

# The Architecture of Provider-Parent Vaccine Discussions at Health Supervision Visits

**AUTHORS:** Douglas J. Opel, MD, MPH,<sup>a,b,c</sup> John Heritage, PhD,<sup>d</sup> James A. Taylor, MD,<sup>a</sup> Rita Mangione-Smith, MD, MPH,<sup>a,c</sup> Halle Showalter Salas, MPhil,<sup>e</sup> Victoria DeVere, BS,<sup>e</sup> Chuan Zhou, PhD,<sup>a,c</sup> and Jeffrey D. Robinson, PhD<sup>e</sup>

<sup>a</sup>Department of Pediatrics, University of Washington School of Medicine, Seattle, Washington; <sup>b</sup>Treuman Katz Center for Pediatric Bioethics and <sup>c</sup>Seattle Children's Research Institute, Seattle, Washington; <sup>d</sup>Department of Sociology, University of California, Los Angeles, Los Angeles, California; and <sup>e</sup>Department of Communication, Portland State University, Portland, Oregon

## KEY WORDS

immunization, health communication, preventive health services

## ABBREVIATIONS

CA—conversation analysis

NVHP—non-vaccine-hesitant parent

PACV—Parent Attitudes about Childhood Vaccine

VHP—vaccine-hesitant parent

Dr Opel conceptualized and designed the study, coordinated and supervised data collection, performed data analysis, drafted the initial manuscript, and revised the manuscript; Dr Heritage contributed to the study design, developed the coding scheme, and reviewed and revised the manuscript; Dr Taylor contributed to the study design, assisted in the coordination and supervision of data collection, supervised data analysis, and reviewed and revised the manuscript; Dr Mangione-Smith contributed to the study design, supervised data collection, and reviewed and revised the manuscript; Ms Salas conducted qualitative data analysis and reviewed and revised the manuscript; Ms Nguyen conducted and coordinated data collection, assisted in drafting portions of the initial manuscript, and reviewed and revised the manuscript; Dr Zhou contributed to the study design, assisted in data analysis, and reviewed and revised the manuscript; Dr Robinson contributed to the study design, developed the coding scheme, performed data analyses, and reviewed and revised the manuscript; and all authors approved the final manuscript as submitted.

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Address correspondence to Douglas J. Opel, MD, MPH, 1900 Ninth Ave, M/S, C9S-6, Seattle, WA 98101. E-mail: [djopel@uw.edu](mailto:djopel@uw.edu)

(Continued on last page)



**WHAT'S KNOWN ON THIS SUBJECT:** An increasing number of parents have concerns about childhood vaccines. Parents consistently cite their child's provider as influential in their vaccine decision-making. Little is known about how providers communicate with parents about vaccines and which communication strategies are important.



**WHAT THIS STUDY ADDS:** How providers initiate the vaccine recommendation at health supervision visits appears to be an important determinant of parent resistance. Also, when providers pursue their original vaccine recommendations in the face of parental resistance, many parents subsequently agree to vaccination.

## abstract



**OBJECTIVE:** To characterize provider-parent vaccine communication and determine the influence of specific provider communication practices on parent resistance to vaccine recommendations.

**METHODS:** We conducted a cross-sectional observational study in which we videotaped provider-parent vaccine discussions during health supervision visits. Parents of children aged 1 to 19 months old were screened by using the Parent Attitudes about Childhood Vaccines survey. We oversampled vaccine-hesitant parents (VHPs), defined as a score  $\geq 50$ . We developed a coding scheme of 15 communication practices and applied it to all visits. We used multivariate logistic regression to explore the association between provider communication practices and parent resistance to vaccines, controlling for parental hesitancy status and demographic and visit characteristics.

**RESULTS:** We analyzed 111 vaccine discussions involving 16 providers from 9 practices; 50% included VHPs. Most providers (74%) initiated vaccine recommendations with presumptive (eg, "Well, we have to do some shots") rather than participatory (eg, "What do you want to do about shots?") formats. Among parents who voiced resistance to provider initiation (41%), significantly more were VHPs than non-VHPs. Parents had significantly higher odds of resisting vaccine recommendations if the provider used a participatory rather than a presumptive initiation format (adjusted odds ratio: 17.5; 95% confidence interval: 1.2–253.5). When parents resisted, 50% of providers pursued their original recommendations (eg, "He really needs these shots"), and 47% of initially resistant parents subsequently accepted recommendations when they did.

