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Acceptance of Human Papillomavirus Vaccination Among Californian Parents of Daughters: A Representative Statewide Analysis

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Abstract

Purpose: To examine likelihood of parental acceptance of human papillomavirus (HPV) vaccination for young adolescent girls, together with reasons for acceptance and non-acceptance. The ultimate goal of this research is to inform policy decisions and educational planning in this area.

Methods: A random-digit-dial telephone survey of parents in California households was conducted, yielding 522 parents with an eligible daughter. Cross tabulations and odds ratios were employed to analyze likelihood of vaccination acceptability. Reasons provided for acceptance or non-acceptance were analyzed qualitatively.

Results: Overall, 75% of the sample reported that they would be likely to vaccinate a daughter before age 13. Hispanic parents were more likely to accept vaccination than were non-Hispanic parents, while African-American and Asian-American parents were less likely. Other subgroups less likely to accept vaccination were identified. Five clusters of reasons by non-accepting parents emerged: pragmatic concerns about effects on sexual behavior, specific HPV vaccine concerns, moral concerns about sexual behavior, general vaccine concerns, and denial of need. A sixth group of interest comprised those who would vaccinate before age 16 but not age 13.

Conclusions: Consistent with previous studies on this topic, a large majority of California parents endorsed HPV vaccination for daughters by the recommend age. Although important subgroup disparities were found, majorities of all subgroups supported vaccination. This information, together with the identified clusters of cognitive decision factors for non-acceptance, has implications for policy decisions and educational planning in this area. Suggestions for further research on subgroup disparities and on cognitive factors involved in parents' decisions arise from these findings.

In the United States, it is estimated that 9,700 women will be diagnosed with invasive cervical cancer and 3,700 women will die from the disease in 2006 [1]. The primary cause of cervical cancer is infection with certain types of human papillomavirus (HPV). Genital HPV infection is believed to be the most common sexually transmitted infection in California and in the United States. Young people aged 15-24 of both genders were estimated to account for three-quarters of new infections in 2000 [2]. Young people are at an especially high risk for HPV infection due to young women's increased cervical ectopy, as well as behavioral risk factors [3]. In 2000, the incidence of HPV infection among this age group, for both genders, was estimated to be 4.6 million [2]. In addition, prevalence among adolescent females has been found to range from 30 to 82% [4-6], with prevalence among males estimated to be equally high [4, 7].

A prophylactic vaccine for HPV was licensed for use in females aged 9-26 years by the U.S. Food and Drug Administration in June 2006. The HPV vaccine prevents cervical cancer precursors caused by HPV types 6, 11, 16, and 18, which are responsible for 70% of cases of cervical cancer and 90% of cases of genital warts [6, 7]. The Advisory Committee on Immunization Practices (ACIP), a 15-member expert panel selected by the Secretary of the U. S. Department of Health and Human Services, has provisionally recommended the vaccine for routine use for 11- and 12-year-old girls. The panel also has recommended catch-up vaccinations for females aged 13-26 who have not been vaccinated previously or who have not received the full vaccine series of three doses [8].

Data from the 2005 Youth Risk Behavior Survey indicate that by ninth grade, 29.3% of females and 39.3% of males report having had sexual intercourse [9]. In addition, HPV can be transmitted by direct genital contact [4, 7]. Nevertheless, a recent longitudinal study suggested that consistent condom use can reduce the risk of HPV infection [10]. Given the mode of

transmission and the commonness of HPV infection among young people, an adolescent can become infected soon after becoming sexually active [4]. Therefore, the vaccine ideally should be administered before a person becomes sexually active.

As the vaccine is targeted at young adolescents, parental acceptance of vaccination against HPV is an important consideration. Several recent studies have explored parental acceptance in the United States and in other countries. Factors identified as contributing to acceptance include benefits to society, benefits to own child, influence of peer groups, influence of physicians, personal experience with genital warts, child's age, perceptions of child's risk of infection with HPV, perceptions of disease severity, perceptions of vaccine dangerousness, and concerns about promoting an increase in risky sexual behaviors and promiscuity [11-15]. No published studies to date, however, have employed a representative sample of parents from a state or country.

Our study was designed to address three research questions, regarding: (1) levels of parental acceptance of HPV vaccination for adolescent and preadolescent daughters, (2) potential race/ethnicity and other subgroup disparities in acceptance rates, and (3) parents' reasons for acceptance or non-acceptance. The ultimate goal of this research is to inform state and local HPV vaccination-related public policy decisions and educational efforts.

