced by 90% in women in the vaccine group, compared to those assigned to the placebo group. The proven effectiveness of the HPV vaccines in clinical trials to date suggests that HPV vaccination may represent a viable preventive strategy in the fight against cervical cancer.

However, while a vaccine that prevents HPV and cervical cancer has clear advantages, there are potential risks and adverse effects associated with vaccines, in addition to social and personal barriers that need to be overcome, if the population at large is to accept and use the HPV vaccine. Parental preferences and perceptions of the HPV vaccine are crucial, and if not assessed

accurately, may threaten the successful implementation of a widely encompassing vaccination program.

Therefore, the purpose of this pilot study was two-prong: (1) assess the willingness of women, residing in the border city of Ciudad Juárez, Mexico, to use the HPV vaccine; evaluate their perceptions about the HPV vaccine, especially as it pertained to use with their 10-14-year-old daughters; and determine potential barriers to vaccine acceptance and compliance, and (2) use the respondent responses to develop appropriate research questions for the main study. This pilot research project represents a preliminary foray in our understanding of HPV vaccine acceptance and perceptions among Mexican women residing in a metropolitan US-México border city. This topic has not been previously investigated in this region.

Methods

Study Setting

The present study was conducted in Ciudad Juárez, México. Ciudad Juárez stands on the Rio Grande (Río Bravo del Norte), across the US border from its sister cities of El Paso, Texas and Las Cruces, New Mexico. The three cities form a bi-national metropolitan area of approximately 2.5 million people, divided by the Rio Grande, making it the largest bi-national metropolitan area on the US-Mexico border. Ciudad Juárez is a growing industrial city in the state of Chihuahua and represents the fifth largest city in México with a population of approximately 1.4 million inhabitants, 58% of whom are reported to be women (INEGI, 2000).

Survey Respondents

A cross sectional descriptive pilot study was conducted to examine women's HPV infection knowledge and HPV vaccine acceptance in Ciudad Juárez, Mexico. After approval was received from the institutional review boards at New Mexico State University and Hospital de la Familia, patients were randomly selected to complete a survey on HPV knowledge and attitudes towards use of an HPV vaccine. The sampling frame consisted of approximately 180 women with female children between the ages of 10-14 years old; of whom, every third of three

were systematically selected for inclusion in the study. Respondent recruitment occurred during regularly scheduled obstetrics and gynecology visits to Hospital de la Familia during the months of January through March 2006. During the visit, potential respondents were approached by a social worker to determine their willingness to take part in the survey. Only four prospective respondents declined to complete the survey; with three women citing time restraints and the fourth one expressing uneasiness and embarrassment over the topic.

The study respondents were assured of anonymity and confidentiality and were requested to complete a 25-item, multiple choice questionnaire. The questionnaire was originally adapted from a previous study examining barriers to Pap smear screening practices among Hispanic women (Pinzon-Perez et al., 2005). The first part of the questionnaire collected sociodemographic information. The second part assessed their knowledge concerning HPV infections and determined their degree of acceptance of an HPV vaccine, both for themselves and their 10-14-year-old daughters.

Results

Sociodemographic Characteristics

The survey sample was composed of 60 adult women, ages 24 to 52 with a mean age of 30.2 years. The majority, 62% were married (n=37) with the remaining 13% being divorced/separated, 12% living with an intimate partner, 10% single, and 3% widowed. All respondents were currently living in Ciudad Juárez and had lived in the city for an average of 27.8 years. The majority, 95% of respondents had been at their current Ciudad Juárez home for twelve or more months (n=56).

Most respondents (67%) self identified as a homemaker (n=40) and had on average, 7.7 years of schooling. The mean weekly family income for respondent families was 1,346 pesos (approximately \$122 US dollars). This income supported households of four individuals in the majority of cases (73%). However, for 22% of the respondents, their family income supported on average seven individuals, and only 5% constituted single households (Table 1).