**CONCLUSIONS:** How providers initiate and pursue vaccine recommendations is associated with parental vaccine acceptance. *Pediatrics* 2013;132:1037–1046

National estimates for the percentage of children aged 19 to 35 months old who have received the recommended doses of diphtheria-tetanus-acellular pertussis, inactivated poliovirus, measles-mumps-rubella, *Haemophilus influenzae* serotype b, hepatitis B, varicella, and pneumococcal conjugate vaccines<sup>1</sup> remain below the Healthy People 2020 goal of 80%.<sup>2</sup> In addition, evidence from national surveys and school vaccination coverage surveillance suggests that the proportion of parents who have concerns about childhood vaccines remains high<sup>3,4</sup> and rates for nonmedical exemptions for required school-entry vaccines are increasing annually.<sup>5</sup> For these reasons, it remains a national priority to sustain and improve childhood vaccine coverage.<sup>2,6</sup>

Emerging evidence suggests that provider-parent communication is important to achieving this goal. A child's provider is consistently cited as a key factor in parental vaccine decision-making<sup>3,4,7,8</sup> and is a trusted source of vaccine information.<sup>9,10</sup> In addition, many vaccine-hesitant parents (VHPs) cite reassurance and vaccine information from their child's provider as the reason they changed their minds to ultimately accept vaccines.<sup>11</sup>

Despite the influence of the child's provider on parental vaccine decision-making, little is known regarding how providers communicate with VHPs about vaccines.<sup>12–14</sup> In a preliminary study, we identified several provider vaccine communication practices that theoretically had the potential to impact parents' vaccination behavior, including how providers initiated their vaccine recommendations (ie, using a presumptive or participatory format) and whether providers pursued their original recommendations when parents voiced initial resistance.<sup>15</sup> The primary aims of the current study were to assess the prevalence of these and other

provider and parent vaccine communication practices as well as to determine which communication practices were associated with parents' verbalized resistance to vaccination. We hypothesized that a presumptive format for provider initiations of vaccine recommendations and provider pursuit of original vaccine recommendations would be associated with increased parental resistance.

## METHODS

### Study Participants

Pediatric providers (pediatricians and nurse practitioners) were recruited from both the Puget Sound Pediatric Research Network, a practice-based research group of primary care practices based in Seattle, WA, and other Seattle area primary care practices. Providers were eligible if they had not participated in our pilot study.<sup>15</sup> To minimize the Hawthorne effect (the influence of observation on behavior),<sup>16</sup> the study was described to providers in general terms as one aimed at understanding parent-provider communication regarding general health topics at health supervision visits. Each provider gave written informed consent. Providers received a \$300 gift card for their participation.

Parents identified on the clinic's daily appointment schedule as having a child 1 to 19 months old being seen for a health supervision visit with a participating provider during the study period of September 2011 through August 2012 were approached by trained research assistants in the clinic's waiting room. Research assistants were in the clinic of each participating provider, on average, 1 to 2 times per week. We chose children aged of 1 to 19 months because they correspond to health supervision visits in which the majority of the recommended vaccines for the primary series are administered.<sup>17</sup> Parents who

met additional inclusion criteria ( $\geq 18$  years old and English-speaking) and who agreed to participate were screened by using the Parent Attitudes about Childhood Vaccine (PACV) survey, a valid and reliable tool for identifying VHPs.<sup>18,19</sup> Parents were considered to be hesitant if they scored  $\geq 50$  on the 100-point PACV survey.<sup>19</sup> We oversampled VHPs because it is their vaccination behavior that is most relevant.<sup>20</sup> The study was described generally to parents to minimize the Hawthorne effect. In addition, the PACV was embedded into a larger survey about parental perceptions of common childhood topics (including vitamin D, breastfeeding, and sleep). Parents provided written informed consent upon enrollment and received a \$20 gift card for their participation.