Methods

The study was conducted using a subset of data from a larger statewide survey of parental opinions on sexuality education and adolescent sexual health services in California. The full-survey questions and sampling plan were developed during fall, 2005 through spring, 2006. The

survey instrument and protocol were reviewed by the Public Health Institute's Institutional Review Board and formally declared exempt as per Category 2 of 45 CFR 46.101. The protocol for obtaining informed consent followed standard telephone survey informed consent practice. The parent was read a consent script and then asked if he or she would agree to participate, with the response entered directly into the data system.

Interviewer training was presented to ten interviewers in spring, 2006 and videotaped for use with any new interviewers to be hired subsequent to the training. Two rounds of pilot-testing were conducted in spring, 2006 to assess and improve question wording and interviewer performance. This involved recording a total of 18 pilot interviews, followed by two reviewers listening to each interview and documenting potential issues in question presentation, follow-up, or comprehension. As a result of these pilot tests, some survey questions were reworded or eliminated, and additional training was provided to interviewers. Data collection took place during spring and summer, 2006.

Sampling

A random-digit-dial (RDD) survey of California parents was conducted. The sample was derived from the population of all households in California, and was classified into five strata consisting of contiguous groups of counties organized by geographic and demographic proximity. A sample from each stratum was selected using computer-generated lists of all published and non-published telephone numbers. Answering respondents were asked to enumerate the numbers of adults and children in the household. Respondents in households with any children aged 18 or younger were asked to identify a parent in the household, after which the

parent was read the informed consent script and then asked if he or she would agree to participate. Appointments were made for a follow-up if the respondent was too busy to initiate or to complete the interview at that time. Initial calls were conducted in English, and Spanish-speaking respondents were called back by a Spanish-speaking interviewer. An average of ten callbacks were made to repeated no-answers, busy phone numbers, and answering machines.

A total of 802 parents completed the interview. For consistency with the ACIP vaccination recommendations, which currently apply only to females, the three HPV questions were asked only of the subset of 522 parents (65%) with one or more daughters aged 18 or younger living at home.

An overall household response rate of .42 was calculated using the American Association for Public Opinion Research method RR3 [16]. This method represents the number of completed interviews divided by the estimated number of eligible households called, where the number of eligible households is estimated by a formula involving know-eligibles, known-ineligibles, and those of unknown eligibility. In addition, a cooperation rate of .55 was calculated, based on the number of completed interviews divided by the sum of completed interviews and other known eligibles who either refused to be interviewed, terminated the interview early, or did not complete an interview appointment. These response rates are near the maximum that can be expected for rigorous large-scale RDD surveys, and several recent studies have demonstrated that non-response bias is typically minimal in such surveys [17, 18].

To enhance statistical efficiency for regional estimates (used for locally-focused analyses on other topics not reported here), the sample was designed with higher sampling rates for the smaller strata. To compensate for the resulting difference in selection probabilities, it was necessary to prepare stratum weights to be used in analyses that pool data across strata. The

resulting design effect attributable to weighting is 1.2. Confidence intervals (.95) for full-group (n = 522) proportion estimates range between +-.04 and +-.05.

Measurement

Demographic data collected about the responding parents included age, gender, race/ethnicity, language of interview, education, household income, country of birth, religious preference, born again or evangelical Christian, frequency of attending religious services, and political leaning. All demographic questions were asked using pre-specified categories. Specific categories used are shown in Table 1.

Two closed-ended and one open-ended HPV vaccination-related questions were asked. Immediately preceding these questions, a brief introduction was read to orient the respondent to the issue:

> *HPV, or human papillomavirus, is the most common sexually transmitted infection among teenagers and can lead to cervical cancer. A vaccine against HPV is currently being developed. The HPV vaccine would be most beneficial if given before age 13, preferably before a person becomes sexually active. It could greatly reduce a woman's chance of developing cervical cancer as an adult.*

The first closed-ended question asked, *If an HPV vaccine were available, how likely would you be to have your daughter vaccinated before her 13th birthday?* The second question asked, *If an HPV vaccine were available, how likely would you be to have your daughter vaccinated before her 16th birthday?* Response options of *very likely, somewhat likely, somewhat unlikely,* and *very unlikely* were read to the respondent. If a respondent answered the

first question with very likely, then the second question was skipped and the respondent's answer to this question was assumed to be also very likely. For analysis purposes, the four response categories were condensed to *likely* and *unlikely*.

