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Toward a model of HPV vaccine series completion in adolescent Hispanic males: Identifying mothers' salient behavioral, normative and control beliefs

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Abstract

HPV vaccine series completion among adolescent Hispanic males (35%) is lower than the *Healthy People 2020* 80% goal. This directed qualitative content analysis identified mother's beliefs about their sons completing the series. We found that mothers (N=19): 1. Express positive feelings; 2. Believe the vaccine has positive effects; 3. Identify the father, and doctor as supporters and friends as non-supporters; 4. List health insurance, transportation and clinic reminders as facilitators and 5. Mention affordability as a barrier to vaccine completion. Results provide guidance for interventions. Increasing HPV vaccination among boys will decrease the overall incidence of HPV in this population.

Keywords

Cancer Vaccines; Papillomavirus Vaccines; Hispanic Americans; Adolescent; Mothers

Certain human papillomavirus (HPV) types can cause penile, anal and oropharyngeal cancer in males. This includes types 16 and 18 which cause the majority of HPV-associated cancers (~63%) and types 31, 33, 45, 52 and 58 that are responsible for an additional four percent [1–6]. As compared to females, the prevalence of high-risk oral and genital HPV is higher among males [7]. Other HPV types (6 and 11) are responsible for an estimated 90% of cases of genital warts [6]. Fortunately, the introduction of the HPV vaccine series has greatly increased our ability to prevent cancers caused by these HPV types [8–10].

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Vaccinating all eligible males is especially important given the rise in the incidence of HPV-caused oropharyngeal cancer in the US and the fact that the incidence of this type of cancer is higher among males [11,12]. In 2009, the Food and Drug Administration approved the HPV vaccine for use in males between the ages of 9 and 26[6]. In 2011 the Advisory Committee on Immunization Practices recommended vaccination with the Gardasil vaccine [6]. The *Healthy People 2020* goal is an 80% HPV vaccine completion rate among all adolescents [13]. However, according to the 2015 National Immunization Survey, the vaccine initiation rate among Hispanic males between the ages of 13 and 17 was an estimated 58.9% and the completion rate was 35% [14]. Given the low rate of vaccine series completion, it is clear that we need to increase our efforts to raise HPV vaccine series completion, among adolescent Hispanic males.

Research on HPV vaccine uptake among adolescent Hispanic males indicates that a doctor's recommendation, a doctor's visit in the last year, older age, awareness of the vaccine and lower income predict vaccine uptake [15,16]. Further, among foreign born parents, those born in Mexico (compared to other countries) are less likely to have had a son who initiated the HPV vaccine series and less acculturated parents were less likely to vaccinate due to a lack of awareness about the vaccine[17]. However, there is less research examining the factors that influence HPV vaccine series completion among this population. Some studies have found that clinic reminders, awareness that males can be vaccinated against HPV and having vaccine information might increase vaccine completion [18,19]. It is necessary to continue to identify factors that are specifically related to completion because researchers have found that factors influencing uptake and completion, at least in females, differ [20].

The first step toward developing an effective intervention is to build a theory-based behavioral model. The *Integrative Model of Behavioral Prediction* (IM) [21,22] proposes that engaging in any given behavior can be predicted by: an individual's intention to engage in that behavior, possession of the necessary skills and abilities to engage in that behavior, and a lack of environmental constraints to engaging in the behavior. According to the IM, behavior change is achieved through identifying the most salient beliefs associated with a behavior and developing intervention messages that target those beliefs. The three belief constructs include behavioral, normative and control beliefs. *Behavioral beliefs* are composed of experiential attitudes (i.e., perceived positive and negative feelings about the behavior) and instrumental attitudes (i.e., perceived positive and negative effects of the behavior). *Normative beliefs* encompass perceived supporters and non-supporters of the behavior in question. That is, those are perceived to agree or disagree that the individual should engage in the behavior. *Control beliefs* are perceived behavioral facilitators and barriers. Beliefs vary by culture and should be identified by conducting elicitation interviews with the population of interest [23]. Therefore, the purpose of this study is to identify the salient beliefs Hispanic mothers hold about having their sons complete the HPV vaccine series.

METHODS

Participants.

From May 2014 through January 2015, we conducted in-depth elicitation interviews with Hispanic mothers of adolescent boys between the ages of 11 and 17. Participants were recruited from community sites including community centers and clinics in Houston, TX. Eligibility criteria included identifying as Hispanic or Latino, Spanish as the primary language and having a son between 11 and 17 years of age who had received at least one dose of the HPV vaccine. Experts suggest conducting elicitation interviews with a sample composed of participants who have and have not engaged in the target behavior[23]. We achieved data saturation at 19 interviews. Our sample consisted of six mothers of boys who had received one dose of the HPV vaccine, five mothers of boys who had received two doses of the HPV vaccine, and eight mothers of boys who had received three doses.