### Data Collection

Health supervision visits were videotaped with small, battery-operated camcorders that were equipped with wide-angle lenses and positioned in ceiling corners of examination rooms. Recording began just before provider entry into the examination room and ended at visit completion after parents exited the room. We considered vaccine discussions to begin with the first mention of vaccines by any participant and to end after the resolution of the last mention of vaccines, even if other topics were discussed in the interim. Vaccine discussions were fully transcribed. Before leaving the clinic after their visit, parents completed a self-administered survey asking for demographic information (birth order of their child, parent age, income, marital status, race/ethnicity, gender, and number of children in their household) and whether this was their first vaccine discussion with their child's provider. The Seattle Children's Institutional Review Board reviewed and approved all study procedures.

## Data Analysis

### Qualitative

We refined the preliminary coding scheme developed in the pilot study<sup>15</sup> by using conversation analysis (CA)<sup>21–23</sup> to identify recurrent physician vaccine communication practices, especially those that seemed to promote or hinder parental vaccination acceptance, and patterns of parent responses to those physician practices. Two investigators with CA expertise who were involved in the development of the preliminary coding scheme (J.D.R. and J.H.) analyzed 70% of the total number of videotaped encounters to develop the final coding scheme. This proportion of videotaped encounters represented  $\geq 75\%$  of VHPs and first-time vaccine discussion visits and  $\geq 1$  encounter from each participating provider. Both CA investigators were blinded to the parents' hesitancy status during their analysis. The final coding scheme contained 15 vaccine communication practices (see Appendix).

Two investigators (D.J.O. and H.S.S.) received a 1-day, in-person training session on the coding scheme from 1 of the CA investigators (J.D.R.) using 10% of the data. Intercoder reliability was subsequently tested on 20% of the data that did not include initial training data, with  $\kappa$  scores ranging from 0.70 to 1.0 (mean  $\kappa = 0.76$ ). Both coders continued to code all remaining data (and recoded the initial 10% of training data) using the turn of talk (the entire length of time 1 person speaks until another begins to speak) as their unit of analysis.<sup>24,25</sup> Both coders were blinded to the parents' hesitancy status. All discrepancies were resolved through discussion with the 2 CA investigators (J.D.R. and J.H.).

### Quantitative

Our main outcome was parent verbal resistance to provider vaccine recommendations. Parent resistance was

binary (yes/no) and determined at the time of coding by assessing resistance to all or some of the provider's recommendations at 2 time points in the vaccine conversation: first, in response to the provider's initiation of the vaccine recommendations, and second, in response to the provider's pursuit of his or her original recommendations. In line with previous research on how verbal actions or recommendations are resisted,<sup>26,27</sup> several different types of parent verbal behaviors were coded as resistance at each of these time points: (1) when parents explicitly rejected some or all of the provider's vaccine recommendations (eg, "I want to go slow and just do the MMR [measles-mumps-rubella]" or "I don't want him vaccinated today"), (2) when parents claimed to not be able to make a decision ("I don't know"), (3) when parents responded with contingencies that they perceived to be a barrier to vaccination at the current visit (eg, "His father's away at the moment" or "We're flying tomorrow"), or (4) when parents responded by raising concerns or questions about vaccines (eg, "That's a lot of shots" or "Well, where would he get Hep [hepatitis] B?"). These 4 types of parental resistance were subsequently dichotomized into explicit (code 1 above) and nonexplicit (codes 2–4) rejections.

Our 2 primary predictors were the format providers used to initiate vaccine recommendations and how they pursued their original vaccine recommendations when encountering parent resistance. Provider initiation formats were dichotomized into presumptive and participatory formats. Consistent with our pilot study,<sup>15</sup> presumptive formats were ones that linguistically presupposed that parents would vaccinate, such as declarations that shots would be given (eg, "Well, we have to do some shots"), even if providers added "tag questions" to the ends of such verbal moves (eg, "So, we'll do 3 shots

and the drink. Is this okay?").<sup>28,29</sup> Participatory formats were ones that linguistically provided parents with relatively more decision-making latitude, such as polar interrogatives (eg, "Are we going to do shots today?") and open interrogatives (eg, "What do you want to do about shots?"), or ones that presupposed that parents would not vaccinate (eg, "You're still declining shots?").

