

**Title:** Pediatrician-Parent Conversations about Human Papillomavirus Vaccination: An Analysis of Audio-Recordings

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**Abbreviations:** Human Papillomavirus (HPV); Health Care Provider (HCP)

**Keywords:** HPV vaccination, health communication, cancer prevention

**Implications & Contribution:** Provider recommendation strongly motivates parents to get HPV vaccine for their adolescent children, but many providers do not offer effective

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recommendations to these parents. Our naturalistic observational study confirms that ineffective pediatrician communication about HPV vaccination is common and identifies urgency and a presumptive approach as critical for motivating same-day HPV vaccination.

## Abstract

**Purpose.** We sought to establish which human papillomavirus (HPV) vaccine communication approaches by pediatricians were associated with same-day HPV vaccination of 11–12-year-olds by evaluating audio-recordings of visits.

**Methods.** Verilogue, a market research company maintaining a panel of primary care pediatricians, provided audio-recordings and transcriptions of well-child visits for 11-12 year old patients from January through June, 2013. Seventy-five transcripts from 19 pediatricians were coded for use of presumptive language (i.e., words conveying assumption of vaccine delivery), offer of delay, recommendation strength, and information provision. Using logistic regression, we evaluated the association between pediatrician communication approaches and agreement to same-day HPV vaccination. Generalized estimating equations (GEE) accounted for clustering of patients within pediatricians.

**Results.** Same-day agreement to HPV vaccination occurred in 29% of encounters. Pediatricians in the sample often provided parents with inconsistent, mixed messages and sometimes offered information about HPV or HPV vaccination that was inaccurate. Pediatricians used presumptive language in only 11 of 75 encounters; when used, presumptive language was associated with higher odds of accepting HPV vaccine (73% vs. 22%, OR=8.96;95%CI=2.32-34.70). Pediatricians offered or recommended delay in the majority of encounters (65%). HPV vaccine acceptance occurred far more often when pediatricians did not mention delaying vaccination (82% vs. 6%; OR=80.84;95%CI=15.72-415.67). Same-day vaccination was not associated with strength of recommendation or pediatrician reference to vaccinating their own children.

**Conclusion.** Our findings highlight the need to develop and evaluate physician-focused trainings on using presumptive language for same-day HPV vaccination.

HPV vaccination coverage in the U.S. continues to be far below the Healthy People 2020 target of 80% series completion by ages 13-15 [1,2]. To augment public health messaging campaigns, public health officials and clinicians seek to identify modifiable aspects of health care provider (HCP)-parent/patient communication about vaccination that may influence acceptance of HPV vaccination.

Among parents' most commonly reported reasons for non-vaccination are lack of physician offer/recommendation of HPV vaccine or physician acceptance of parental wish to delay [3-6]. Many physicians do not meet quality indicators, such as making a recommendation that is strong, timely (i.e., vaccination by ages 11-12), consistent across the patient panel (i.e., making routine rather than risk-based endorsement of vaccination) and urgent (recommending same-day rather than delayed vaccination) [7]. A recent systematic review underscored the importance of physician confidence about HPV vaccine communication [8]. However, as most of these studies involved HCP self-report, the quality of HPV vaccine communication may be even poorer than reported due to socially desirable responding [9,10]. Additionally, studies of parents' recollections of their interactions with HCPs suggest that poor-quality communication is associated with lower HPV vaccine uptake [11].

In contrast to self-report and retrospective report of clinical encounters, objective observation of conversations between pediatricians, caregivers, and adolescents may clarify communication strategies that encourage or discourage vaccination uptake. For example, in an observational study that focused on early childhood immunization, the results indicated that using presumptive language (i.e., words conveying assumption of vaccine delivery) led to higher rates of vaccine acceptance compared to a participatory approach [12]. The current study had the following objectives:

- 1) To describe the frequencies of pediatrician HPV vaccine communication behaviors;
- 2) To evaluate the associations between pediatrician HPV vaccine communication behaviors and parental agreement to same-day HPV vaccination; and
- 3) To describe common themes observed across pediatricians' discussions about HPV vaccination.

To meet these objectives, we used quantitative and qualitative analyses of audio-recordings/transcripts of full clinical encounters between pediatricians, 11– 12-year-old patients, and their caregivers.