Respondents were then asked an open-ended question: *What are your reasons for feeling this way about vaccinating your daughter?* Interviewers probed for clarity as necessary, but did not probe substantively. Responses were typed into the database verbatim. Spanish language responses were later translated by a professional translator, and reviewed by a second professional translator.

Data analysis

Quantitative analyses were performed using SPSS 12.0 for Windows. Cross tabulations and odds ratios were used to assess race/ethnicity and other potential subgroup disparities, with statistical significance assed by chi-square test. Unadjusted odds ratios for accepting vaccination before age 13 were calculated for each subgroup that resulted from each of the ten categorical variables reported in Table 1. Subgroups with fewer than 25 parents were collapsed into "other" categories, and additionally for parsimony, the five political leaning categories were collapsed into three. Each subgroup was analyzed individually as a dichotomous yes/no variable, with results reflecting the difference between subgroup members versus non-members. Phi correlation coefficients among all variables, or classifications within categorical variables, were calculated to assess the level of collinearity among variables.

Qualitative analysis methods were used for the open-ended question on reasons for likelihood of acceptance. This involved open coding of data to develop substantive categories

[19, 20]. For the three vaccination acceptance categories (before age 13, before age 16 but not before age 13, not before age 16) by which we organized the open-ended responses, each of the two coauthors independently coded all responses in the two smaller categories and a sample of 30 in the larger category. Differences were discussed and resolved, and a coding dictionary was developed. The second author coded the remainder of the responses in the larger category, and the first author then reviewed these codes. All questions raised were discussed and resolved by the two authors.

Results

Sample demographics

A majority of the 522 sample parents were female (73%) and aged between 30 and 49 (70%). The largest racial/ethnic subgroups were non-Hispanic White (41%) and Hispanic (38%). Educational attainment varied widely, with 26% of parents having earned a high school diploma or GED and 41% having earned a college degree or higher. Household income also varied widely, with 33% reporting a household income below $40,000 and 43% reporting a household income above $60,000. (The 2004-2005 median household income in California has been estimated at $51,312 [21].) A majority of the parents were born in the United States (61%). Of foreign-born parents, the greatest proportion was born in Mexico (24%). Catholics represented the largest religious denomination in the sample (38%), and 22% of parents identified as born-again or evangelical Christians. A quarter of the parents reported attending religious services more than once a week, and another quarter reported attending rarely or never. Forty percent of

parents self-identified as conservative, 26% middle of the road, and 24% liberal. The demographic characteristics of the sample are presented in further detail in Table 1.

Vaccination acceptance

Overall, 75% of the sample reported they would be likely to vaccinate a daughter before age 13, while 6% reported they would be likely to vaccinate before age 16 but not before age 13, and 18% reported they would be unlikely to vaccinate before age 16. Because the vaccine has been recommended for 11- and 12-year-old girls, we further examined the characteristics of parents who were likely to vaccinate before age 13.

All variables with one or more subgroup categories showing a significant ($P < .05$) odds ratio are reported in Table 2. These include race/ethnicity, education, religious preference, born-again/evangelical, religious-service attendance, and political leaning. Consistent with our policy-focused applied research questions, the three most fixed parent characteristics were of primary interest--age, gender, and race/ethnicity. No significant effects of age or gender were found. Within race/ethnicity, Hispanic parents (OR = 2.12, $P = .001$) were more likely than others to endorse vaccination before age 13, while Asian-American (OR = 0.44, $P = .02$) and African-American (OR = 0.46, $P = .03$) parents were least likely to do so. Other subgroups more likely to endorse vaccination included the less-than-high-school and high school or GED education subgroups, Catholics, rarely or never religious-services attenders, and political liberals. Additional subgroups less likely to endorse vaccination were college graduates, other Christians, those reporting no religion, born-again or evangelical Christians, more than once-a-week religious-service attenders, and political conservatives.

Phi correlation coefficients among subgroup membership variables revealed moderate but widespread multicollinearity -- moderate because no correlations were above .60, but widespread in that many subgroups were significantly correlated. For example, the phi correlation between Hispanic and Catholic subgroup membership was .56 ($P < .001$), with 73% of Hispanics reporting a religious preference of Catholic and 73% of Catholics reporting an ethnicity of Hispanic. We analyzed a series of exploratory multivariable logistic regression models in an attempt to disentangle this multicollinearity, but found wide fluctuations in odds ratios and *P* values across theoretically specified models. For example, in a multivariable model that includes both race/ethnicity and religious preference, enough of the vaccination-predictive variance is shared across these two variables that the unique contribution (i.e., the contribution after the shared variance is removed) of each is non-significant. This problem of model parameter instability is a common and expected result of multicollinearity [22]. For these reasons we did not focus on multivariable analyses and adjusted odds ratios. We note instead the importance to our primary research question of the unadjusted race/ethnicity subgroup differences and the absence of gender and age subgroup differences, together with the collateral importance of the unadjusted subgroup differences found among the other variables.