Procedure.

Potential participants were approached at the community sites in Spanish, and provided with a brief description of the study. We explained the purpose of the study, eligibility criteria, the length of the interview and the incentive amount. Women who met the eligibility criteria and were interested in participating, provided written informed consent. The majority of the participants were interviewed at the recruitment sites, but when that was not possible, research staff conducted the interview at the participant's home, in a quiet room that allowed for privacy and where it was quiet enough to allow for audio-recording. The recruitment sites included three community centers and two clinics. Each of the sites allowed the research team access to a private, quiet room where the interview could be conducted and recorded. Before the interview, participants completed a brief demographic survey that included mother's age, country of birth, marital status, and level of education. The interviews were then conducted and audio-recorded by female research staff. Each interview lasted between 20–35 minutes. Participants were compensated $20 for their participation. All procedures were approved by the Institutional Review Board at the University of Texas Health Science Center-Houston (HSC-SPH-13–0594).

Interview Guide and Data Analysis.

The interview guide consisted of a series of open-ended questions. Its development was guided by previous research conducting elicitation interviews to discover underlying beliefs, as described by the IM [24–28]. This research provided guidelines and suggestions regarding the wording of the interview questions. As such, our interview guide consisted of questions that identified participants' behavioral, normative and control beliefs related to having their sons complete the vaccine series (Table 1). Four questions elicited behavioral beliefs associated with vaccine completion. Two of the four questions identified experiential attitudes (i.e., positive and negative feelings about vaccinating) and the remaining two questions elicited instrumental attitudes (i.e., positive and negative effects of vaccinating). Two questions elicited normative beliefs (i.e., who would support vaccination and who would not support vaccination). The final two IM items elicited control beliefs (i.e., barriers and facilitators to vaccinating). Additional probes were prepared in case they were needed. However, during the coding process we noted that they were infrequently employed. As

suggested [25], we pilot tested the interview guide with five mothers from the population of interest in order to ensure comprehension and clarity of the questions.

We followed Middlestadt and colleagues' recommendations for collecting and analyzing qualitative interview data [29].The interviews were transcribed verbatim by a Spanish-speaking transcriptionist. Given that the purpose of the study was to identify mother's beliefs about having their sons complete the HPV vaccine series, our research design was a content analysis. Specifically, we employed directed qualitative content analysis [30] to rank the beliefs mentioned and to select the most salient beliefs. This type of content analysis is appropriate when the goal is to validate an existing theory [30]. It is recommended for elicitation interview studies [29] and qualitative studies employing the IM and conceptually-related Theory of Planned Behavior [25]. We employed the Framework Method [31] to analyze these data. The primary author first read through the transcripts and developed a list of codes for positive and negative experiential attitudes (i.e., behavioral beliefs), positive and negative instrumental attitudes (i.e., behavioral beliefs), behavioral supporters and non-supporters (i.e., normative beliefs) and behavioral facilitators and barriers (i.e., control beliefs), respectively. Codes were created by assigning concepts to key words or phrases regarding a particular belief. Similar key words and phrases were then grouped and named with a particular code. After developing the codes, independent coders, including the primary author, then examined the text for the pre-determined codes. The second and third coders were instructed to note any additional codes that they believed should be considered for inclusion. They marked the quote(s) they believed were associated with any additional codes. Then, the potential codes and their associated quotes were discussed by all three coders and a consensus regarding their inclusion was reached. This process resulted in the addition of one code "clinic hours" which was listed as a behavioral facilitator (i.e., control belief). As prescribed by the Framework Method [31], the primary author then developed a spreadsheet with matrices for each interview question in which participant's responses/quotes were entered into the rows and the codes were entered in adjacent columns at the top. Each coder received a copy of the spreadsheet and read each response and marked the cells under each code as appropriate. All discrepancies between the coders' theme counts were examined, discussed and resolved. The frequencies and percentages for the theme counts were calculated to determine the majority responses for each construct and select the most salient beliefs. As suggested by Francis and colleagues [25,32], the most salient beliefs were defined as, at minimum, the top 75% of beliefs mentioned.