## **METHODS**

### **Study Population and Transcript Preparation**

The Point of Practice national physician panel maintained by Verilogue provided audio-recordings and transcripts of patient visits between January and June 2013. The company gave pediatricians digital recording devices to audio-record entire well-child visits. After obtaining caregiver consent (any adult accompanying the minor patient to the well visit), the pediatrician audio-recorded the entire patient encounter. Separate conversations with nurses were not recorded. Families received compensation for their participation. Providers, caregivers, and patients were unaware that analysis of the recordings would focus specifically on HPV vaccine communication. Pediatricians securely transmitted patient visit audio-recording to Verilogue, along with patient age, race, ethnicity, and insurance type as well as pediatrician sex, years in practice, and practice type. The company de-identified personal information for the patient and pediatricians and provided us with transcripts of entire patient encounters with pediatricians. The

study received exempt status from institutional review boards at Indiana University and University of North Carolina.

The Verilogue participant panel included 44 board-certified pediatricians from across the nation; 20 of these pediatricians had patient visits during the study period with 11-12 year olds, resulting in a sample of encounters with 100 patients. Of these encounters, 25 were excluded because a caregiver was not present during the visit, discussion did not touch on vaccination of the child, or the child started the HPV vaccination series at a prior visit. This resulted in 75 usable transcripts from 19 providers.

### **Transcript coding**

Using a directed qualitative analysis approach [13], we developed categorical codes to characterize HPV vaccine communication approaches and themes of interest based on prior research on physician-parent communication regarding vaccination [7,12,14,15]. The codes captured whether the pediatrician: (a) used presumptive vs. non-presumptive language; (b) recommended HPV vaccine (i.e., strong, moderate, weak, or no recommendation); (c) offered/recommended delay of vaccination; (d) used a risk-based approach to the need for HPV vaccination; (e) provided information, including misinformation, about HPV infection or vaccination; (f) responded to parent hesitancy with, for example, immediate acquiescence, provision of additional information, or elicitation of specific parent concerns with the goal of vaccine acceptance; (g) specifically mentioned sexual transmission of HPV; (h) shared personal vaccination practices (i.e., pediatrician vaccinating own or future offspring); and (i) engaged in lengthy scientific monologues about HPV vaccination.

The investigators jointly developed a provisional code book of categorical definitions for each code. Examples of quotes that correspond to codes appear in Table 1. To insure reliability,

pairs of coders (MK, KD, & LS) independently coded 20 of the transcripts to confirm similar approaches to coding. Initial inter-coder percent agreement was .80 or better for all but one category. The team resolved discrepancies through discussion until consensus and recoded transcripts accordingly.

## **Quantitative Measures**

The outcome of interest, *vaccine acceptance*, was defined as same-day caregiver agreement to HPV vaccination. Definite acceptance was a caregiver statement of wanting the vaccination for the child or agreement with a provider recommendation, (e.g., “ok”, “uh huh”); and we assumed probable acceptance when the caregiver did not make a verbal statement of refusal. Codings of definite and probable comprised the category “accepted.” Caregiver statements of definite refusal (e.g. “I don’t want that one”, “no”) or those coded “unclear” were combined into the category “not accepted”. Medical chart data submitted by participating pediatricians did not include documentation of vaccination at the medical encounter.

Predictors included the following subset of categories, which lent themselves to quantitative coding:

*Presumptive Approach.* A presumptive approach featured a matter-of-fact statement that the child was due for or would receive HPV vaccine that day or at a future date, conveying a positive stance toward vaccination (e.g., “The ones you’re getting are an Adacil, Menactra and the HPV”; “The HPV—you will get that next time”). In contrast, a non-presumptive style involved questions or uncertainty (e.g., “And you could get HPV. Do you want [it]? Have you thought about [it]? Are we doing HPV today?” (See Table 1 for additional examples).

*Strength of Recommendation.* Weak recommendations featured passive voice (e.g., “it is recommended”) or third-person attribution of recommendation (e.g., “professional organizations recommend”). Moderate recommendations required a first-person singular or plural statement (e.g., “I/we recommend.”) Strong recommendations involved first-person singular or plural statement as well as emphasis words such as “strongly” or “definitely,” (e.g., “I strongly recommend that he gets the HPV vaccine”). Mentioning HPV vaccine without a clear endorsement was not considered a recommendation.