Table 1
Demographic information (N = 60 respondents)

Characteristics	N (%)	Mean ± SD
Median age, years	39	40.2±11.4
Sex		
Female	60 (100)	
Race		
Hispanic	60 (100)	
Median family weekly income, pesos	1,000	
Education, years completed	8	7.7±3.2
Marital status		
Married	37 (61.7)	
Divorced/separated	8 (13.3)	
Widowed	2 (3.3)	
Never been married	0 (0.0)	
Living with intimate partner	7 (11.7)	
Years lived in Ciudad Juárez	30	27.8±15.5

HPV Knowledge

It is worthy to note that only two of the respondents self reported knowing very much about HPV. Whereas the remaining respondents were equally divided between self-reporting knowing “a little” about HPV (n=29), and the other half as knowing “very little or nothing at all” (n=29). Only a few identified specifically what they knew about HPV. Of those, merely 7% knew that HPV was a virus or STI and that it was transmitted during sexual intercourse with a man. Yet, eighty-six percent knew that HPV somehow hurts a woman’s body. Of the few respondents (n=20) who described how HPV hurts women, 85% stated that the virus generally harms the body, while only 15% stated that HPV causes cervical cancer. Interestingly, an equal proportion of the respondents thought that HPV harmed women more than men (33%); harmed men more than women (33%); or thought HPV affected both women and men equally (33%).

HPV Vaccine Knowledge & Attitudes

Eighty-six percent of the women respondents had not heard of the HPV vaccine (n = 50). However, 63% of all respondents stated that they know advantages of being HPV vaccinated and identified four potential benefits of the HPV vaccine. The largest number of respondents, 62% felt that the HPV vaccine would prevent

HPV infection. Nine percent felt that if vaccinated they would feel less worried, 8% stated that the vaccine would protect them against the virus, and another 8% declared that if vaccinated they would live longer and healthier lives. Only 4% thought there were no advantages to the HPV vaccine, while 9% did not know of any possible advantages.

By comparison, when the respondents were conversely asked if they knew of any disadvantages to HPV vaccination, 83% stated either “no” or “do not know” about any disadvantages of the HPV vaccine and the remaining 17% stated that they knew about HPV vaccine disadvantages. When this last subset of respondents was asked for specific disadvantages, 7% felt that the HPV vaccine may influence women to stop getting Pap tests; 4% stated that the vaccine had not yet been approved or distributed; 4% stated that the vaccine may not work; and 2% stated it would increase promiscuity among women.

The majority of respondents (83%) stated that they would be willing to be immunized with an HPV vaccine (n=49). By comparison, 7% said no to HPV immunization; 2% said maybe; and, 8% said they did not know whether they would be willing to be immunized (Figure 1).

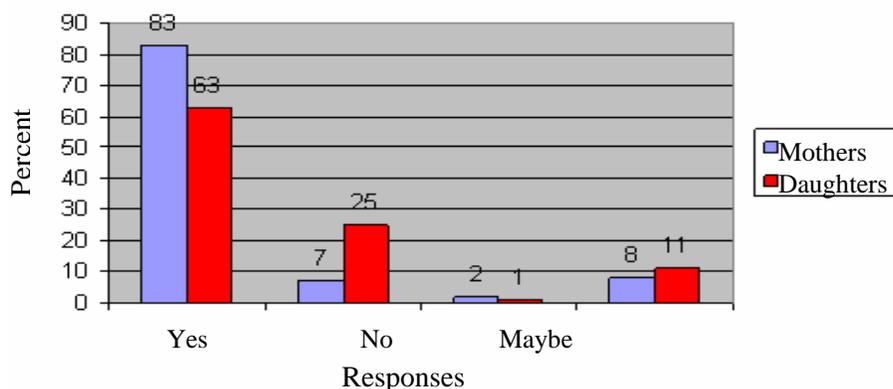


Figure 1
Comparison of the willingness of mothers to use the HPV vaccine for themselves as opposed to their daughters

Reasons for vaccine use included respondents identifying HPV immunization as critical to disease prevention and as essential to an individual's good health. In so far as identifying reasons for not using the HPV vaccine were concerned, they mainly centered on the issues of potential religious objections, socio-cultural beliefs, and fear of adverse effects of the HPV vaccine.

When asked to conjecture about a woman's feelings when receiving the HPV vaccine, 41% of the respondents felt that the woman would be embarrassed or ashamed (n=24), 22% thought the woman would feel good about herself because she would be protected against HPV, 16% thought she would feel scared or bad, 12% thought she would feel normal or nothing out of the ordinary, and 9% did not know.

Respondents were asked about their feelings and possible intended behaviors regarding HPV immunization of (their) 10 to 14 year-old daughters. Sixty-three percent stated that they would immunize their girls (n=38), while 25% said no to HPV immunization, 1% said maybe, and the remaining 11% were undecided (Figure 1). The most common response in favor of the HPV vaccine use among 10-14-year-old girls was expressed by 68% of the respondents, who stated that it would protect and prevent disease (n=28). Additionally, 15% stated that they would use the vaccine if it was recommended by a physician.