Provider pursuit of their original vaccine recommendations in the face of parental resistance was dichotomized into pursuing and not pursuing. Pursuit included moves such as "He really needs these shots," "If he was my child I would definitely go ahead," "Whooping cough can be a killer in the kid under 1," and "It's way less shots than it used to be." Not pursuing included providers either accepting parents' resistance (eg, "Okay" or "Alright" and moving on) or pursuing vaccine recommendations that were mitigated relative to their original recommendations, such as pursuing fewer vaccines (eg, "We could split them up") or delaying shots (eg, "We could do them when you come back in 2 months").

For the analysis, we used Pearson's  $\chi^2$  tests (or Fisher's exact tests) to compare demographic and visit characteristics among VHPs and non-VHPs (NVHPs) and to compare communication practices between both VHPs and NVHPs as well as among first-time and non-first-time vaccine discussions. Pearson's  $\chi^2$  tests (or Fisher's exact tests) were also used to explore the bivariate association between our outcome of parent resistance to the provider's vaccine recommendation and the provider communication practices of initiation and pursuit.

We used backward stepwise logistic regression to identify potential demographic and visit characteristic confounders of this relationship using a significance level for removal of  $>.2$

and for the addition of  $<.1$ . We did not include individual provider and clinic/practice categorical variables in our modeling because their association with our main outcome and predictors was not found to be significant in bivariate analyses ( $P > .1$ ). We performed multivariate logistic regression to examine the association between provider initiation and parental resistance while adjusting for confounders that were retained in backward stepwise modeling and that were not narrowly distributed<sup>30</sup> (parent hesitancy status, parent race, parent age, child age, length of vaccine discussion, and first-time vaccine discussion). For all regression analysis, robust SEs were used to account for within-provider clustering.

## RESULTS

We enrolled 16 pediatric providers from 9 primary care practices. Among the enrolled providers, 10 were women and 1 was a nurse practitioner. Practice settings of participating providers included university-based ( $n = 2$ ), community hospital-based ( $n = 1$ ), multispecialty group ( $n = 2$ ), urban private ( $n = 1$ ), and suburban private ( $n = 3$ ) practices.

We videotaped 113 health supervision visits between participating providers and enrolled parents; 2 (2%) videos did not contain a vaccine discussion and were excluded from further analysis. Among the 111 videotaped visits that were analyzed, 55 (50%) included VHPs (Table 1). The majority of participating parents were married, white mothers who were  $\geq 30$  years old and had a household income  $> \$75\,000$ . There were no significant differences in demographic characteristics between participating VHPs and NVHPs.

The frequencies of provider general vaccine communication practices are shown in Table 2. The majority of providers did not explicitly solicit parental

**TABLE 1** Demographic Characteristics of Study Population

Characteristics	Total (N = 111)	VHP (n = 55)	NVHP (n = 56)	P <sup>a</sup>
Parent aged $\geq 30$ years <sup>b</sup>	75 (77)	36 (72)	39 (83)	.2
Mother <sup>b</sup>	86 (89)	47 (94)	39 (83)	.11
Parent's marital status				
Married or living with a partner <sup>b</sup>	89 (92)	46 (92)	43 (91)	1.0
Parent education				
Some college/2-year degree or more <sup>b</sup>	84 (87)	41 (84)	43 (91)	.36
Household income				
$> \$75\,000$ <sup>b</sup>	59 (62)	28 (57)	31 (67)	.30
Parent race/ethnicity				
White <sup>b</sup>	79 (81)	40 (80)	39 (83)	.71
Number of children in household				
1 child <sup>b</sup>	55 (57)	28 (56)	27 (57)	.89
Child eligible for study is first-born <sup>b</sup>	60 (62)	28 (56)	32 (68)	.22
First immunization discussion <sup>b</sup>	18 (26)	8 (21)	10 (34)	.2
Child aged $\leq 2$ months	42 (38)	20 (37)	22 (39)	.75
Length of immunization discussion $< 5$ minutes	44 (40)	23 (42)	21 (38)	.64

Data are presented as  $n$  (%).

<sup>a</sup>  $\chi^2$  test (or Fisher's exact test).

<sup>b</sup> Numbers do not equal total 111 because of missing data.

questions or concerns about vaccines (62%) but did discuss the rationale (55%) and potential side effects (55%) of the recommended vaccines. Providers used general communication practices with similar frequencies among both VHPs and NVHPs and when having first-time and non-first-time vaccine discussions.