Reasons for acceptance and non-acceptance

Open coding analyses were used to categorize parents' reasons for being likely or unlikely to vaccinate before a certain age. Table 3 shows the three vaccination acceptance groups and the percentage of the total sample they represent. The table also shows the categories of reasons for each group and the distribution of reason categories in the sample.

As illustrated in Table 3, ten categories of reasons emerged across the three vaccination-acceptance groups (likely before age 13, likely before age 16 but not age 13, and not likely before either age). Parents who would be likely to vaccinate before age 13 most frequently explained their views by reference to specific health and safety reasons (e.g., "Because my first goal is to keep her safe and not judge her behavior") or general pragmatic prevention reasons that did not specifically mention health or safety (e.g., "That would be important to me because I believe it is better to prevent than to regret"). A smaller proportion cited a general belief in recommended vaccinations (e.g., "For the same reason I would vaccine her against polio").

Among parents not likely to vaccinate before either age 13 or age 16, five clusters of reasons were identified: pragmatic concerns about the effect on their daughter's sexual behavior (e.g., "Because it would encourage my daughter to have sex and I wouldn't want that"), specific HPV vaccine concerns (e.g., "Because I don't want her to have the side effects of this vaccine"), general vaccine concerns (e.g., "Because she is not vaccinated, we use holistic medicine"), moral concerns about the effect on their daughter's *s*exual behavior (e.g., "My vaccination is to teach her to be pure before god and do what is right"), and denial of any need (e.g., "I trust my daughter and I don't believe that there is any need to vaccinate her").

Another group of potential interest consisted of those who would vaccinate before age 16 but not before age 13. Among those in this group who explained why they would not vaccinate before age 13, two types of concerns were most common: specific HPV vaccine concerns (e.g., "I'm not sure about the science yet, I have not seen any facts on it") and pragmatic sexual behavior concerns (e.g., "I've taught her not to have sexual relations at age 13, but at 16, it's much more likely"). Among those who explained why they would vaccinate before age 16,

reasons given were similar to reasons given by the larger group of parents who endorsed vaccination before age 13.

Discussion

Consistent with previous studies on this topic [11-15], a substantial majority of California parents were accepting of the HPV vaccination for their daughters at the recommended age. Although important subgroup differences were found, majorities of all subgroups were supportive of vaccination. Of the 18% who were non-accepting, the five clusters of reasons for non-acceptance identified, together with a sixth subgroup of delayed acceptors, have implications for policy and social marketing decisions in this area.

One notable finding is that Asian-American and African-American parents were the least likely race/ethnic groups to endorse HPV vaccinations before age 13. This is especially problematic in the case of Asian-American parents, in light of a recent study that assessed racial and ethnic disparities in Pap smear use among California women [23]. This study found that in comparison to other racial/ethnic groups, Asian-American women, especially Vietnamese and Southeast Asian, were least likely to report having had cervical cancer screening in the past 3 years, as well as ever having had a screening. Vietnamese and Southeast Asian-American women also have higher invasive cervical cancer incidence rates than do most other racial and ethnic groups [24]. Given these data, it will be important to conduct more research on the reasons for low HPV vaccination acceptance and low Pap testing compliance among these groups. This information would be useful in providing culturally appropriate outreach to these higher-risk populations.

African-American parents were similarly disinclined to endorse HPV vaccination for their daughters; however, African-American women in California are more likely in comparison to other women to have cervical cancer screening [23]. In spite of these higher screening rates, the lower levels of support for HPV vaccination among African-American parents is cause enough for special attention in both research and outreach.

