

Human Papillomavirus Vaccination in Hmong-American Adolescents: A Participatory Focus Group Study

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Abstract

Background: Human papillomavirus (HPV) vaccination rates in Asian-American/Pacific- Islander (AAPI) populations are substantially lower than majority Americans. No studies have assessed HPV vaccine rates in the Hmong population, an AAPI group with increased risks of cervical and nasopharyngeal cancer. In 2015, the HPV vaccinations rates for Hmong girls and boys ages 9-17 at a Minnesota community health center (CHC) were 32% and 20%, lower than national 2017 HPV rates of 47% and 53%. This qualitative community-based participatory action research study identified multilevel barriers, facilitators, and decision-making processes about HPV vaccinations among Hmong adolescents and parents.

Methods: Bilingual community researchers recruited Hmong adolescents and their parents from a community health center, conducted eight focus groups with 12 adolescents and 13 parents. Participants also completed demographic and HPV knowledge surveys. The research team analyzed transcripts using participatory thematic analysis and identified themes using a multilevel socioecological model combined with an assets lens.

Results: Both survey and focus group results showed that Hmong adolescents and parents had low levels of HPV and HPV vaccine awareness. At the individual-level, both adolescents and parents reported concerns about side-effects and cost as reasons for not getting any type of vaccination, however they also expressed a strong desire to learn about HPV and the HPV vaccine. Community-level barriers identified included community narratives around traumatic experiences with vaccines, and facilitators included family and community connections and communications. At the institutional-level, barriers included structural constraints in health care settings, while facilitators included ease of obtaining vaccines at school-based clinics and provider authoritative decision-making. Finally, there was a range of decision-making processes between parents and adolescents and between parents and providers.

Conclusion: A linguistically and culturally-specific HPV educational program for Hmong adolescents and parents could address barriers and build on facilitators and assets to promote HPV vaccine uptake. These findings have informed the development of an eHealth application to increase HPV vaccinations in Hmong adolescents. Future research will test the feasibility, acceptability, and efficacy of culturally-tailored, multilevel HPV vaccination interventions that may provide evidence about the efficacy of culturally-appropriate education in comprehensive vaccine strategies.

Background

Human papillomavirus (HPV) is a common and serious threat to health. Nearly eighty million Americans are infected with at least one HPV strain. Of the 200 identified HPV types, twelve high-risk virus strains [1] cause nearly all cases of cervical cancer [2, 3] and are responsible for 75% of vaginal, 69% of vulvar, 63% of penile, 91% of anal, and 72% of oropharyngeal cancers.[4] In sexually active women there is an 80% lifetime risk of acquiring HPV, and HPV infection rates in men may be even higher. [5, 6] The latter may

explain the rise in anal and oropharyngeal cancer rates from 1975–2009 where rates are nearly 2.5 times greater in men than in women. [7, 8] Additionally, between 1988 and 2009, the incidence of anal and oropharyngeal cancers rose from 0.7 to 1.3 cases per 100,000 people and 1.0 to 2.5 cases per 100,000 people, respectively, in Minnesota. [9]

Among women, cervical cancer caused by HPV remains the most serious public health threat for many racial/ethnic minority populations [10], especially Hmong Americans, for whom cervical cancer is the leading cause of cancer death in women. [11] Hmong women have the highest cervical cancer incidence and mortality rates (at 36.6 cases and 10.5 cases per 100,000 people, respectively), over four times those of their non-Hispanic White counterparts (8.0 cases and 2.5 cases per 100,000 people, respectively) [11], and cervical cancer incidence and mortality rates continue to rise among Hmong women. [12] Despite this, HPV vaccine rates for Hmong children ages 9–17 are low, with reports of rates being 32% in girls and 20% in boys, which are much lower than the 2017 national rates of 47% and 53%, respectively. [13]

