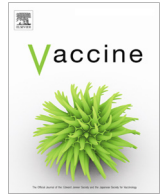




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## Associations between parents' satisfaction with provider communication and HPV vaccination behaviors

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### ABSTRACT

**Background:** Despite increasing awareness of the importance of a provider recommendation for HPV vaccine, the U.S. has yet to achieve the Healthy people 2020 goal of 80% series completion among adolescents. This failure indicates a need for further examination of the modifiable influences on parents' decision-making. Healthcare providers can influence parents' HPV vaccination decision-making, but little is known about parents' perspectives on the counseling they receive. We sought to assess U.S. parents' satisfaction with provider communication about HPV vaccine and associations with vaccination behaviors.

**Methods:** Parents of 11-to-17-year-old adolescents who discussed HPV vaccination with a healthcare provider at least once ( $n = 795$ ) completed our online survey in Fall 2016. We assessed their satisfaction with the discussion using the HPV Vaccine Communication Satisfaction Scale ( $\alpha = 0.94$ ). We examined associations between satisfaction (categorized as low, moderate, or high), and three vaccination behaviors: refusal/delay, series initiation ( $\geq 1$  dose), and continuation ( $\geq 2$  doses among initiators) using multivariable logistic regression.

**Results:** Most parents reported high (36%) or moderate (38%) satisfaction with provider communication about HPV vaccination; fewer reported low (26%) satisfaction. Moderately satisfied parents (vs. low) had lower odds of refusal/delay (aOR = 0.59, 95% CI: 0.38–0.89), and higher odds of initiation (aOR = 1.71, 95% CI: 1.15–2.55) and continuation (aOR = 2.05, 95% CI: 1.24–3.40). The associations were stronger for highly satisfied parents (refusal/delay aOR = 0.45, 95% CI: 0.29–0.70, initiation aOR = 3.59, 95% CI: 2.23–5.78, and continuation aOR = 4.08, 95% CI: 2.38–7.01).

**Conclusions:** Our study suggests that parent satisfaction with provider communication may play an important role in HPV vaccination decision-making. Yet, communication satisfaction has been largely unexamined in the HPV-vaccine literature to date. We introduce a brief, 7-item HPV Vaccine Communication Scale that can be used to assess parents' level of satisfaction with their provider's communication specific to HPV vaccine. We identify communication areas for providers to prioritize when discussing HPV vaccine with parents.

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### 1. Introduction

Although widespread use of HPV vaccine would prevent the majority of HPV-associated cancers in the United States (U.S.), coverage is lower than for other adolescent vaccines [1–3]. Parent

behavior contributes to the suboptimal uptake: 36% of parents report declining HPV vaccination for their children [4], and healthcare providers regularly encounter hesitant parents in their clinical practices [5]. A high-quality provider recommendation that includes a strong endorsement for same-day vaccination and an emphasis on cancer prevention is associated with decreased parental refusal and increased series initiation and receipt of subsequent doses [6]. While healthcare professionals' increased awareness and emphasis on the importance of a provider recommendation for HPV vaccine is encouraging, the U.S. has yet to achieve the Healthy

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people 2020 goal of 80% coverage for series completion [1], indicating the need for further examination of the modifiable provider influences on parents' decision-making.

In contrast to the compelling literature on the influence of provider recommendations, there is little available evidence regarding the role that parents' satisfaction with provider counseling plays in their decision-making about HPV vaccination [7]. Interest in assessing parents' satisfaction with providers' communication has been spurred by recent research on directive or "presumptive" approaches to recommending vaccines; although presumptive recommendations are consistently associated with vaccine acceptance, early research with parents of young children suggested that the approach might negatively impact patient experience [8]. A comprehensive measure of parents' satisfaction could facilitate research and intervention development aimed at reducing hesitancy and increasing uptake. To address this need, we used data from a national sample of parents of adolescents to develop the HPV Vaccine Communication Satisfaction Scale. We then sought to estimate associations between parents' communication satisfaction and three HPV vaccination behaviors: refusal/delay during the initial discussion, series initiation ( $\geq 1$  dose), and continuation ( $\geq 2$  doses among initiators).

## 2. Methods

### 2.1. Participants and procedures

In September 2016, we conducted an online, cross-sectional survey of parents of adolescents. Respondents were members of KnowledgePanel, a nationally representative panel of U.S. adults maintained by the survey research company GfK [9]. GfK constructs the panel using an address-based sampling (ABS) frame supplemented with follow-up phone calls to nonresponsive households; this probability-based sampling methodology is designed to more effectively recruit difficult-to-reach individuals, such as young adults and those in low-response areas, as compared to random digit dialing alone [10]. GfK provides internet service and a web-enabled device to households that lack these resources to ensure that participation is accessible to lower-income adults. Panelists with established internet access instead receive points toward small cash payments. These incentives are provided for ongoing participation in the panel across multiple surveys.