It is useful to relate the categories of reasons we found to decision factors identified in cognitive psychology research. Our framework for interpretation is based on cognitive research on judgment and decision making (JDM), as applied to vaccination decisions. We primarily build on and extend work by Baron, Meszaros, and colleagues [25-27].[1]

Three decision factors are most typically recognized as important influences on parents' decisions regarding vaccination of their children. These are perceived dangers of the vaccine, perceived dangers of the disease, and perceived susceptibility to the disease [25]. Similar factors also have been reported in previous studies of parental perspectives on vaccination of children against sexually transmitted infections, together with an additional pragmatic factor based on fear of encouraging sexual behavioral [13, 15]. More recent cognitive research has identified five additional factors that can influence a parent's decision, involving parents' perceived ability to control their child or adolescent's susceptibility to the disease, parents' perceived ability to control outcome of the disease, ambiguity or doubts about the reliability of disease information, a general preference for errors of omission over errors of commission, and recognition that vaccination of other adolescents will reduce own child's risk (i.e., the free-ride effect, or relying on herd immunity) [25, 26, 29].

[1] We have learned of another article that reviews parental beliefs and decision making about immunizations [28]. This model includes institutional and social-environmental factors and focuses on health belief model constructs. We consider this model complimentary to our framework, which is primarily focused on cognitive and value-based judgment and decision factors.

In our sample we found direct evidence for the first five of these nine factors. The question remains as to what extent the last four previously identified decision factors might be contributing to parental non-acceptance. These later factors are not as likely to be identifiable directly from the parent's self-reported reasons. Further research on this topic would be valuable to address the question of relative importance and potential interaction across all nine of these potential decision factors.

We also identified a factor not previously reported – parents' primarily moral concerns about their adolescent's potential sexual behavior. While these parents might also have aspects of pragmatic concerns or denial of need, they focus primarily on moral rather than pragmatic values in their responses (e.g., "My vaccination is to teach her to be pure before god and do what is right"). While the percentage of parents in the moral-concern category is small (2.9% of the sample), this nevertheless represents a large number when applied to a state or national population. It is also possible that some of the expressed pragmatic concerns are actually based in underlying but unexpressed moral concerns.

Further research involving in-depth probing of parents' reasons related to sexual behavior concerns could better illuminate the relative prevalence and potential interaction between pragmatic versus moral sexual-behavior concerns. Moral values in general are often treated as protected or sacred values, which resist tradeoffs with other values and arise from strict deontological rules concerning actions, rather than from consideration of consequences [27, 30]. Many of the parents in this sample who provided moral-concern reasons for non-acceptance appeared to be exhibiting protected values. A key question for further research is under what conditions can a parent's protected deontological values related to a daughter's sexual behavior

be traded off against pragmatic, consequentialist values related to health, safety, and disease prevention.

The study has several limitations. It is not clear how the results obtained via an abstract scenario presented by a stranger on the phone might translate into real life decisions, where medical providers and other health system information, together with conversation with family and friends, will for some parents contribute to the decision process. In addition, the situation is additionally hypothetical in that parents were eligible for the questions if they had one or more daughters 18 or younger living at home, so that in many cases the question was about a daughter already past the recommended vaccination age-range, or alternatively younger than the age at which most parents would be focused on this decision. Further, many parents might have been hearing of the vaccine for the first time, without sufficient opportunity to process the information and to think through their perceived risks, benefits, values, and emotional concerns. It is also possible that due to the newness of the vaccine the reported acceptance rates are low estimates, which will increase over time as the vaccine becomes better known.

Another limitation is that some Asian-American parents in California do not speak English, and these were excluded from our study due to practical constraints. As a result, the results reported for this subgroup might not be representative of the full Asian-American parent population in California. One additional limitation is that in taking advantage of the efficiency and power of a large telephone survey, we collected the open-ended responses with a minimum of probing and follow-up questioning.

In spite of these limitations, the results presented here have important policy implications. It is clear that the majority of parents are at least hypothetically supportive of HPV vaccination at the recommended ages. This is consistent with previous studies and is in itself important policy-

relevant information, especially coming from a representative sample of a large and heterogeneous statewide population. Yet nearly one out of five parents is not supportive. These parents report a diversity of primary concerns, which offer clues to the types of messages that would be most effective in influencing their decision. The results of this study also illustrate disparities involving Asian-American and African-American parents' acceptance levels, which will require special attention. Other subgroup differences reported might also provide clues useful to the development of targeted educational strategies.