How providers initiated their vaccine recommendations and how parents responded to these initiations are shown in Fig 1. The majority of providers (74%) initiated vaccine recommendations by using presumptive formats, but significantly more providers used participatory initiation formats with VHPs than with NVHPs (41% vs 11%;  $P = .001$ ). Of the parents who voiced resistance (41%), the ma-

majority did so by explicitly rejecting some or all of the provider's recommendations (53%). Significantly more VHPs than NVHPs resisted (54% vs 28%;  $P = .009$ ).

Among all parents, a larger proportion resisted vaccine recommendations when providers used a participatory rather than presumptive initiation format (83% vs 26%;  $P < .001$ ). This finding remained true among VHPs (89% vs 30%;  $P < .001$ ). In regression analysis, provider use of participatory initiation formats for their vaccine recommendations was associated with a significantly increased odds of parental resistance to those recommendations in both unadjusted (odds ratio: 14.2; 95% confidence interval: 4.9–41.0) and adjusted models that

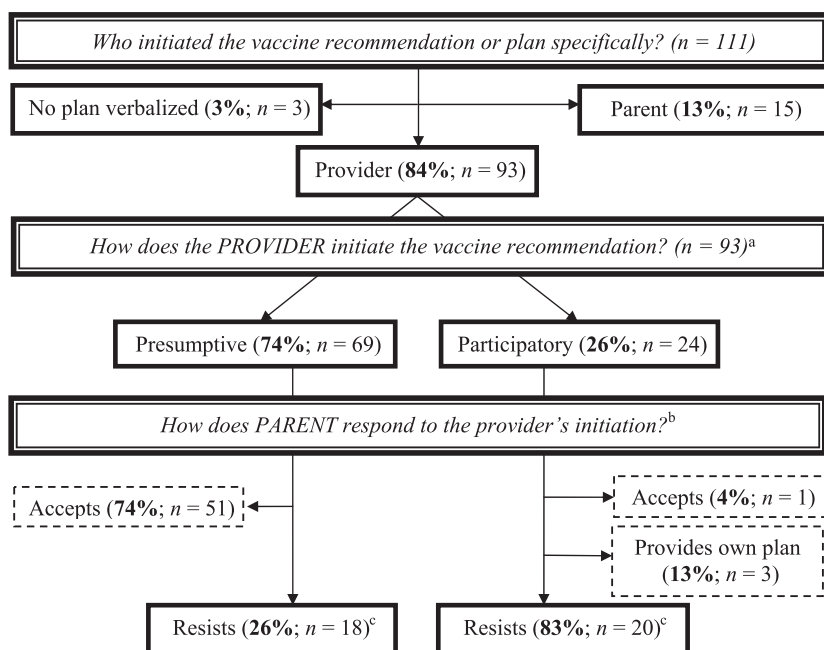
**TABLE 2** General Vaccine Communication Practices by Parental Hesitancy Status

Provider Communication Practice	Frequency			P <sup>a</sup>
	Total (N = 111)	VHP (n = 55)	NVHP (n = 56)	
Does provider explicitly solicit parent questions or concerns about shots?				
Yes	42 (38)	20 (36)	22 (39)	.75
Does provider give rationale for shots?				
Yes	61 (55)	30 (55)	31 (55)	.93
Does provider discuss side effects?				
Yes	61 (55)	28 (51)	33 (59)	.40

Data are presented as  $n$  (%).

<sup>a</sup>  $\chi^2$  test.





**FIGURE 1**

How providers initiated the visit vaccine recommendation and how parents respond. <sup>a</sup>Provider use of participatory initiation formats with VHPs and NVHPs was 41% vs 11%, respectively ( $P = .001$ ,  $\chi^2$  test). <sup>b</sup>Parent resistance to provider initiation among VHPs and NVHPs was 54% vs 28%, respectively ( $P = .009$ ,  $\chi^2$  test). <sup>c</sup> $P < .001$  (Fisher's exact test).

controlled for parental hesitancy status, parent and child demographic characteristics, and visit characteristics (adjusted odds ratio: 17.5; 95% confidence interval: 1.2–253.5).