In order to maintain qualitative rigor, we were guided by the model of trustworthiness' four components: credibility, transferability, dependability and confirmability [33]. To establish credibility, we employed a peer examination strategy [34]. The co-author (CCC) carefully reviewed and discussed the coding process with the primary author. We established transferability by employing the same data collection methods to investigate HPV vaccine series completion among Spanish-speaking Hispanic mothers of girls and obtained similar findings [35]. In order to establish dependability we have carefully described the research methods to ensure that our study is auditable [33]. Finally, we employed triangulation [36] to establish confirmability. More specifically, we employed method triangulation, investigator triangulation and data source triangulation. We collected quantitative data and confirmed the association of the beliefs with HPV vaccination in this population (i.e., method

triangulation). The associated manuscript is in preparation. Four of the authors (AMR, CCC, BTM and FLC) were involved in the study from its inception in order to provide multiple observations and perspectives (i.e., investigator triangulation). We collected data from both mothers who had and mothers who had not yet had their sons complete the HPV vaccine series (i.e., data source triangulation). This allowed us to gain insight into the behavior from two different perspectives (those who had engaged in the behavior and those who had not).

RESULTS

Demographics.

The mean age of our 19 participants was 42.3 years (*SD*= 6.0 years) with the majority over 40 years of age (Table 2). Most participants were married or living with a partner (68.4%), did not complete high school (73.7%) and were foreign-born (94.8%) with a mean of 19.3 years living in the United States (SD= 9.2 years). Over half (57.9%) had sons between the ages of 13 and 14 years. All of the sons were covered by health insurance with 89.6% covered by a government funded/subsidized plan. Approximately 42% of the sons had received all three doses of the vaccine with the remaining having received either one or two doses (31.6% and 26.3%, respectively).

Behavioral Beliefs.

Experiential attitudes (positive and negative).—The most often mentioned positive feelings included: *good* (34.8%), *happy* (17.4%), *at ease* (13%) and *secure* (13%). Mothers stated that they would feel *good* because their sons would have all of the required doses. *"I felt good because I said to myself, 'Now he has all of the vaccines that are required for the series.'"* Others stated that they would feel *happy* because the vaccine series would protect him from HPV. "*I will feel happy when I finish the vaccine series because it will help him avoid HPV." At ease*, was another positive feeling expressed by mothers and was attributed to the belief that completing the vaccine series would prevent their son from getting HPV. "*I felt at ease after completing the vaccine series, because it is best to prevent HPV."* Feeling more *secure* about their son's future health was the fourth most frequently mentioned positive feeling associated with having him complete the HPV vaccine series. "*I felt more secure about his health after he completed the vaccine series."*

Almost 80% of the mothers reported no negative feelings about having their sons complete the vaccine series. Mothers who responded "no negative feelings" elaborated that this was because the vaccine would help ensure good health. "*Not one negative feeling. There are no negative feelings if the vaccine keeps him healthy."*

Instrumental attitudes (positive and negative).—The most frequently mentioned positive effects included: for *protection* (28.6%), for *prevention* (28.6%) and the *vaccine is good for his health* (23.8%). Mothers explained that completing the vaccine series would *protect* their sons from HPV. "*Well, I know that by completing the series he will be protected. At least he will be protected from HPV."* Those who responded *prevention* said that vaccine series would prevent illnesses or cancer: "*A positive effect is the prevention of a sexually transmitted illness. Also, the vaccine will prevent him from getting cancer."*

Mothers who responded that the *vaccine is good for his health often explained that they believed* that their son would enjoy better health as a result of the vaccine: "*Well, it was the same as when he received the other two doses, I believe that the vaccine is good for his health."*

No negative effects (88.2%) was the most common response when mothers were asked to describe negative effect of vaccinating. *"Negative effects? I don't believe that there are any and vaccinating against HPV is something that I will not regret. I will not regret having prevented my son from giving someone else the human papillomavirus or contracting it from someone else."* Mothers often explained that having their sons complete the HPV vaccine series would only have positive health effects.

Normative Beliefs.

Supporters.—The most salient supporters of HPV vaccine series completion were: the *son's father* (31.4%), the *son's mother* (28.6%) and the *doctor* (20%). The son's father was mentioned most frequently as a supporter of completing the vaccine series. *"My husband, my child's father, supports completing the vaccine series. As his parents we watch over the health of our child to make sure that he is well and maintains good health."* Mothers often elaborated that it was their responsibility to make the decision to have their sons complete the vaccine series for his health. "*I made the decision myself. As the mother, I am the one who makes decisions for my children."* Doctors were mentioned as supporters because they recommended vaccination against HPV. "*The doctor. He told me about the vaccine, explained it to me and said that vaccinating my son was a good thing to do."*