The reasons for low vaccination rates in Hmong adolescents is currently unknown. Studies in other cultural minority communities with HPV vaccination disparities point to a range of factors, including limited awareness, cultural or religious beliefs, limited health literacy, concerns about HPV being seen as related to the initiation of sexual activity, mistrust of healthcare providers, and provider behavior. [14–17] These findings reinforce the value of targeting health determinants beyond the individual level as a means to eliminate or reduce health disparities, [18, 19] as many multi-level factors clearly impact vaccination participation. Numerous studies have highlighted the importance of the socioecological model (SEM), developed by Bronfenbrenner in 1979, as a framework that describes how individuals' health behaviors are influenced by personal, intrapersonal, institutional, community, and societal/public policy ecologies. [20] Multilevel interventions target at least two of these levels of influence (ecologies). When carried out appropriately, multilevel interventions can forge synergistic influences that facilitate sustainable healthy behavior changes. [19] Multilevel interventions are likely needed in order to address the complexity of vaccine hesitancy for minority populations.

The gaps in the literature show that multilevel strategies to increase HPV vaccine uptake in the Hmong community are urgently needed. As part of a multilevel approach, strategies may be more effective if they reflect community assets. [18] Public health and clinical practices have traditionally used a deficit model that views members of at-risk populations as needing health services, the delivery of which are designed and implemented by non-community 'experts'. In contrast, the assets approach builds on cultural and community strengths to solve health problems. [21–29] Community-based participatory action research (CBPAR) engages community members as equal partners in the design and implementation of an intervention. Leveraging community expertise in these kinds of partnerships adds context-specific knowledge of a community's priorities and the individual and community resources available to co-produce solutions. By redressing the imbalance between the assets and deficit models, interventions are better equipped to incorporate the protective factors within a community that influence, promote, and sustain an individual's health.

The primary objective of this study was to describe key factors (barriers, facilitators, decision-making processes) that influence HPV vaccination in Hmong adolescents and parents. In order to identify these multilevel factors impacting HPV vaccination uptake in the Hmong community, the SEM framework combined with a community-based assets approach was used. This work was conducted by a community-based participatory action research (CBPAR) partnership.

Methods

Community-based Participatory Action Research (CBPAR)

This CBPAR study equitably involved all partners in the qualitative research process. Partners were the University Minnesota School of Social Work (UMN), HealthPartners Institute (HPI), and Somali, Latino, and Hmong Partnership for Health and Wellness (SoLaHmo), a community-driven research organization of Minnesota Community Care that emphasizes an asset-based approach to maximize communities' inclusion in all phases of research. The CBPAR focus group team consisted of three Hmong bilingual bicultural SoLaHmo community researchers, two non-Hmong SoLaHmo researchers, one UMN researcher, one HPI researcher, and two Hmong social work graduate students. A community advisory board (CAB) comprised of seven Hmong community members and health professionals gave input to the project's design and focus group recruitment strategies.

Sample and procedures

In 2017, Hmong adolescent and parent dyads who attended a local community health center in Saint Paul, Minnesota were recruited to participate in focus groups. A medical record query identified 434 Hmong adolescents ages 10–17 years who had and had not completed the HPV vaccine series. The Hmong community researchers sent study invitation letters to 150 families randomly selected from the patient registry to participate in the focus groups, wherein 12 of the families responded (i.e., response rate of 8.0%). Upon arrival, parents consented for themselves and their children, while adolescents provided assent. All participating adolescents were below the age of 16 and were not able to provide consent on their own. Both consent and assent were obtained verbally and in written forms. Each participant was compensated \$20 for their time. The study was approved by the University of Minnesota Institutional Review Board (#1612S01841).

Data collection

Participating adolescents and parents completed a questionnaire about demographics, HPV, and the HPV vaccine. Adolescent and parent focus groups occurred simultaneously in two separate rooms. Two bilingual community researchers facilitated four focus groups with adolescents in English (two groups

with boys and two groups with girls) and four mixed-gender focus groups with parents in Hmong language. All focus groups were audiotaped and observation notes were taken. Two semi-structured focus group guides—one for adolescents and one for parents—were used to inquire about participants' personal experiences and their perspectives of other Hmong people's experiences with any type of vaccination and with the HPV vaccine in particular (see Additional Files 1 and 2). Focus group questions were pre-tested with the CAB members and were modified for cultural appropriateness. Specific questions explored reasons to get vaccinated, reasons not to get vaccinated, and how decisions about vaccines are made in Hmong families. Both adolescent and parent focus group guides were developed for this study and have not been published elsewhere.