How providers responded when parents voiced resistance to original vaccine recommendations is shown in Fig 2. Half of the providers pursued their original recommendation with no significant difference in doing so between resisting VHPs and NVHPs ( $P = .31$ ). Significantly more providers pursued their original recommendation when parents resisted with an explicit rejection than when parents used a less explicit type of resistance (80% vs 17%;  $P < .001$ ).

Despite initial resistance, 9 of 19 (47%) parents accepted the provider's vaccine recommendation immediately after providers pursued it. This number included 27% of VHPs (3 of 11) and 75% of NVHPs (6 of 8) ( $P = .07$ ). For those parents who continued to resist ( $n = 10$ ), 30% of providers continued to

pursue their original vaccine recommendation.

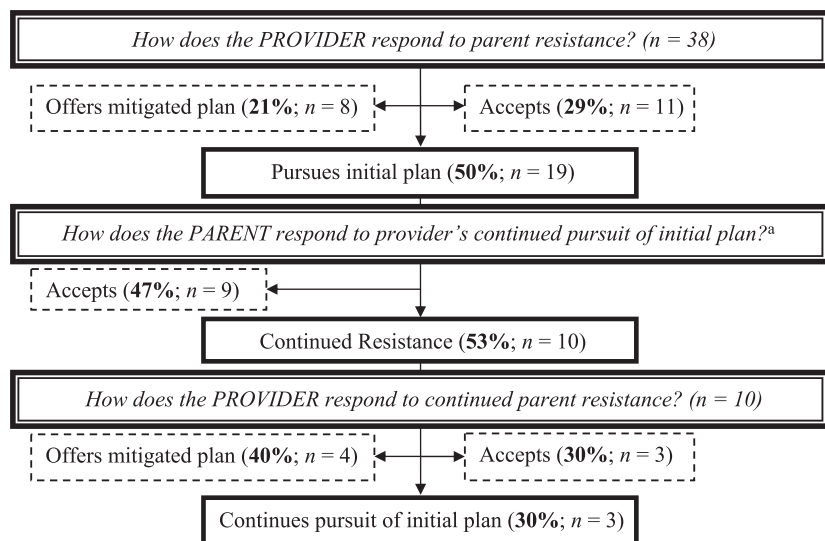
## DISCUSSION

This is the first study to our knowledge that examines the frequency of specific communication practices during provider-parent vaccine discussions at pediatric health supervision visits and their association with parental vaccine resistance. As such, it is the first to address the existing gap in evidence for provider communication behaviors that are effective in increasing parental acceptance of childhood vaccines. These results provide foundational information to help guide the development of quality improvement interventions aimed at increasing vaccination rates among VHPs.

Our finding that use of participatory initiation formats when making vaccine recommendations was associated with increased odds of parental resistance highlights the significance of initiation as a communication practice in vaccine

discussions. Although the linguistic format of how a topic is introduced has received attention in other medical settings,<sup>31–34</sup> it has not yet been explored in the context of vaccine discussions. In fact, no previous reference on how to communicate with VHPs<sup>35–40</sup> includes mention of how a provider should initiate the vaccine recommendation.

In addition, this result seems to stimulate reflection on what collaborative communication and shared decision-making connote in the context of childhood vaccines. Although a participatory approach may be aligned with expectations parents have of providers in vaccine discussions<sup>41,42</sup> and be consistent with consensus recommendations that promote collaborative communication as a best practice with VHPs,<sup>35,40,43</sup> use of this approach may need to be reconsidered if it leads to fewer children being fully vaccinated and/or vaccinated on time. Furthermore, there appears to be a need for resolving the incongruity that currently exists with respect to the use of shared decision-making in the childhood vaccine context. Shared decision-making is typically not indicated when there is only 1 medically acceptable choice.<sup>44</sup> Childhood vaccines fulfill this criterion. Yet, shared decision-making is appropriate when a decision is value-laden.<sup>45</sup> In an era of vaccine hesitancy, vaccines also fulfill this criterion. Whether shared decision-making is appropriate in childhood vaccine discussions is likely central to the existing disagreement among pediatricians regarding the appropriateness of dismissing families for refusing vaccines.<sup>46–50</sup> Relatedly, our finding that many providers did not give a rationale for the vaccine(s) recommended and did not discuss potential side effects of these vaccines (and did not do so significantly more often during first-time vaccine conversations) raises issues regarding