Non-supporters.—Most mothers (73.7%) did not identify any non-supporters, but a small percentage (15.8%) identified their friends as non-supporters. This pattern of responses suggests that these mothers did not have anyone discouraging or not supporting vaccination and that it would not matter if someone did. *"I believe that no one would discourage me from vaccinating him. Besides, I am the only one who will make that decision for my son."* Some mothers' also mentioned that their friends did not support vaccination because they had inaccurate information about the vaccine. "*My friends, the misinformed ones, always say that it could damage him in certain areas of his personal life. But I don't listen to them. I simply tell them that vaccinating is my decision and they must respect it."* Other mothers explained that those friends believed that vaccinating was unnecessary. *"Sometimes friends comment, they say 'No, why would you vaccinate him if he doesn't need the vaccine?' But once you read the information in the brochures and such…Perhaps this is what they need. They haven't received information about the vaccine and they feel unsure about vaccinating their sons."*

Control Beliefs.

Facilitators.—The four most salient facilitators to vaccine completion included: *health insurance* (39.3%), *transportation* (17.9%), scheduling *vaccination appointments* (10.7%) and *vaccine reminders* (7.1%). One mother said, "*Well, for me it was easy to vaccinate because he has Medicaid. But if he did not have health insurance then it would be difficult to vaccinate him because I do not have the means necessary to pay for that vaccine."* Regarding

transportation, one mother stated, *"Having a way to get to the clinic makes completing the vaccine series easier."* Transportation as a facilitator was followed by having a scheduled vaccination appointment for the next dose in the series. *"Having a scheduled appointment with the doctor to vaccinate him would make it easier to complete the vaccine series."* Finally, receiving clinic reminders about upcoming vaccine doses was the fourth most frequently mentioned facilitator of vaccine series completion. *"For me it would be easier if the clinic remind me or sent me a notification message so that I can have it in mind that he needs one more dose of the vaccine to complete the series."*

Barriers.—The top three barriers to vaccine completion included: *nothing* (25%), no *health insurance* (25%) and *cost of the vaccine* (13%). Several mothers stated that there were no barriers to having their son complete the HPV vaccine series. "*No, there was nothing that made vaccinating him difficult."* However, other mothers mentioned that if their son did not have health insurance at the time when the next vaccine dose was due, completing the vaccine series would be difficult. *"My son not having health insurance and having to wait until he has health insurance would make it difficult to complete the series."* The majority of responses regarding the *cost of the vaccine* were related to the mother being unable to cover the cost of the vaccines out-of-pocket. *"Well, I say that it is money, not having money that would make it hard to complete the series because then I would have to pay for the HPV vaccine myself."*

DISCUSSION

This qualitative elicitation study identified the behavioral, normative and control beliefs held by Hispanic mothers about having their adolescent sons complete the three dose HPV vaccine series. Our findings can be used to develop quantitative survey items which will allow researchers to better understand what factors predict vaccine series completion in this population. In addition, the beliefs we identified add to the literature regarding the types of intervention messages that may help increase vaccine series completion in this population.

Mothers' experiential attitudes (i.e., positive and negative feelings) were all positive. *Good*, the most mentioned feeling, related to complying with the recommendation about the number of doses needed. The remaining positive feelings (i.e., happy, at ease and secure) were associated with the health benefits of the vaccine. These findings support existing research that Hispanic parents are generally accepting of the HPV vaccine [37,38]. They also provide guidance for intervention messages and suggest that it is more important to reinforce and increase the positive feelings identified rather than focusing on reducing negative feelings since negative feelings do not appear to be as salient for vaccine series completion in this population. Future research should investigate the relative importance of the feelings identified in order to determine which should be addressed in interventions.

The most often mentioned instrumental attitudes (i.e., positive and negative effects) were all positive. Mothers believe that completing the vaccine series will offer protection from HPV and cancer and that it provides health benefits. Negative effects of vaccination were not salient in this population, suggesting the once the series is initiated, concern about side effects is minimized. Our findings suggest reinforcing the health benefits of completing the

HPV vaccine series and incorporating the terms “prevention”, “protection” and the “vaccine is good for his health” in intervention messages. This is supported by research showing that a focus on vaccine benefits is associated with greater vaccination intentions [39].

For Hispanic mothers of adolescent boys, the son’s father was the most mentioned supporter of HPV vaccine series completion. The importance of fathers in HPV vaccination decisions is supported by existing research [40]. However, this is the first study to show that their support is important for vaccine completion in adolescent boys, as it is for vaccine completion in adolescent girls[35]. This suggests that the role fathers play in decision-making should be taken into account. One strategy is to have intervention messages reinforce that fathers do support vaccine series completion. Findings also suggest that intervening with fathers might increase vaccine completion in this population.