Analysis

The demographic information and HPV survey responses were entered into an online database and analyzed with descriptive statistics. The community researchers simultaneously translated and transcribed the audiotapes of the parent focus groups from Hmong into English. The research team analyzed the data using participatory analysis, which engages academic and community partners in collaborative analysis and interpretation of data for improved accuracy and culturally grounded insights. This approach can lead to more effective and sustainable interventions that resonate with communities while being grounded in science. [30–32] The three Hmong and two non-Hmong SoLaHmo team members and one institution researcher coded the transcripts independently, engaged in a process to discuss and agree on codes, and then identified the main themes in the transcripts collaboratively. The participatory thematic analysis team used three levels of the socioecological model [20]—individual, community, and institutional—and an asset lens to organize and interpret themes and codes.

Results

A total of 12 adolescents and 13 parents participated in eight focus groups (N = 25). Youth participants were between ages 10 and 16 years, received free or reduced lunch, were born in the US, and were bilingual. Most parent participants were women, between ages 30 and 49 years, married, not born in the US, had no formal education, spoke Hmong, and spoke little English. Generally, both Hmong adolescents and parents had low levels of awareness regarding HPV or the HPV vaccine (Table 1). Themes in the four overarching categories—barriers, facilitators, decision-making processes and assets—are organized by the three levels of the socioecological model—individual, community, and institution (Table 2).

Barriers to HPV Vaccination by SEM level

Adolescent and parent participants described similar barriers to receiving vaccinations in general and the HPV vaccination specifically, although they expressed different perceptions. The most salient individual-level barrier was the low level of awareness regarding HPV and HPV vaccination, which was consistent

with both participants' survey responses. As a result, many of the focus group responses primarily centered on perceptions of and experiences with vaccinations in general. The two most common individual-level barriers to any type of vaccination were concerns about the side effects and the cost. Generally, adolescents and parents were concerned about the pain associated with any vaccination, if it was covered by their insurance and if they could afford the vaccine at all.

"...transportation isn't a big deal but cost is, because everything is money and I don't want to spend my money to be honest on [a] vaccine. I'd rather spend my money on food, to be honest." (Adolescent, Focus Group 1)

Parent participants described additional individual-level barriers to general vaccines. For many parents, access to health information regarding vaccination was challenging because they did not read or speak English.

"... the ones that take their kids [to get vaccinated] are those who are smart and more well educated. Those who understand English well... [but] for me, I don't know... the language." (Parent, Focus Group #3)

Parent participants shared their concerns about the quality of vaccines in the US, since they believed that prior to immigration to the US, the vaccines and medicines they received in their homelands or refugee camps were of poor quality. Parent participants who expressed these concerns shared their belief that vaccinations could cause shrinkage in some children's reproductive organs.

"...when we lived in Vinai (a refugee camp), when they say 'take your kids to get shots' then after that, there is no nice way to put it, but the sons, their private areas shrunk and you had to look for medicine to eat... and after that it became bigger again, so that's why some Hmong people are afraid [of vaccines]". (Parent, Focus Group #1)

Parent participants expressed their concern that they had been part of vaccine research studies in refugee camps. Finally, there was a common sentiment expressed by parent participants about only seeking medical care for their children when they are symptomatically sick.