**FIGURE 2** How providers pursued their original vaccine recommendation among parents who verbally resisted the provider's initiation. <sup>a</sup>Parent acceptance after provider pursuit among VHPs and NVHPs was 27% vs 75%, respectively ( $P = .07$ , Fisher's exact test).

the type and quality of parental consent obtained by providers. The typical conversation that we observed can be described as simple consent: explanation of an intervention followed by expressed or implied agreement.<sup>44</sup> Simple consent may be appropriate because vaccines represent a low-risk intervention administered according to a schedule in which there are currently no known acceptable alternatives. Furthermore, it is a conversation that is supplemented by written material (eg, the Vaccine Information Sheet) on the risks and benefits of each vaccine. However, as real and perceived risks of vaccines become evident and the absolute risk of vaccine-preventable disease remains low, a conversation that better approximates informed consent may be more appropriate, especially among VHPs.

Another interesting finding was that nearly half of initially resistant parents accepted the provider's original vaccine recommendation if the provider continued to pursue it. These findings seem especially important given that only 50% of providers pursued their original recommendation after initial

parent resistance. Although persistence may pay off, it should be acknowledged that doing so is not without burden. Engaging in conflict with VHPs takes an emotional toll on providers.<sup>15</sup>

There are several limitations to this study. First, it is possible that under normal, nonvideotaped circumstances, provider-parent interaction involves different communication behaviors than those identified. However, other studies have revealed a negligible effect of the videotape on provider and parent behavior,<sup>51</sup> and we used several maneuvers to minimize the Hawthorne effect. Second, we videotaped only a single vaccine encounter and therefore could not assess how specific provider communication practices varied or were associated with vaccination outcomes over time. Because vaccine administration and communication is a longitudinal issue, there may be instances along this continuum in which a participatory initiation or lack of pursuit of a vaccine recommendation is most appropriate to develop rapport and establish trust at the risk of temporarily enabling parent refusal. Third, although we controlled

for several confounding variables related to parent acceptance of childhood vaccines and provider vaccine communication behavior, other unmeasured confounders may exist. There were also too few observations to perform an adjusted analysis of the association of parent acceptance and provider pursuit. Fourth, our outcome of parent resistance was not based on an examination of the child's vaccine records, and therefore is a proxy of their immunization behavior. Last, the coding scheme was developed by using a relatively homogenous sample of providers and English-speaking, white parents with high socioeconomic status from 1 geographic location; therefore, the communication behaviors it is meant to reflect may not be representative or generalizable.

## CONCLUSIONS

How providers initiate their vaccine recommendations at health supervision visits appears to be an important determinant of parent resistance to that recommendation. Also, if providers continue to pursue their original recommendation after encountering parental resistance, many parents eventually agree to it. These associations require confirmation in longitudinal studies with a more diverse population of parents and providers.