Existing literature supports the importance of perceiving that the doctor supports HPV vaccination [16,41]. As such, reinforcing the belief that doctors recommend vaccine series completion may increase the likelihood of completion. Also, increasing the mother’s belief in her role as a supporter of vaccine series completion may increase her self-efficacy and the likelihood that her son completes the vaccine series.

Mothers’ friends was the second most common response when asked about non-supporters after “no one”. However, mothers often elaborated that their friends’ opinions would not change their belief that completing the series was the best thing to do. Existing research among mothers of girls is consistent with our finding of friends as non-supporters of vaccination [40]. Future research should investigate the importance of friends’ lack of support for mothers of boys. The current findings suggest that interventions should emphasize likely supporters of vaccination and, to a lesser extent, develop messages to counter the potential influence of friends’ perceived lack of support.

Lacking health insurance and having to pay for the vaccine were the second and third most frequently mentioned perceived or potential barriers after “no barriers”. Existing research supports the association between vaccination and vaccine affordability (i.e., having health insurance coverage or vaccine availability for free or at a low cost) [38]. The final two facilitators to vaccine series completion were related to the vaccination appointment itself. Mothers mentioned that having a scheduled vaccination appointment and a clinic reminder about the upcoming appointment facilitated vaccine series completion. There is support for the influence of vaccine reminders on vaccination rates [42]. However, this is the first study to identify the importance of having a vaccination appointment. Interventions should raise awareness among these mothers that the health insurance cover the cost of the vaccine. Further, even is their child’s coverage lapses, programs such as *Vaccines For Children* cover the cost of the vaccine for eligible uninsured and underinsured children. Interventions should also reinforce the importance of making vaccination appointments and provide mothers with strategies to remember and keep upcoming appointments. In addition, health care providers should be encouraged to send appointment reminders. Finally, as evidenced by our “no barriers” finding, many mothers did not encounter obstacles to vaccination. This suggests a need to further explore the difference between perceived and actual barriers to HPV vaccination.

There are some limitations to the study. First, given that we only interviewed Spanish-speaking Hispanic mothers of boys, our results may not be generalizable to English-speaking Hispanic mothers, mothers with high levels of acculturation, or to non-Hispanic mothers. Mothers whose primary language is English or who are highly acculturated, may have different salient beliefs than the mothers we interviewed in the current study. Also, our study participants resided in an urban area; therefore, our results may not reflect the beliefs of mothers who live in rural areas and have more limited transportations or clinic options and thus may experience more barriers to accessing the HPV vaccine. Interviewing fathers was beyond the scope of our study, so our findings may not reflect the beliefs of fathers. Mothers are more likely than fathers to make medical decisions and attend clinic visits with their minor children, so it is possible that their beliefs, attitudes and experiences differ in significant ways[43–47]. These other populations may have different salient beliefs that need to be identified and addressed by future interventions. Also, as with research of this nature, there is the possibility of social desirability bias on the part of the respondent. In order to limit the effects of this bias, interviewers received training on how to engage with participants and conduct the interview in such a way as to ensure that participants felt comfortable sharing their beliefs. Finally, there is the possibility of interviewer bias. To minimize this bias, we employed a structured interview guide and provided interviewers with in-depth training.

CONCLUSION

This is the first study to examine Spanish-speaking Hispanic mothers' beliefs about having their sons complete the HPV vaccine series using the Integrative Model. We found generally positive feelings toward having their sons complete the HPV vaccine series and a belief that completing the series would positively affect the health of their sons. Fathers and doctors were generally viewed as being supportive of the son completing the series. We also found evidence that having health insurance, transportation, and receiving a clinic reminder as facilitators to vaccine completion. Future research should confirm our results and expand the research scope to identify the salient beliefs fathers and explore their role in vaccinating their sons against HPV. It should also examine if and how beliefs differ depending on whether the mother has a son, daughter or both and how this influences HPV vaccine series completion. This will facilitate the development of HPV educational interventions for both parents. Our findings provide important guidance for the development of interventions for Spanish-speaking Hispanic mothers of adolescent boys. Ultimately, effective theory-based interventions have the potential to reduce the burden of HPV-associated cancers in the Hispanic population.

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References

1. Amano K. International Agency for Research on Cancer. IARC monograph on biological agents: a review of human carcinogens. Lyon, Fr Int Agency Cancer Res. 2012;100.