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Table 1
Demographic Characteristics of the Sample ($N = 522$)

Characteristics	*n*	%
Age		
Under 30	69	13.2
30-39	181	34.7
40-49	185	35.5
50 and over	85	16.2
Gender		
Female	383	73.4
Male	139	26.6
Race and ethnicity		
Hispanic	200	38.2
White, non-Hispanic	211	40.5
African-American, non-Hispanic	36	6.9
Asian, non-Hispanic	40	7.7
Other, non-Hispanic	28	5.4
Language of interview		
English	396	75.9
Spanish	126	24.1
Education		
Less than high school	65	12.5
High school graduate or GED	135	25.8
Some college	107	20.4
College graduate	117	22.4
Graduate school	98	18.8
Household income		
Less than $20,000	62	11.9
$20,000-$40,000	112	21.4
$40,000-$60,000	65	12.5
$60,000-$100,000	100	19.2
More than $100,000	125	23.9
Country of birth		
USA	319	61.1
Mexico	123	23.6
Other Central/South America	21	4.1
Asia	38	7.2

Other	20	3.8
Religious preference		
Catholic	200	38.2
Protestant	73	14.0
Jewish	9	1.7
Muslim	8	1.5
Buddhist	7	1.4
Mormon	9	1.7
Other Christian	93	17.7
None	71	13.6
Other	48	9.2
Born-again or Evangelical Christian		
Yes	112	21.5
No	399	76.4
Attend religious services		
Rarely or never	140	26.8
Few times a year	86	16.4
1-3 times a month	101	19.4
Once a week	131	25.1
More than once a week	62	11.9
Political leaning		
Very conservative	63	12.0
Somewhat conservative	150	28.7
Middle of the road	137	26.2
Somewhat liberal	87	16.7
Very liberal	39	7.5

Table 2
Percents Likely to Vaccinate Before Age 13 and Unadjusted Odds Ratios

Variables	% likely	Odds ratio	95% CI	*P* value
Race and ethnicity				
White	74.1	0.82	0.54—1.24	.337
Hispanic	84.1	2.12	1.34—3.34	.001
African-American	61.1	0.46	0.23—0.92	.026
Asian	60.5	0.44	0.22—0.88	.017
Other	79.3	1.21	0.48—3.04	.689
Education				
Less than high school	87.7	2.43	1.12—5.24	.021
High school or GED	82.7	1.68	1.01—2.78	.043
Some college	70.9	0.70	0.43—1.14	.149
College	66.4	0.52	0.33—0.83	.005
Graduate school	77.3	1.10	0.64—1.82	.788
Religious preference				
Protestant	74.3	0.87	0.49—1.56	.648
Catholic	84.6	2.22	1.40—3.51	.001
Other Christian	65.6	0.51	0.31—0.83	.006
Other	65.8	0.53	0.32—0.90	.018
None	82.9	1.58	0.82—3.05	.173
Born again or evangelical	63.1	0.43	0.27—0.68	.000
Attend religious services				
Rarely or never	87.5	2.73	1.53—4.76	.000
Few times a year	81.2	1.42	0.79—2.55	.245
1-3 times a month	76.8	1.05	0.62—1.76	.869
Once a week	72.2	0.75	0.47—1.18	.211
More than once a week	50.8	0.26	0.15—0.46	.000
Political leaning				
Conservative	65.9	0.36	0.23—0.56	.000
Middle of the road	79.7	1.31	0.81—2.15	.274
Liberal	90.2	3.73	1.97—7.08	.000

Notes: CI = confidence interval.
All demographic variables with one or more significant categories are shown.

Table 3
Vaccination Acceptance Groups and Categories of Reasons Within Each Group for Vaccinating or Not Vaccinating Before a Specific Age (N = 522)

Vaccine Acceptance Groups	% of Sample	Reason Categories	% of Sample[1]
Likely to vaccinate by age 13	74.5	Health and safety	39.7
		Pragmatic prevention	25.3
		General belief in vaccination	4.9
Likely to vaccinate by age 16, but not by age 13	5.5	Pragmatic prevention[2]	1.8
		Health and safety[2]	0.9
		HPV vaccine concerns[3]	0.8
		Pragmatic sexual behavior concerns[3]	0.6
		General belief in vaccination[2]	0.3
Unlikely to vaccinate by either age 13 or age 16	18.3	Pragmatic sexual behavior concerns	7.6
		HPV vaccine concerns	6.0
		Moral sexual behavior concerns	2.9
		General vaccine concerns	2.5
		Denial of need	2.1
Don't know or refused to answer	1.5		

[1] includes multiple reasons provided by approximately 4% of parents, omits 9% of responses that were uncodable or ambiguous

[2] gave reason for endorsing vaccination by age 16

[3] gave reason for not endorsing vaccination by age 13