"...if my child doesn't have any sickness then why would I go? Why would they need a shot? What if they get the shot and they start having a fever? Then you would need to find medicine for them to eat also. It doesn't fit and it's not the time, just take the sick to get fix. So if you don't have a sickness then you don't do anything and that's how some of them [Hmong parents] think." (Parent, Focus Group #3)

Participants in the adolescent focus group did not report community-level barriers and tended to express more concerns at an individual level. Parent participants, however, shared community narratives around traumatic experiences with vaccines (e.g., shrinkage of reproductive organs) when they were refugees in Thailand. These narratives form a community-level barrier for parents accepting vaccinations for their children in the US.

Both adolescents and parent participants described how not having HPV vaccinations being required for school attendance in Minnesota was an institutional barrier. Parent participants also shared that they were frustrated with the time constraint of a typical clinic visit because it limits their opportunity to engage in informative and educational discussions with their children's providers.

Moreover, during time-sensitive visits with their children's providers, parents feel like their roles are passive. They feel they are only allowed to absorb the information given to them and are not given the opportunity to inquire about the purpose of the vaccinations or if there are additional vaccinations that their children may need. Finally, parent participants shared that they feel uncomfortable and unsure of how to make decisions regarding vaccinations for their children when providers frame health decisions as opinions (e.g., starting sentences as, 'I think this vaccination will be best for your child...') rather than as a prescriptive fact (e.g., 'I give this vaccination to your child to prevent serious diseases').

"So when they [providers] talk to parents, it doesn't seem like they are using what they learned. They are using what they think to tell us... They will have to use what they learned to teach you and say, 'according to what we learned, it should be good.' Instead, they say 'we think it should be good.' This means that they are using what they think to teach you. When it's like this, you already think that it is not good, but they keep on saying that it will be good. In the end it doesn't end up being good and they don't know what to do. For Americans, they say 'sorry', but for us Hmong, 'sorry' is not okay." (Parent, Focus Group #3)

Facilitators for HPV Vaccination by SEM level

Adolescent and parent participants expressed a range of individual-level facilitators for getting vaccinations. These included a strong desire to learn about the HPV vaccination (i.e., eagerness to learn about HPV and the HPV vaccine), and for parent participants included having trust in biomedicine, reliance on providers, and a strong desire for healthy children. After the researchers shared information about the HPV vaccine with the focus group participants, both adolescent and parent participants expressed a desire for more information about HPV and the HPV vaccine. This desire to learn more about HPV and the HPV vaccine was a salient facilitator to obtaining vaccines. Parent participants shared they trusted the medical providers in the United States and relied heavily on these providers to make vaccination decisions for their children.

"I do take them [my children] to go get shots. They are given shots according to what the doctor says." (Parent, Focus Group #4)

Finally, many parent participants expressed that they wanted their children to be healthy and would initiate vaccinations if that meant protecting their children against sickness.

My husband and I are very supportive of keeping our kids healthy so we will do whatever it takes to keep our kids healthy." (Parent, Focus Group #4)

In both adolescent and parent groups, there was a strong expression of social connectedness as a community-level facilitator to promote vaccination. They described how health information and education transpired and spread in conversations with peers, family members, and community members.

"For myself, there isn't anything that comes in the way saying that it is the culture (kev cai) [when it comes to getting my kids vaccinated]. But if you have a problem... go to others [in our community] who know a little bit about it." (Parent, Focus Group #1)

Adolescent participants identified institutional-level facilitators to promote vaccination, and these were sports/extra-curricular activity prompts, health classes, and school-based clinics. Many adolescent participants expressed being involved in sports or extracurricular activities and suggested that when it came to getting their annual check-ups or evaluations, they could easily initiate the HPV vaccine at this point of care. One adolescent, who was aware of the HPV vaccine, said he learned about it in his health education class. Several adolescent participants also shared that they were receiving care at their school-based clinics.