By comparison, of those respondents who were against use of the HPV vaccine (n=15), 33% said their girls were too young, another 33% said their girls do not need the vaccine, 26% said they need more information and education about the HPV vaccine, and 7% said they did not know. Interestingly, the majority of the mothers (58%) felt that HPV immunization would not lead their daughters into earlier initiation of sexual activity (n=35), while 27% thought it could, and the remaining 15% were not sure or did not know. Additionally, the majority of the mother respondents (75%) felt that vaccination of their 10- or 14-year-old girls could not wait (n=45), while 19% felt that HPV vaccination

could wait until their daughters were at least 18 years old.

HPV Vaccine & Potential Barriers

Respondents were asked to identify attitudes and potential barriers to HPV vaccine use. When asked about the church's approval for use of the HPV vaccine with 10 to 14 year-old girls, 38% said the church would not approve (n=23), an equal number (38%) said the church would approve, 20% did not know (n=11), and 5% said that the church has nothing to do with it. For the 23 respondents who offered a positive opinion, the majority (64%) thought that the church would be in favor of the HPV vaccine for young girls because the church wants what is best for the people and another 31% noted that in recent years, the church has becoming more tolerant and accepting in it's views.

Other opinions reflected a negative perception regarding the church's attitude. Specifically, of the 23 respondents who thought the church would not approve of the HPV vaccine use with young girls, 47% offered that the church's beliefs conflict with medicine and science, 25% said the church does not approve of premarital sex, 22% said the church does not want the HPV vaccine used by its followers because it may increase promiscuity, and 9% said that 10-14 year old children are too young to receive such a vaccine.

On the question of how they would respond, if the church were to oppose use of the HPV vaccine, 34% said that they would support the church's decision (n=20), while 59% said they would be against the church's decision. Of the 20 respondents who offered an opinion in support of a decision by the church not to use the HPV vaccine, 66% said they would do so because the vaccine is not beneficial and 33% offered that there are other ways to protect yourself and children against HPV. By comparison, the reason given most often by the 36 respondents for refusing to follow a possible anti-vaccine use mandate by the church was identified by 56% of the respondents to be the fact that the HPV vaccine was best for their child's health (n=20), with another 24% stating that it saves lives and prevents disease.

Perceptions of the Potential Uses & Side Effects of the HPV Vaccine

Perceptions of the potential uses and side effects of the HPV vaccine were also identified. Surprisingly, 55% of the respondents thought that women who were vaccinated for HPV would not feel protected from cervical cancer (n=33) (Figure 2), whereas only 29% thought that vaccinated women would believe that they were protected against the disease. Similarly, the majority (68%) thought that vaccinated women would not believe that the HPV vaccine would protect them against other STIs (n=41), while 20% thought that it would.

When asked about a woman's potential increase in sexually promiscuous behavior (including a potential increase in the number of sexual partners and an increase in unsafe sex practices, such as lack of condom utilization) following HPV vaccination, 27% thought that promiscuous behavior would increase (n=16) (Figure 2), and

68% thought that it would not. Related, only 14% of the respondents felt that STIs served as a deterrent or punishment for promiscuous people (n=8), while the remaining 86% felt that it does not.

The respondents were particularly concerned about the possible side effects of the HPV vaccine. The main concern expressed by 19 of the respondents, centered on their fear of potentially contracting an HPV infection and developing cervical cancer as a consequence of receiving the HPV vaccine (32%) (Figure 2). On the other hand, 53% thought that the vaccine was safe and believed that its use would help reduce their likelihood of getting cervical cancer (n=32). When respondents were asked if they trusted public health officials, the medical establishment, and pharmaceutical companies about the efficacy of the HPV vaccine, 66% said yes (n = 39), 22% said no, and 12% were not sure.