*Offer of Delayed Vaccination.* Offer of delay occurred when pediatricians stated that the parent could choose to vaccinate at a later point or clearly recommended that the parent wait to vaccinate until later (e.g., “I usually wait 'til 13 on that one [HPV].”) In a few cases in which pediatrician discourse could not be clearly coded, “no delay” was assigned.

*Reference to Vaccinating Own Child.* This code included instances when pediatricians referred to having their own child receive HPV vaccine or stated that they would vaccinate their child if they had children (e.g., “I’ve done my two girls. I haven’t done my boys yet but probably will in the next few years”).

## **Quantitative Data Analysis**

The unit of analysis was patient visit. Logistic regression analyses assessed the following four pediatrician behaviors as potential predictors of parental agreement to HPV vaccination: presumptive approach, strength of recommendation, offer of delay, and reference to vaccinating own child. Analyses used generalized estimating equations to account for correlated data due to the clustering of patients within pediatricians. Child sex differences in offer of delay and strength of recommendation were examined with chi-square analyses. Using chi-square analyses, we



examined whether particular communication behaviors systematically co-occurred—presumptive approach, strength of recommendation, and offer of delay.

## RESULTS

Pediatricians were experienced, all from private practices in urban settings, located predominantly in the Midwest and South (Table 2). The majority of well-child visits were with white patients; 34 were with girls (45%) and 41 boys (55%) ages 11 or 12. Less than a third of the visits (29%) resulted in same-day vaccine acceptance, which was not associated with patient sex ( $p=.45$ ).

### *Qualitative Analysis of Pediatrician Discussion of HPV Vaccine*

Pediatrician communication about HPV vaccine created impressions of “mixed messages” and pediatricians were often inconsistent in their communication approaches across patients. Pediatricians often made recommendations alongside an offer/recommendation of delay, in effect diluting the initial recommendation (see Table 1). Pediatricians often treated HPV vaccine differently from Tdap and meningococcal conjugate vaccine. (Hepatitis A and seasonal influenza vaccines were discussed infrequently.) Pediatricians portrayed non-HPV vaccines as “required by school/camp” or “routine” but HPV vaccine as “optional”, a matter of parent choice. One provider, after giving a brief, presumptive recommendation for two vaccines, said “Gardasil is the one to discuss.” Pediatricians more often referred to mode of transmission for HPV infection than for other vaccine-preventable diseases. Some pediatricians made direct statements about sexually transmitted infection or sexual transmission (e.g., “It is sexually transmitted and girls and boys pass it back and forth”), but many statements were less direct (see

Table 1) and involved vague links between vaccination timing and projected future sexual relationships (e.g., “He’s not at the age where he’s doing anything immediately”).

A few pediatricians discussed HPV vaccine as they did other vaccines, employing a brief, matter-of-fact presumptive style with HPV vaccine at the end of a list of vaccines for which the child was “due”. These providers tended to offer a strong recommendation (e.g., “It’s not required but strongly recommended”), even in cases where they accommodated the parent’s desire to delay (e.g., “ok...Eventually she will get the Gardasil”).

Back-and-forth dialogue about HPV vaccine in which parental questions or concerns were elicited was not the norm. Instead, pediatricians sometimes provided a monologue of scientific facts (See Table 1.) Information about other vaccines was usually limited to, “It guards against (disease).” Misinformation about duration of protection and cancer targets was common (e.g., “HPV causes colon cancer”; “The vaccine covers 100% for life.”) Some pediatricians referred to their personal decisions to vaccinate their own or future children against HPV, an approach not used with other adolescent vaccines.

Many pediatricians offered or recommended delaying vaccination before caregivers voiced any reaction to HPV vaccine such that caregivers agreed with delaying rather than directly voicing refusal of an offered vaccine. Common rationales for delay included the child being “too young” and that children the patient’s age were not at risk for sexual behavior. Some of these pediatricians seemed to hold preconception that they must introduce HPV vaccine gradually over multiple visits. They made reference to either discussing HPV vaccine at a prior visit or voiced an intention to familiarize the family with the topic at the current visit, with plans to revisit the vaccination decision at a future visit.