As mentioned earlier, at the individual-level, parents' trust in medical providers is an important facilitator. At the institutional-level, providers' authoritative recommendations for parents to get their children vaccinated was the most salient facilitator in obtaining the HPV vaccine. One parent mentioned,

"...[the] vaccine is up to the doctor. If they say that we can get it, then we get it, but if they say that we can't, then even if we take the children, they won't vaccinate." (Parent, Focus Group #4)

Decision-making processes

Across all focus groups, there was a range of decision-making processes being reported, either between adolescents and parents or between parents and providers. Many parent participants described making the decisions for children when they were younger, and that they continued making decisions for their children into adolescence. This occurred despite parents' describing linguistic barriers and a lack of connection with health information. To overcome those barriers parent participants described relying on teens to interpret school health materials and, in some cases, even serving as interpreters for their parents when attending their own clinic appointments. Several teenage participants expressed they wanted a shared and collaborative decision-making process with their parents. A few adolescent participants said they made health decisions alone, with parent participants saying they deferred to their children, as the children were the ones who could get sick so they could take the responsibility of getting the vaccine. From the parent participants' perspectives, a consensus existed around parents having to trust and rely on their children for communication about health information, inherently recognizing that this is a vulnerability in their decision-making processes.

The dynamics of vaccination decision-making with providers was also raised. Many parent participants described playing a passive role with their children's providers thus heavily relying on the judgment and

decisions of medical providers. At the same time, parents also expressed wanting to play a more active and informed role in their children's vaccination decision-making process.

Discussion

To our knowledge, this is the first study to identify Hmong adolescents and parents' perceptions about the HPV vaccine and vaccinations in general. This study is also unique in that it uses the socioecological model to identify multi-level barriers, facilitators, and decision-making processes that affect obtaining HPV vaccination. By incorporating cultural considerations from an assets-based perspective, our findings and methods add to the existing literature on educational efforts around HPV and HPV vaccination. The participatory approach used in this study also reinforces the notion that these findings resonate and are supported by the affected community. Similar to other studies in cultural and ethnic minority communities, the results of this study revealed low levels of HPV and HPV vaccine awareness in the Hmong community. [33–36] This lack of knowledge highlights an opportunity for tailored, multi-level programs to leverage individual, family, community, and institutional assets, in order to increase HPV knowledge and vaccination.

In addition to lack of HPV awareness, significant individual-level barriers to HPV vaccination among Hmong adolescents and parents included concerns about side effects, costs of vaccines, historical experiences with vaccines, parent literacy levels, and cultural norms of only seeking medical care for symptomatic individuals. These findings are consistent with other studies in minority communities [37–45], and demonstrates how language literacy, health literacy, and a treatment mindset are challenges for delivering health care to Hmong patients. Other than the pain associated with an injection, specific concerns about HPV vaccine safety were not raised, although this may be due to low awareness of the HPV vaccine, and parents' concerns about safety were relevant to all vaccines. Hence, it is important to be transparent about HPV vaccine side-effects, and stress the safety and testing profile of the vaccine when communicating and educating the Hmong community. Also, the concerns raised by these parents around literacy suggest a need to use low literacy and oral messaging modes in order to successfully engage parents around HPV vaccination. At the institutional-level, improved provider-patient shared discussions about HPV and HPV vaccination are needed and should recognize that more visit time may be required with Hmong families. Additionally, providers who express vaccine recommendations as opinions (e.g., "I think") as opposed to presenting medical information as factual may contribute to concerns and ambiguity in the parent decision-making process.

The facilitators and decision-making processes identified key cultural and community assets that can be leveraged to develop effective HPV vaccination programs for Hmong families. The eagerness expressed by both adolescents and parents, particularly their desire to learn more about HPV and the HPV vaccine, suggests that HPV messages tailored to Hmong families are warranted. Parents also exhibited contradicting narratives around vaccinations, one about mistrust of vaccinations (e.g., shrunken reproductive organ concerns) and one involving a strong trust in doctors (especially if they are not being ambiguous). This incongruity suggests that in parent-provider decision-making circles, it may be pivotal

to leverage the trust and respect in doctors themselves and use that to address a lack of trust in vaccines amongst Hmong parents. As established by numerous qualitative and quantitative studies, a provider recommendation is strongly associated with the uptake of HPV vaccination. [46–52] Therefore, incorporating providers and their interactions with parents in a multilevel HPV vaccination intervention is very much warranted in the Hmong community, and more effective communication from health care providers and institutions to Hmong families should be incorporated in such interventions.