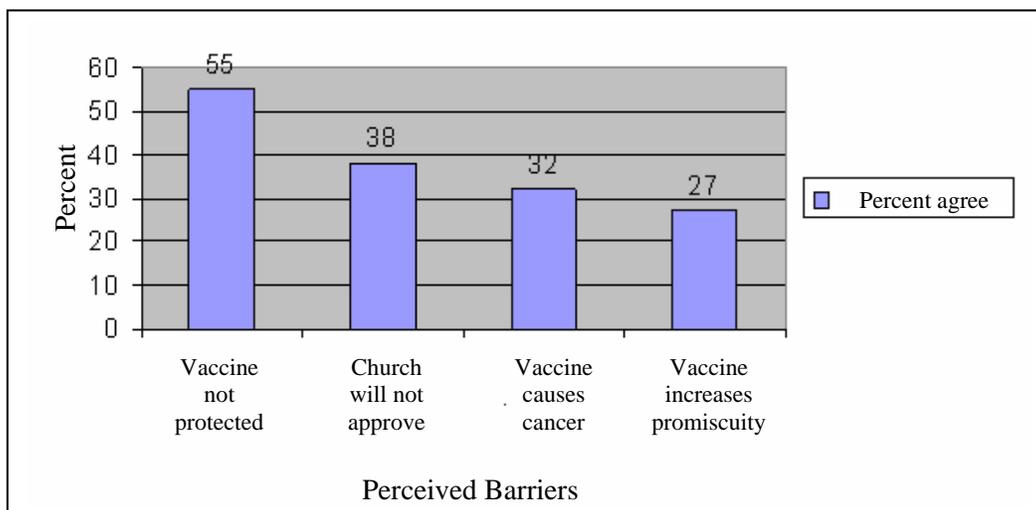


Figure 2
Perceived barriers to HPV vaccine use*

*There were no statistically significant differences in the patterns of acceptance of the HPV vaccine when respondents were grouped by age, marital status, number of children, educational level, income, and other sociodemographic characteristics.

Discussion

For an HPV vaccination program to be successful, the vaccine must not only be effective in preventing disease, but it must also be widely accepted and used by the public. In the present study, there was a disappointingly low level of knowledge and understanding of HPV and the HPV vaccine by the majority of the respondents (96% and 86%, respectively). On the other hand, and despite their admittedly limited knowledge, the majority of the respondents expressed a general willingness to either be vaccinated themselves (82%) or vaccinate their daughters (63%) with the HPV vaccine.

While studies examining respondent perceptions with regard to HPV vaccination are limited, several researchers have found that health beliefs like concerns about the efficacy of the vaccine, uncertainty about vaccine safety, fear of potential vaccine side effects and religious objections were generally associated with vaccination programs (Taylor et al., 2002; Zimet, Liao & Fortenberry, 1997). Likewise, in this study cohort, the reasons for not accepting the HPV vaccine included lack of efficacy (4%), fear of potential increased promiscuous behavior by vaccinated female teens and women (23%), religious beliefs (34%), and adverse effects, that included a surprisingly 32% of the respondents fearing that if vaccinated they may contract an active HPV infection and end up developing instead of averting cervical cancer in the future.

It has been widely stated in the literature that increased knowledge and awareness of a particular disease and its concomitant vaccine have proven to be important determinants of people's health beliefs and practices (Bodenheimer, Fulton & Kramer, 1986). Thus, given the low level of knowledge and understanding of HPV and the HPV vaccine by the overwhelming majority of our respondents, it is suggested that an HPV public health campaign and educational intervention aimed at our female population of interest would increase their acceptance of the HPV vaccine for themselves and especially for their young daughters.

In fact, Davis and colleagues (2004) studied a similar population of respondents (mothers of young children ages 10-15 years old) and they discovered that initially only 55% of the mothers were willing to accept the HPV vaccine for their children. However, after an educational intervention, the number of mothers willing to have their children vaccinated increased to 75%. Similarly, a study conducted by Lazcano-Ponce and colleagues (2001) in Cuernavaca, México, demonstrated that upon receiving an explanation on how possibly an HPV vaccine may prevent cervical cancer in their daughters, 84% of the women respondents said that they would allow their teenage daughters to be vaccinated. These studies emphasize the important role that public health educational interventions could play in preparing our population for the wide implementation and acceptance of the HPV vaccine.

In this study, potential religious objections, socio-cultural beliefs, and adverse effects of the HPV vaccine were identified as the main limiting factors to its wider acceptance and usage. Similarly, Bodenheimer and colleagues (1986) found the main factor determining respondents' willingness to be vaccinated with the hepatitis B vaccine was their fear of contracting the actual disease. Yet other researchers have shown that religious objections and socio-cultural beliefs, especially against STIs are a major determinant of whether vaccines against these infections are accepted by the public (Jackson et al., 1995; Zimet et al., 1997). If in fact that's the case, an STI vaccine such as the HPV vaccine, in a predominantly Catholic country like México, may be met with unique barriers and unexpected resistance.

Resistance to an HPV vaccination program may arise because in Latin America, there is a well-known socio-cultural stigma associated with sexual behavior and STIs. This is especially true in México, where information and education pertaining to sexual behaviors, practices, and STIs are not widely acknowledged or made readily available (Blanc & Way, 1998).