2. Forman D, de Martel C, Lacey CJ, et al. Global burden of human papillomavirus and related diseases. Vaccine. 2012;30 Suppl 5:F12–F23. doi:10.1016/j.vaccine.2012.07.055. [PubMed: 23199955]
3. FDA. Highlights of Prescribing Information Gardasil 9 (human Papillomavirus 9-Valent Vaccine, Recombinant). Silver Spring, MD; 2014.
4. Serrano B, Alemany L, Tous S, et al. Potential impact of a nine-valent vaccine in human papillomavirus related cervical disease. Infect Agent Cancer. 2012;7(1):38. doi:10.1186/1750-9378-7-38. [PubMed: 23273245]
5. Saraiya M. Population-Based HPV Genotype Attribution in HPV-Associated Cancers. Atlanta; 2015.
6. Markowitz LE, Dunne EF, Saraiya M, et al. Human papillomavirus vaccination: recommendations of the Advisory Committee on Immunization Practices (ACIP). Morb Mortal Wkly Rep. 2014;63(RR-05):1–30. http://www.ncbi.nlm.nih.gov/pubmed/25167164.
7. Mcquillan G, Kruszon-moran D, Markowitz LE, Unger ER, Paulose-ram R. Prevalence of HPV in Adults Aged 18 – 69 : United States, 2011–2014. NCHS Data Brief. 2017;(280):2011–2014. https://www.cdc.gov/nchs/data/databriefs/db280.pdf.
8. Markowitz LE, Dunne EF, Saraiya M, Lawson HW, Chesson H, Unger ER Quadrivalent Human Papillomavirus Vaccine: Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Recommendation Report 2007; 2007.
9. Howlader N, Noone AM, Krapcho M. et al. SEER Cancer Statistics Review, 1975–2008. Bethesda; 2011 http://seer.cancer.gov/csr/1975_2008/.
10. Joura EA, Giuliano AR, Iversen O-E, et al. A 9-Valent HPV Vaccine against Infection and Intraepithelial Neoplasia in Women. N Engl J Med. 2015;372(8):711–723. doi:10.1056/NEJMoa1405044. [PubMed: 25693011]
11. Jemal A, Simard EP, Dorell C, et al. Annual report to the nation on the status of cancer, 1975–2009, featuring the burden and trends in human papillomavirus (HPV)-associated cancers and HPV vaccination coverage levels. J Natl Cancer Inst. 2013;105(3):175–201. doi:10.1093/jnci/djs491. [PubMed: 23297039]
12. Chaturvedi AK, Engels EA, Pfeiffer RM, et al. Human papillomavirus and rising oropharyngeal cancer incidence in the United States. J Clin Oncol. 2011;29(32):4294–4301. doi:10.1200/JCO.2011.36.4596. [PubMed: 21969503]
13. U.S. Department of Health and Human Services O of DP and HP. Healthy People 2020 [Internet]. D.C http://www.healthypeople.gov/node/3527/objectives#4654.
14. Reagan-Steiner S, Yankey D, Jeyarajah J, et al. National, Regional, State, and Selected Local Area Vaccination Coverage Among Adolescents Aged 13–17 Years - United States, 2015. Morb Mortal Wkly Rep. 2016;65(33):850–858. doi:10.15585/mmwr.mm6533a4.
15. Reiter PL, Brewer NT, Gilkey MB, Katz ML, Paskett ED, Smith JS. Early adoption of the human papillomavirus vaccine among hispanic adolescent males in the united states. Cancer. 2014;120(20):3200–3207. doi:10.1002/cncr.28871. [PubMed: 24948439]
16. Reiter PL, McRee AL, Pepper JK, Gilkey MB, Galbraith KV., Brewer NT. Longitudinal predictors of human papillomavirus vaccination among a national sample of adolescent males. Am J Public Health. 2013;103(8):1419–1427. doi:10.2105/AJPH.2012.301189. [PubMed: 23763402]
17. Kepka D, Ding Q, Bodson J, Warner EL, Mooney K. Latino Parents' Awareness and Receipt of the HPV Vaccine for Sons and Daughters in a State with Low Three-Dose Completion. J Cancer Educ. 2015;30(4):808–812. doi:10.1007/s13187-014-0781-0. [PubMed: 25572463]
18. Alexander AB, Stupiansky NW, Ott MA, Herbenick D, Reece M, Zimet GD. What parents and their adolescent sons suggest for male HPV vaccine messaging. Health Psychol. 2014;33(5):448–456. doi:10.1037/a0033863. [PubMed: 24588632]
19. Roncancio AM, Ward KK, Carmack CC, Munoz BT, Cano MA, Cribbs F. Using Social Marketing Theory as a Framework for Understanding and Increasing HPV Vaccine Series Completion Among Hispanic Adolescents: A Qualitative Study. J Community Health. 2017;42(1):169–178. [PubMed: 27624345]