When pediatricians encountered caregiver hesitancy or concern about possible side effects of HPV vaccine, they typically acquiesced at once. A few pediatricians explored the parents' concerns (e.g., "So what kind of questions do you...have about it that you're unsure? Why don't you want to do it?"). One pediatrician leveraged the parent's stated desire to discuss the vaccine with her daughter at home by offering written material to review at home *after* the vaccination occurred.

Few caregivers independently raised the topic of HPV vaccination. One pediatrician began with "The only other vaccine that we don't have to do this year, um, but actually" to which the caregiver responded "HPV" and then asked about her son's history of warts (non-genital).

#### *Predictors of Same-Day HPV Vaccine Acceptance*

Pediatricians employed a presumptive approach in 11 of 75 visits (Table 3). Visits where a pediatrician used presumptive language had HPV vaccine acceptance 73% of the time, whereas acceptance occurred only 22% of the time when presumptive language was not used. A presumptive approach was associated with 9 times greater odds of same-day vaccination (OR=8.96; 95% CI=2.32-34.70).

Pediatricians mentioned delay of HPV vaccination in 49 of 75 visits. When delay of vaccination was offered or recommended, only 6% of caregivers agreed to vaccinate, compared to 82% agreement when delay was not mentioned. With no mention of delay, odds of agreement to vaccination were 81 times greater (OR=80.84; 95%CI=15.72-415.67). Strength of recommendation ( $p=.94$ ) and pediatrician reference to vaccinating own children ( $p=.58$ ) were not associated with HPV vaccine acceptance. Use of presumptive language, strength of

recommendation, and offer of delay co-occurred in unexpected ways. Some providers who adopted a presumptive approach mentioned but did not directly recommend the vaccine. In the visits in which pediatricians used presumptive language, visits were split between no recommendation (6 of 11, 55%) and endorsement of HPV vaccine (5 of 11; 45%). Offering delay occurred in only 2 of 11 presumptive language visits (18%). In contrast, offering delay accompanied 47 of 64 non-presumptive language visits (73%). In the encounters in which pediatricians did not recommend the vaccine, 60% (15 of 25) offered delay.

No patient sex differences were found in pediatrician offer of delay ( $p=.88$ ), presumptive recommendation ( $p=.62$ ), or strength of recommendation ( $p=.45$ ).

## **DISCUSSION**

Our research showed that offering to delay HPV vaccination and failure to use presumptive language were very strong predictors of non-acceptance of vaccine. The findings in this research extend those reported by two prior studies that also analyzed audio-recorded HPV vaccination discussions between patients/parents and providers. Whereas those studies examined both adolescent and adult women (11-26 year) [14] or adolescent females and males spanning 11 to 17 years [16], we focused specifically on patients ages 11–12, the ages when HPV vaccination is routinely recommended. Moreover, our larger sample size of early adolescents allowed us to conduct both qualitative and quantitative analyses. Lastly, we sampled physicians from many different geographical locations within the United States rather than from a single health system of clinics in a single city [16], improving potential generalizability of findings.

A geographically diverse sample of pediatricians seeing children ages 11 and 12, typically conveyed a mixed message about HPV vaccine by treating it differently from other

vaccines, offering to delay or acquiescing to parental desire for delay, and failing to make clear, strong recommendations. Few used presumptive language that the child is due for HPV vaccination, even though this was associated with higher same-day vaccination [12,17]. Although many pediatricians in our sample provided at least basic information about the vaccine or HPV infection, their communications often had factual inaccuracies, used risk-based language, and inconsistently educated about the vaccine preventing one or more cancers.

Research documents physician anticipation of parental hesitancy regarding HPV vaccination [8]. It is possible that expectations of parental resistance to pediatricians' recommendations may discourage some pediatricians from communicating clearly about certain issues. For example, Mangione-Smith et al. found that physician perception of parental desire to have an antibiotic prescribed for their child often did not match parental expectations [18]. Similarly, Healy et al. reported that health care providers particularly and significantly underestimated parental interest in HPV vaccination compared to other vaccines [19]. Gilkey and colleagues found that only 13% of providers felt that parents viewed HPV vaccine as important for their child's health [15]. Some pediatricians may cope with their expectation of parental hesitancy about, or resistance to, HPV vaccination by gradually introducing the topic to parents. We suggest that when pediatricians expect parental hesitancy, they may actually fuel parental hesitancy and reduce the likelihood of vaccine acceptance – a self-fulfilling prophecy.