Involving school-based clinics and health education classes may also be a point of entry for a multilevel HPV vaccination intervention. Several review studies have found that school-based interventions significantly increase the uptake of HPV vaccine in adolescents. [53–55] One such prominent US school-based HPV intervention includes the “Vaccinate Before You Graduate (VBYG)” program, which provides HPV vaccinations to 12th grade students at school-based clinics in Rhode Island at no out-of-pocket costs through a contract with a licensed wholesale drug distributor. [56] However, those developing such interventions need to consider the capacity of the government, school and school-based clinics to implement such programs, and whether specific culturally tailoring would be needed in various communities.

In the context of decision-making, many of the decision-making processes were interactive between adolescents and parents and between parents and providers, which suggests that conversations about vaccinations are happening. These types of decision-making interactions are assets. Multilevel interventions should incorporate a dyadic approach that involves both adolescents and parents with providers. Parent-teen interactions around health issues in adolescence, including HPV vaccination, have received notable attention in recent research. Findings indicate that study designs engaging parents along with their children result in significantly better health outcomes. [57–61] For example, a “dyadic” design recognizes the importance of parental knowledge in the acceptability of HPV vaccination and capitalizes on the potential for parents and children to act as reciprocal health educators and co-contributors to health decisions. [62, 63] This approach is especially appropriate in the context of the Hmong community, where adolescents are already engaging with their parents in the process of health decisions as health messengers, interpreters, and even decision makers. Moreover, as noted above, shared decision-making between providers and Hmong parents and adolescents, especially where parents’ levels of literacy is a concern, is critical. Tapping into the knowledge and literacy-base of Hmong adolescents can mediate this engagement between parents and providers. Finally, it is also important to note that the professional judgement of the provider (e.g., factual vs. opinion-like recommendation) may be an important influence in Hmong parents’ decisions to get vaccinated for HPV.

Limitations

The current study has several limitations. First, the low number of participants from both adolescent and parent focus groups may not have been sufficient to reach saturation, and so, additional themes may not have emerged. Future evaluations with a larger sample might present a greater diversity of views and

allow for additional analyses by characteristics, such as acculturation status, gender, age, language, and years in US. Furthermore, the low level of HPV and HPV vaccine awareness in both groups may be an artifact of selection bias. Despite the 150 eligible adolescents, it is possible that those familiar with HPV vaccine declined to participate in the focus group sessions. Responses by participants may also have been subjected to social desirability bias. Both adolescent and parent participants may have felt inclined to share socially acceptable responses in the presence of their peers and researchers. However, this issue may have been minimized by the fact that awareness of HPV and the HPV vaccine was low in both populations. Furthermore, on the advisement of the CAB, the research team did not explicitly query participants on connection between sex and HPV when participants did not mention it. This decision resulted in our not exploring other research findings that parents' views of the sexual nature of HPV transmission is a potential barrier to HPV vaccination. [40, 64–66]

Conclusion

Hmong adolescents and their parents identified barriers and facilitators to the HPV vaccine, which we mapped to the multi-level SEM. Participant barriers to HPV vaccination included low levels of HPV or HPV vaccine knowledge, concerns about side-effects both at the individual level and through community-level stories about harm from vaccinations in Southeast Asia, concerns about costs, and structural constraints in health care settings. They expressed an eagerness to learn about HPV and the HPV vaccine, desires to establish community connections and communications with health care providers. There was variability in decision-making processes, with some parents wanting institutions to require it and clinicians to give it, others wanting clinicians to recommend it, and still others wanting time to understand and discuss pros and cons of vaccinations before accepting or refusing it. Using a multi-level approach that capitalizes on Hmong adolescent, parent, and community assets may be fruitful for encouraging HPV vaccine uptake.