20. Dorell CG, Stokley S, Yankey D, Markowitz LE. Compliance with recommended dosing intervals for HPV vaccination among females, 13–17 years, National Immunization Survey-Teen, 2008–2009. Vaccine. 2012;30(3):503–505. doi:10.1016/j.vaccine.2011.11.042. [PubMed: 22119587]
21. Fishbein M, Cappella JN. The role of theory in developing effective health communications. J Commun. 2006;56(SUPPL.). doi:10.1111/j.1460-2466.2006.00280.x.
22. Fishbein M, Yzer MC. Using theory to design effective health behavior interventions. Commun Theory. 2003;13(2):164–183. http://www.scopus.com/inward/record.url?eid=2-s2.0-0042287842&partnerID=40&md5=37b540ffc4fea67eebd99efd80b0516f.
23. Montaño D, Kasprzyk D. Theory of Reasoned Action, Theory of Planned Behaviour, and the Integrated Behavioral Model; 2008. doi:10.1016/S0033-3506(49)81524-1.
24. Fishbein M. The role of theory in HIV prevention. AIDS Care. 2000;12(3):273–278. doi:10.1080/09540120050042918. [PubMed: 10928203]
25. Francis AJJ, Eccles MPM, Johnston M, et al. Constructing Questionnaires Based on the Theory of Planned Behaviour: A Manual for Health Services Researchers; 2004. doi:0-9540161-5-7.
26. Kasprzyk D, Montaño DE, Fishbein M. Application of an integrated behavioral model to predict condom use: A prospective study among high HIV risk groups. J Appl Soc Psychol. 1998;28(17):1557–1583. http://www.scopus.com/inward/record.url?eid=2-s2.0-0032166053&partnerID=40&md5=8ef93f84b38fd2d7cf122c1aec644623.
27. Hamilton K, White KM. Identifying parents' perceptions about physical activity: a qualitative exploration of salient behavioural, normative and control beliefs among mothers and fathers of young children. J Health Psychol. 2010;15(8):1157–1169. doi:10.1177/1359105310364176. [PubMed: 20472605]
28. Tipton JA. Caregivers' psychosocial factors underlying sugar-sweetened beverage intake among non-hispanic black preschoolers: An elicitation study. J Pediatr Nurs. 2014;29(1):47–57. doi:10.1016/j.pedn.2013.06.006. [PubMed: 23871263]
29. Middlestadt SE, Bhattacharyya K, Rosenbaum J, Fishbein M, Shepherd M. The use of theory based semistructured elicitation questionnaires: formative research for CDC's Prevention Marketing Initiative. Public Health Rep. 1996;111 Suppl :18–27.
30. Hsieh H-F. Three Approaches to Qualitative Content Analysis. Qual Health Res. 2005;15(9):1277–1288. doi:10.1177/1049732305276687. [PubMed: 16204405]
31. Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. BMC Med Res Methodol. 2013;13(1):117. doi:10.1186/1471-2288-13-117. [PubMed: 24047204]
32. Ajzen Icek, Fishbein M. Understanding Attitudes and Predicting Social Behavior. Englewood Cliffs: Prentice-Hall; 1980.
33. Lincoln YS, Guba EG. Naturalistic Inquiry; 1985. doi:10.1177/1473325006070288.
34. Holloway I. Basic Concepts for Qualitative Research; 1997.
35. Roncancio AM, Ward KK, Carmack CC, Munoz BT, Cribbs FL. Hispanic mothers' beliefs regarding HPV vaccine series completion in their adolescent daughters. Health Educ Res. 2017;32(1):96–106. doi:10.1093/her/cyw055. [PubMed: 28088755]
36. Carter N, Bryant-Lukosius D, Dicenso A, Blythe J, Neville AJ. The Use of Triangulation in Qualitative Research. Oncol Nurs Forum @BULLET. 2014;41(415):545–547. doi:10.1188/14.ONF.545-547.
37. Perkins RB, Tipton H, Shu E, et al. Attitudes Toward HPV Vaccination Among Low-Income and Minority Parents of Sons: A Qualitative Analysis. Clin Pediatr (Phila). 2013;52(3):231–240. doi:10.1177/0009922812473775. [PubMed: 23362316]
38. Brewer NT, Fazekas KI. Predictors of HPV vaccine acceptability: A theory-informed, systematic review. Prev Med (Baltim). 2007;45(2–3):107–114. doi:10.1016/j.ypmed.2007.05.013.
39. Sperber NR, Brewer NT, Smith JS. Influence of parent characteristics and disease outcome framing on HPV vaccine acceptability among rural, Southern women. Cancer Causes Control. 2008;19(1):115–118. doi:10.1007/s10552-007-9074-9. [PubMed: 17952620]
40. Hertweck SP, LaJoie AS, Pinto MD, Flamini L, Lynch T, Logsdon MC. Health Care Decision Making by Mothers for their Adolescent Daughters Regarding the Quadrivalent HPV Vaccine. J