Limitations include use of a selected sample of pediatricians and no medical record verification of same-day vaccination. The modest sample size prevented us from conducting analyses adjusted for sociodemographic characteristics and contributed to large confidence intervals in the logistic regression analyses. Future studies could include a probability sample of providers to help ensure generalizability, more audio-recordings per physician, and access to

medical records or state vaccination registries for vaccination verification. It would also be useful to examine the role of adolescent patients in conversations about vaccine decisions. Our impression was that patients were more likely to voice distress about getting shots in general than resistance to HPV vaccine. Future research should examine communication styles of other vaccine-provider professionals, including family physicians, nurses, and pharmacists. Given that we found that pediatricians demonstrated inconsistency in communication behaviors across patients, it would be helpful to better understand which physician, caregiver, and patient characteristics drive physicians' use of different communication behaviors with different families. Physicians, caregivers, and patients being unaware of the research focus on HPV vaccination lends credibility to our data and largely eliminates the problem of socially desirable responding.

The findings from this study are consistent with, and add substantially to, the emerging literature on physician-family communication about HPV vaccination. This study identifies urgency and presumptive communication as critical for motivating same-day HPV vaccination.

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**Table 1.** Example quotes for communication behaviors

**Table 2.** Patient and Pediatrician Characteristics

**Table 3.** Prevalence of Communication Styles

**Table 1.** Example quotes for communication behaviors

Communication Behavior	Example Quotes
Presumptive Style	<p><u>Yes:</u></p> <p>“Got a couple of shots today. The ones you’re getting are an Adacil, Menactra and the HPV”. (girl; female MD from GA, 21-30 years practice);</p> <p>“We’ve got tetanus, meningitis, the HPV. And we can get that going for you” (girl; male MD from SC, 21-30 years practice)</p> <p><u>No:</u></p> <p>“the HPV, which is the Gardasil you absolutely do not need to do at [AGE] years of age” (boy; male MD from FL, 11-20 years practice);</p> <p>”Can I interest you at all in Gardasil shot?” (girl; male MD from FL, 11-20 years practice)</p>
Recommendation Strength	<p><u>Weak:</u> “they do recommend it for boys” (boy, male MD from FL, 11-20 years practice)</p> <p><u>Moderate:</u> “I think it’s an important vaccine &amp; I think it’s good, ok.” (boy, male MD from FL with 11-20 years practice)</p> <p><u>Strong:</u> “I do however recommend it completely between now and being 18” (male, female MD from IN, 11-20 years practice).</p>
Offers to delay vaccination	“I know the nurse wrote down all these different vaccines. You obviously do not have to do



	<p>all of them (laugh). Uh, the HPV which is the Gardasil, you absolutely do not need to do at this age...there is no urgency in a [AGE] to do it (laugh).” (boy; male MD from FL, 11-20 years practice)</p> <p>“I like that &amp; I would like for her to have that but I don’t care when.” (girl; female MD from GA, 21-30 years practice)</p>
Risk-based approach to need for HPV vaccine	<p>“She’s not at an age where she is going to be having any risk factors.” (girl; male MD from WI, 11-20 years practice)</p> <p>“But as long as it’s before he’s sexually active which he better not be because then he’d have to answer to his pediatrician and his mama.” (boy, male MD from GA, 21-30 years practice)</p>
Provides information about HPV infection or vaccine	<p>“There’s not, as far as we know, there’s not a genetic predisposition.” (girl, male MD from WI, 11-20 years practice)</p> <p>“They do now recommend Gardasil for boys. It’s approved from the FDA from 9 all the way up to 28.” (girl; female MD from FL, 11-20 years practice)</p> <p>“It’s the one for cervical cancer to prevent the virus that causes that one.” (girl, female MD from GA, 21-30 years practice)</p>
Provides misinformation	<p>“It’s good at any age” (girl; female MD from GA, 21-30 years practice)</p> <p>“Other research looking at the uterine &amp; ovarian cancer with the HPV causing some of that</p>