It is worthy to note that many of the potential barriers to the HPV vaccine will be unlike the

ones encountered in other vaccination programs. One such unique barrier reported in this study was parental apprehension to vaccinate their 10-14-year-old daughters against a STI (i.e., HPV). Therefore, even though 83% of the mother respondents were willing to receive the HPV vaccine for themselves, only 63% expressed a similar willingness to vaccinate their young daughters. This substantial difference in HPV vaccine acceptance was mainly attributed to the maternal belief that their daughters were not sexually active and therefore, did not need to be vaccinated at such a young age (25%). This belief appears to be quite prevalent among Mexican parents despite well documented evidence that points to a trend of sexual initiation at younger ages among their adolescent children (Pisani et al., 2000). Thus, the major question for many parents would be whether vaccination of their daughters for HPV might be perceived as condoning sexual intercourse at a younger age.

Another distinct barrier to the HPV vaccine especially among the heavily Catholic Hispanic populations examined by this study appeared to be whether or not the church would endorse the use of the HPV vaccine. Given the previous stands of the Catholic church against any and all premarital sexual relations and the potential fears shared by some within the Catholic community in regard to the HPV vaccine either encouraging its young followers to engage in sexual relations early on in their adolescent lives and before marriage or providing safe haven to promiscuity; it will be interesting to see on which side of the HPV vaccine issue, the official Catholic church position would weigh in and what kind of impact on vaccine acceptance this decision would have on its followers.

References

- Blanc, A. K., & Way, A. A. (1998). Sexual behavior and contraceptive knowledge and use among adolescents in developing countries. *Studies in Family Planning*, 29, 106-116.
- Bodenheimer, H. C., Fulton, J. P., & Kramer, P. D. (1986). Acceptance of hepatitis b vaccine among hospital workers. *American Journal of Public Health*, 76, 252-255.
- Bosch, F. X., & Muñoz, N. (2002). The viral etiology of cervical cancer. *Virus Research*, 89, 183-190.

Conclusions

Hence, even though the potential to reduce cervical cancer mortality through the introduction of a viable HPV vaccine is an exciting and promising idea, currently approved for use in the US by the Food and Drug Administration (Food & Drug Administration News, 2006), many questions and obstacles still remain before its successful implementation on a grand international scale. It is quite evident from this study that the effectiveness of such a vaccine on the US-México border will largely depend on the willingness of the mainly Hispanic population of interest to accept and use the HPV vaccine. However, experience with existing vaccines has demonstrated reluctance to accept immunization, even among those populations at risk (Zimet, Liao & Fortenberry, 1997). Thus, future public health educational initiatives not only need to increase awareness and understanding of HPV and the HPV vaccine among this vulnerable and yet uninformed population but must also specifically address many of the barriers cited by the women in this study through the design and implementation of culturally appropriate interventions.

Finally, there were several limitations to this study. First, this was a pilot evaluation and our sample size was limited (N=60), making it difficult to make generalized inferences to the population at large. Second, the instrument used had not been rigorously tested for validity and reliability. Third, the instrument most likely did not address all the potential barriers of why women may choose not to use the HPV vaccine for themselves and their young daughters. Nonetheless, this study does provide much useful insight into potentially unique barriers faced by women residing on the US-México border and offers promise and direction to future public health initiatives.