Pediatr Adolesc Gynecol. 2013;26(2):96–101. doi:10.1016/j.jpag.2012.10.009. [PubMed: 23518189]

41. Kester LM, Zimet GD, Fortenberry JD, Kahn JA, Shew ML. A national study of HPV vaccination of adolescent girls: Rates, predictors, and reasons for non-vaccination. Matern Child Health J. 2013;17(5):879–885. doi:10.1007/s10995-012-1066-z. [PubMed: 22729660]
42. Jacobson Vann JC, Szilagyi P. Patient Reminder and Patient Recall Systems to Improve Immunization Rates [Systematic Review]. Cochrane Database Syst Rev. 2005;(4).
43. Garfield CF. Fathers and the Well-Child Visit. Pediatrics. 2006;117(4):e637–e645. doi:10.1542/peds.2005-1612. [PubMed: 16585280]
44. Mehta SK, Richards N. Parental Involvement in Pediatric Cardiology Outpatient Visits. Clin Pediatr. 2002;41(10):593–596. doi:10.1177/000992280204100806.
45. Moore T, Kotelchuck M. Predictors of Urban Fathers' Involvment in their Child's Health Care. Pediatr Off J Am Acad Pediatr. 2004;113(N.3):574–580. doi:10.1542/peds.113.3.574.
46. Zvara BJ, Schoppe-Sullivan SJ, Dush CK. Fathers' involvement in child health care: Associations with prenatal involvement, parents' beliefs, and maternal gatekeeping. Fam Relat. 2013;62(4):649–661. doi:10.1111/fare.12023. [PubMed: 26405366]
47. Ahmann E. Supporting fathers' involvement in children's health care. Pediatr Nurs. 2006;32(1):88–90. http://ezproxy.lib.vt.edu:8080/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=flh&AN=MED-16572547&site=ehost-live&scope=site. [PubMed: 16572547]

Table 1.

IM belief constructs, definitions and elicitation interview questions as related to mothers' decisions to have their sons complete the HPV vaccine series.

Construct	Definition	Interview Question
Behavioral beliefs- Experiential attitude	Belief that having her son complete the HPV vaccine series leads to certain affective outcomes	Describe the positive feelings or emotions you felt/would feel about giving your son the remaining doses of the HPV vaccine. Describe the negative feelings or emotions you felt/would feel giving your son the remaining doses of the HPV vaccine.
Behavioral beliefs- Instrumental attitude	Belief that having her son complete the HPV vaccine series leads to certain outcomes	In your opinion, what are the positive effects of giving your son the remaining doses of the HPV vaccine? In your opinion, what are the negative effects of giving your son the remaining doses of the HPV vaccine?
Normative beliefs	Individuals the mother believes support and do not support her having her son complete the HPV vaccine series	Who in your life supported/would support you giving your son the remaining doses of the HPV vaccine? Who in your life did not support/would not support your giving your son the remaining doses of the HPV vaccine?
Control beliefs	Salient barriers and facilitators of having her son complete the HPV vaccine series	What are some of the things that made it/would make it easier to give your son the remaining doses of the HPV vaccine? What are some of the things that made it/would make it harder to give your son the remaining doses of the HPV vaccine?

Table 2.

Demographic characteristics of the sample (N= 19).

	N (%)
Mother's Age (Mean= 42.3, SD= 6.0)	
< 40 years of age	7 (36.8)
≥ 40 years of age	12 (63.2)
Mother's Marital Status	
Single, never married	2 (10.5)
Married or living with partner	13 (68.4)
Separated or divorced	4 (21.1)
Mother's Education Level	
Less than high school completed	14 (73.7)
Completed high school	5 (26.3)
Mother's Country of Birth	
Mexico	13 (68.4)
El Salvador	4 (21.1)
Honduras	1 (5.3)
United States	1 (5.3)
Son's Age	
11– 12 years of age	2 (10.6)
13–14 years of age	11 (57.9)
15–17 years of age	6 (31.6)
Son's Health Insurance	
Government funded/subsidized insurance	17 (89.6)
Private insurance	2 (10.5)
Son's HPV Vaccination Status	
1 Dose	6 (31.6)
2 Doses	5 (26.3)
3 Doses	8 (42.1)