	<p>too (boy; male MD from TX, 21-30 years practice)</p> <p>“Women can actually pick up cancer from this vaccine.”(boy; male MD from SC, 21-30 years practice)</p>
<p>MD response to caregiver hesitancy/refusal</p>	<p>MD: “..and then eventually the Gardasil shot. That’s the cervical cancer vaccine.” CG: “no”. MD: “OK.”. CG: ”No, we are definitely skipping it.” MD: “So one today, the tetanus?” (girl; male MD from IL, 11-20 years practice).</p> <p>CG: “I’m just making sure that it didn’t make him grow boobies or anything like that”. MD: “no, it won’t do nothing bad, do nothing bad.” (boy, female MD from OH, 21-30 years practice)</p> <p>MD: ”So what kind of questions do you have about it that you’re unsure? Why don’t you want to do it? “(girl; male MD from NC, 31+ years practice)</p>
<p>HPV-sexual activity linkage</p>	<p>“Well, the thing is, it protects, the virus is passed back and forth between boys &amp; girls.” (male, female MD from SC, 3-10 years practice)</p> <p>“You’ve got to get that in there before they enter that stage of life” (boy, male MD from OH, 21-30 years practice)</p> <p>“And it’s not, most of the time you hear about it being transmitted sexually, but not all cases.” (boy, male MD from Texas, 21-30 years practice)</p>

Personal Vaccination Practice	<p>”Doctors ain’t supposed to say this but for what it’s worth, my two teenage boys have gotten it. You know?” (boy; male MD from OH, 21-30 years practice)</p> <p>“As far as I’m concerned, if I had any boys they’d, you know, they’d be getting it. Both my daughters got theirs at, as soon as it became available.“ (boy, male MD from AZ; 21-30 years practice)</p>
Scientific Monologue	<p>“Okay. Yeah, it's funny, I was talking to a father a few months ago, um, his boy actually came in for a college physical. He just got accepted to college and decided he wanted to come in. Um, and sort of at the end of our visit I said to him I just wanted to let you know that the cervical cancer vaccine for girls, which has been around for about nine years or something like that, uh, just got approved for boys two years ago. And he looks at me and he says, well the last time I checked my boy doesn't have a cervix. Uh, yeah and I said, yeah, I realize that. But do you have any girls? He said, yeah, I have a daughter. And I said, I'll tell you what, let's not do any of the girls. Just do all the boys. ... You know, boys get it and they generally have no symptoms other than they give it to the girls and then the girls can get cervical cancer. There is a slight like, um, increased risk of like cancer of the penis and cancer of the anus with human papilloma virus.” (boy, male MD from Ohio; 21-30 years practice)</p>

**Table 2.** Patient and Pediatrician Characteristics

<b>Patients (n=75)</b>	<b>n (%)</b>
Sex	
Male	41 (55)
Female	34 (45)
Insurance Type	
Preferred Provider Organization (PPO)	38 (51)
Medicaid	16 (21)
Private	12 (16)
Health maintenance organization (HMO)	8 (11)
No insurance	1 (1)
Race	
White	55 (73)
Black/African American	11 (15)
Mexican/Puerto Rican/Other Hispanic	6 (8)
Middle-Eastern/Other Asian	3 (4)
<b>Pediatricians (n=19)</b>	
Gender	
Male	15 (79)
Female	4 (21)
Years in Practice	
3 -10	1 (5)
11-20	8 (42)
21-30	8 (42)
31 +	2 (11)
Practice Location	

South	9 (47)
Midwest	7 (37)
Northeast	2 (11)
West	1 (5)

# of Transcripts per Pediatrician

Mean	3.9
Range	1-9

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**Table 3.** Prevalence of communication styles

<b>Communication Style</b>	<b>N (%)</b>	<b>N (%) vaccinated</b>
<b>Strength of Recommendation</b>		
No Recommendation	25 (33%)	7 (28%)
Weak	19 (25%)	5 (26%)
Moderate	26 (35%)	8 (31%)
Strong	5 (7%)	2 (40%)
<b>Presumptive Language</b>		
Yes	11 (15%)	8 (73%)
No	64 (85%)	14 (22%)
<b>Offer of Delay</b>		
Yes	49 (65%)	3 (6%)
No/Unclear	26 (35%)	19 (73%)
<b>Reference to Vaccinating Own Child</b>		
Yes	13 (17%)	3 (23%)
No	62 (83%)	19 (31%)