Declarations

Ethical approval and consent to participate

All procedures performed in the study were in accordance with the ethical standards of the University of Minnesota Institutional Review Board on Social and Behavioral Research. Informed consent and assent were obtained from all parents and adolescents included in the study.

Consent for publication

Not applicable.

Availability of data and materials

The datasets supporting conclusions of this article are not available publicly due to containing sensitive information, but are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

SX was involved in the implementation of the study, data collection, data analysis, and drafting and revising the manuscript. MYK helped in implementing the study, collecting data, analyzing data, and editing the manuscript. BV helped in implementing the study, collecting data, and editing the manuscript. KACP was involved in implementing the study, collecting data, analyzing the data, and editing the manuscript. SLP was involved in implementing the study, analyzing the data and editing the manuscript. JD helped in obtaining study approval, implementing the study, analyzing the data, and drafting and editing the manuscript. HYL conceived and designed the study and edited the manuscript. HYL is also the PI on the CDC/NCI grant funding for the project. All authors read and approved the final manuscript.

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Abbreviations

HPV: Human papillomavirus; CAB: Community Advisory Board; CBPAR: Community-based Participatory Action Research; HPI: HealthPartners Institute; SEM: Socioecological Model; SoLaHmo: Somali, Latino,

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Tables

Table 1. Participant Demographics (N=25)

Sociodemographic variables	Adolescents (N=12)	Parents (N=13)
Adolescent Age Range		
10-13	2	–
14-16	10	–
Parent Age Range		
30-49	–	7
50-69	–	6
Gender: Female	6	8
Marital Status		
Single/Separated/Divorced	–	3
Married		10
Insured with Coverage	–	11
Received Free or Reduced Lunch	11	–
Birth country		
US	7	0
Laos or Thailand	5	13
Highest Level of Education		
No Formal Education	–	7
English Language Learner (ESL/ELL)	–	5
Elementary School	5	0
Some High School	7	0
College Graduate	–	1
Speaks Hmong	12	13
Speaks English	12	3
Heard of the Human Papilloma Virus (HPV)	1	2
Heard of the HPV vaccine	3	2
HPV Vaccine Status		
None	12	–
Incomplete series (1 or 2 shots)	–	–
Complete series	–	–

Table 2. Adolescent Themes, Parent Themes and Assets organized by Levels of the Socioecological Model (SEM)

	<ul style="list-style-type: none"> ● Children facilitate communication between parents and clinics/schools/doctors ● Knowledge-base of teens 	<ul style="list-style-type: none"> ● Knowledge-base of children ● Provider authoritative decision-making 	<ul style="list-style-type: none"> ● Interactive conversations and decision-making around health
Community (Social Circles/Friends)	<p>Barriers</p> <p>(None)</p> <p>Facilitators</p> <ul style="list-style-type: none"> · Peer conversations 	<p>Barriers</p> <ul style="list-style-type: none"> · Community narrative around traumatic experiences with vaccines <p>Facilitators</p> <ul style="list-style-type: none"> · Family/community conversations 	<ul style="list-style-type: none"> · Peer/family/community conversations
Institutions (Health Care Systems, Schools)	<p>Barriers</p> <ul style="list-style-type: none"> ● HPV not required for school ● Communication methods with children 	<p>Barriers</p> <ul style="list-style-type: none"> ● HPV not required for school ● Communication methods with parents/kids ● Visit time constraints ● Parent passive engagement in health discussions with provider ● Provider framing of health decisions: fact vs. 'opinion' <p>Facilitators</p> <ul style="list-style-type: none"> ● Provider authoritative decision-making 	

	<p>Facilitators</p> <ul style="list-style-type: none"> ● Prompts for vaccines in sports/extra-curricular activity ● Education in health classes ● Education and vaccines in school-based clinics 		<ul style="list-style-type: none"> ● Institutional levers (e.g., sports/extra-curricular activities, school-based clinics) ● Provider authoritative decision-making
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Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [AdditionalFile1AdolescentFocusGroupGuide.docx](#)
- [AdditionalFile2ParentFocusGroupGuide.docx](#)