- Davis, D., Dickman, E. D., Ferris, D., & Dias, J. K. (2004). Human papillomavirus vaccine acceptability among parents of 10- to 15-year-old adolescents. *Journal of Lower Genital Tract Disease*, 8, 188-194.
- Food and Drug Administration (FDA). (2006). FDA licenses new vaccine for prevention of cervical cancer and other diseases in females caused by human papillomavirus. Retrieved July 7, 2006, from <http://www.fda.gov/bbs/topics/NEWS/2006/NEW0385.html>
- Jackson, D. J., Martin, H. L., Bwayo, J. J., Nyange, P. M., Rakwar, J. P., Kashonga, F. et al. (1995). Acceptability of HIV vaccine trials in high-risk heterosexual cohorts in Mombasa, Kenya. *AIDS*, 9, 1279-1283.
- Kjaer, S. K., van den Brule, A. J. C., Paull, G., Svare, E. I., Sherman, M. E., Thomsen, B. L. et al. (2002). Type specific persistence of high risk human papillomavirus (HPV) as indicator of high grade cervical squamous intraepithelial lesions in young women: Population based prospective follow-up study. *British Medical Journal*, 325, 572-578.
- Koutsky, L. A., Ault, K. A., Wheeler, C. M., Brown, D. R. Barr, E., Alvarez, F. B. et al. (2002). Controlled trial of human papillomavirus type 16 vaccine. *New England Journal of Medicine*, 347, 1645-1651.
- Lazcano-Ponce, E., Rivera, L., Arillo-Santillán, E., Salmerón, J., Hernández-Avila, M., & Muñoz, N. (2001). Acceptability of a human papillomavirus (HPV) trial vaccine among mothers of adolescents in Cuernavaca, Mexico. *Archives of Medical Research*, 32, 243-247.
- Muñoz, N., Bosch, F. X., de Sanjose, S., Herrero, R., Castellsague, X., Shah, K. V. et al. (2003). Epidemiologic classification of human papillomavirus types associated with cervical cancer. *New England Journal of Medicine*, 348, 518-527.
- Pisani, E., Cuchí, P., Zacarías, F., Schwartlander, B., Stanecki, K., Castilho, E. et al. (2000). HIV and AIDS in the Americas: An epidemic with many faces. Geneva, Switzerland: Joint United Nations Programme on HIV/AIDS (UNAIDS).
- Rathus, S., Nevid, J., & Ficher-Rathus, L. (2001). *Human sexuality in a world of diversity* (5th ed.). Toronto, Ontario: Allyn and Bacon.
- Slomovitz, B. M., Sun, C. C., Frumovitz, M., Soliman, P. T., Schmeler, K. M., Pearson, H. C. et al. (2006). Are women ready for the HPV vaccine? *Gynecologic Oncology*. In Press.
- Taylor, J. A., Darden, P. M., Brooks, D. A., Hendricks, J. W., Wasserman, R. C., & Bocian, A. B. (2002). Association between parents' preferences and perceptions of barriers to vaccination and the immunization status of their children: A study from pediatric research in office settings and the National Medical Association. *Pediatrics*, 110, 1110-1116.
- Villa, L. L., Costa, R. L. R., Petta, C. A., Andrade, R. P., Ault, K. A., Giuliano, A. R. et al. (2005). Prophylactic quadrivalent Human Papillomavirus (Types 6, 11, 16, and 18) L1 virus-like particle vaccine in young women: A randomised double-blind placebo-controlled multicenter phase II efficacy trial. *Lancet Oncology*, 6, 271-278.
- Walboomers, J. M. M., Jacobs, M. V., Manos, M. M., Bosch, F. X., Kummer, J. A., Shah, K. V. et al. (1999). Human papillomavirus is a necessary cause of invasive cervical cancer worldwide. *Journal of Pathology*, 189, 12-19.
- Zimet, G. D., Liao, A., & Fortenberry, D. (1997). Health beliefs and intention to get immunized for HIV. *Journal of Adolescent Health*, 20, 354-359.

Acknowledgments

The project described was supported in part by grants from the Paso del Norte Health Foundation through the Center for Border Health Research and New Mexico State University through the Office of the V.P for Research. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the Paso del Norte Health Foundation, the Center for Border Health Research or New Mexico State University.

The authors would like to offer a special thanks to Dr. Gustavo Martinez, General Director, Dr. Victor Fernandez, Medical Director, Dr. Perez Kan, Director of the Ob/Gyn Neoplasia Clinic, and all the dedicated personnel at the Department of Social Work at Hospital de la Familia for their invaluable contributions to this project. Additionally, our outmost gratitude is extended to Adriana Pena, Director of Investigations, SADEC/FEMAP for her outstanding coordination of the project and to Dr. Jeffrey Brandon, Dean, Dr. Larry Olsen, Associate Dean, and Robert Buckingham, Professor, of the College of Health & Social Services at New Mexico State University for their sage and caring mentorship. Finally, the authors would like to submit their outmost respect and deep appreciation to all the participants for their enthusiastic cooperation, which makes all of our public health efforts worthwhile.

Author Information

John Moraros, MD, MPH, CHES*
Associate Professor
Department of Health Science, MSC 3HLS
College of Health & Social Services
New Mexico State University
P.O. Box 30001
Las Cruces, NM 88003 USA
Ph.: 505-646-6058
Fax.: 505-646-6166
E-Mail: johnmoraros@yahoo.com

Yelena Bird, MD, MPH
David D Barney, PhD, MSW, MPH
Sasha C. King, BA
Matthew. Banegas, MS, BA
Department of Health Science
New Mexico State University

Enrique Suarez-Torillo, MD
Executive Director
SADEC/FEMAP

* corresponding author