We invited panel members who were parents of an 11- to 17-year-old child living primarily in their households to participate in the survey. Of the 2580 invited parents, 1253 confirmed having an age-eligible child, gave informed consent, and completed the survey. The American Association for Public Opinion Research (AAPOR) formula 4 response rate was 59% [11]. We asked parents with more than one age-eligible child to complete the survey for the child with the most recent birthday. For the present study, we focus on the subset of 795 parents who reported having discussed HPV vaccination with their child's healthcare provider at least once. Harvard Pilgrim Health Care Institute's Institutional Review Board approved the study protocol.

### 2.2. Measures

#### 2.2.1. Initial refusal/delay

We assessed parents' self-reported refusal/delay of HPV vaccination for their child during their initial conversation with their child's healthcare provider with one item: "What did you decide to do about getting the HPV vaccine for [child's name]?" We dichotomized responses to reflect initial refusal/delay ("To get it at a later visit," "Not to ever get it," or "To make a decision later") vs. initial acceptance ("To get it at that visit").

#### 2.2.2. HPV vaccination status

We assessed HPV vaccination status with the following item: "How many shots of the HPV vaccine has [child's name] had [12]?" We categorized the responses, defining HPV vaccine series initiation as  $\geq 1$  dose and series continuation as  $\geq 2$  doses among those who initiated. Parents who initially refused/delayed were included in these measures as they may have gone on to get HPV vaccine for their adolescent at a subsequent visit.

#### 2.2.3. Communication satisfaction

We assessed parents' satisfaction with the provider's counseling during the initial conversation through 7 statements. Parents reported their agreement on a scale of 1 (strongly disagree) to 5 (strongly agree) that the provider: (a) gave a clear message about getting HPV vaccine, (b) spent the right amount of time discussing HPV vaccine, (c) used easy to understand language, (d) addressed concerns, (e) gave the chance to ask questions, (f) discussed scheduling all shots, and their (g) overall satisfaction with the communication. We adapted the items from existing measures of general patient satisfaction with provider communication [13–16], as well as qualitative studies of parent preferences for provider communication specific to HPV vaccination [17,18]. We created the HPV Vaccine Communication Satisfaction Scale by averaging the responses and categorizing the composite scores into low (mean score of 1–3.9), moderate (4–4.9), and high (5) satisfaction based on similar cut-points for general patient satisfaction scales [13–16].

#### 2.2.4. Provider recommendation quality

We asked whether the provider recommended HPV vaccination during the first discussion (yes/no). For parents who reported receiving a recommendation, we used a validated index to assess if the provider included up to 3 quality indicators in the recommendation: (a) said HPV vaccination was important, (b) said the vaccine prevents cancer, and (c) recommended same-day vaccination [7,19]. We summed the number of indicators that were included in the recommendation to create a three-level measure of recommendation quality: no recommendation, low-quality recommendation (0–1 indicators), or high-quality recommendation (2–3 indicators).

#### 2.2.5. Vaccination confidence

We assessed parents' confidence in adolescent vaccination in general (not specific to HPV vaccination) with four items adapted from the Vaccination Confidence Scale, a validated measure of parents' vaccination beliefs ( $\alpha = 0.87$ ) [20,21]. Parents reported their agreement on a scale of 1 (strongly disagree) to 5 (strongly agree) with statements about vaccination (a) effectiveness, (b) safety, (c) importance, and (d) the likelihood of their child getting a vaccine-preventable disease if unvaccinated. We averaged responses to the four items and categorized vaccination confidence scores below the median as low (1–4.4), and at or above the median as high (4.5–5).

#### 2.2.6. Parent-provider relationship quality

Our survey assessed parents' perceptions of the quality of their relationship with their child's healthcare provider using a validated index of four items ( $\alpha = 0.78$ ) adapted from Saha et al. [22]. Parents reported their agreement on a scale of 1 (strongly disagree) to 5 (strongly agree) with statements about (a) their overall satisfaction with the quality of their child's health care, (b) the extent to which the provider gives them the information they need, (c) the extent to which the provider spends adequate time with them, and (d) their overall trust in the provider. We averaged the responses to the four items and categorized relationship quality scores below

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