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## APPENDIX Coding Scheme

Communication-Behavior Description	Codes	Examples
1. Who initiates vaccine topic generally, in any way?	1 = Pediatrician 2 = Guardian	See 3a and 4a below "So what about vaccines?"
2. Who initiates vaccine recommendation or plan specifically?	1 = Pediatrician 2 = Guardian in a way that allows or provides doctor to initiate the recommendation/plan 3 = Guardian proposes a plan that complies with or endorses recommended plan; if 3, go to 5a and 4a-c = 99 4 = Guardian proposes a plan that resists vaccines or resists recommended plan; if 4, go to 5a and 4a-c = 99 99 = No verbal recommendation or plan	"We know he's getting shots today." "We're going on vacation so I think I would like to get all the vaccines today." "So we wanted to wait on Hep B and the polio and just do the other ones."
3a. Does the pediatrician lead with a prevaccine discussion move? • This must be an initiating action like a question that demands a response, not the beginning of an initiation.	0 = No 1 = Yes 99 = N/A due to guardian initiation (see code 2 above)	"It's time for shots" or "How did he do with the vaccines last time?" or "Do you have questions about the vaccines?"
3b. What type of response does the guardian give to the prevaccine move?	1 = Unmitigated go-ahead 2 = Raises question regarding "fact" of immunization 3 = Raises issue of "concern" regarding immunization 4 = Raises opinion/plan regarding immunization (go to 5a) 5 = Raises multiple issues (1-4 above) 99 = N/A due to no pre-move	Go-ahead = "Fine," "No" "What are the vaccines he has to have?" "It's 3 at once—all today?" "We do want to be vaccinated against whooping cough."
4a. Initiation: How does the pediatrician initiate the vaccine recommendation (key)? Must be an initiating action (T1). Note: sometimes doctors do this over the course of multiple sequences of talk because the recommendation has multiple parts; code on overall recommendation, especially at its end. However, if resistance comes earlier, code at that point. Rule: code on most recent/proximate action	1 = Presuppositional (in favor of shots) 2 = Presuppositional + tag (in favor of shots) or strongly rising questioning intonation 3 = Polar interrogative 4 = Open interrogative 5 = Initiation designed against immunization (note that parent acceptance/agreement with this will be coded as resistance in 4b) 99 = N/A due to code 3 in 2 or code 4 in 3b; or no verbal recommendation or plan at all	"Well we have to do some shots"; "The vaccines we would give today can cause fever" "So we'll do 3 shots and the drink. Is that okay?" "Are we going to do the shots today?" or "Here is option X: Do you want to do that?"; "Are we gonna do some immunizations today?" "How do you feel about the immunizations?" or "What do you want to do about shots?" "You're still declining shots"; "And you're choosing right now not to?"
4b. Response: How does the guardian respond to the pediatrician's initial initiation move? (T2)	0 = Resistance: go to 4c below (note that acceptance of code 5 in 4a is resistance) 1 = Unmarked "response" (eg, continuer, simple acknowledgment of speaking) 2 = Accepts verbally or implicitly accepts by virtue of moving on in next turn 3 = Responds to polar or open interrogative by providing a vaccine plan (go to 5a) 99 = N/A due to no 4a or no recommendation or plan at all	"Mm hm," (if not a response to a question); "Oh"; "Uh huh" "Yes" or "Yeah" (if response to question or proposal); "Okay"; "Right"; "Good"; "That's fine"; "If he gets a fever, can I give him Tylenol?"; or just remaining silent/nonverbally acquiescing Provider: "Are we gonna do some vaccines today?" Parent: "Yes, the Rota ... and the Pentacel"
4c. Resistant response: If 4b = 0, what is the nature of the resistance in the guardian's response to the pediatrician's initial initiation move?	1 = Explicit rejection of some/all of proposal 2 = Demurral 3 = Cites contingency	"I don't want him vaccinated today"; "I want to go slow and just do the MMR" "I haven't really thought about it"; "I don't know" "We're flying tomorrow."

APPENDIX Continued

Communication-Behavior Description	Codes	Examples
	4 = Raises questions or concerns, brief	"Well, where would he get Hep B?" or "What are the side effects?"
	5 = Raises concern, extended (3 or more)	3 or more concerns
	99 = N/A due to no code 0 in 4b	
5a. Pursuit #1: How does the pediatrician respond to or pursue the guardian's response to the initial initiation move? (T3)	1 = Pursues initial bid (ie, does not back down); resists completely (code 1 if 2b = 3 and doctor resists in any way)	"He really needs these shots"; "If he was my child I would definitely go ahead"
	2 = Pursues mitigated version of initial bid, but still more than what parent is going for; resists partially (note: code this when doctors ask parents if they can answer any questions/ concerns to get them to change mind)	"We could do them when you come back in 2 months"; "We could split them up"
	3 = Accepts verbally or implicitly accepts by virtue of moving on in next turn	"Okay"; "Let's check him over" (new activity)
	99 = No recommendation or plan at all	
5b. Response to pursuit #1: If pediatrician's pursuit involves another "bid," how does the guardian respond to the pediatrician's pursuit? (T4)	0 = Resistance: go to 5b1 below	
	1 = Unmarked "response" (eg, continuer, simple acknowledgment of speaking)	"Mm hm"; "Yeah"
	2 = Accept	"Yes" (if response to question), "Okay"; "Right"; "Good"
	3 = Accept presupposed in next turn	"If he gets a fever, can I give him Tylenol?"
	99 = N/A due to no pursuit (ie, 5a = 3)	
5c. Resistant response to pursuit #1: If pediatrician's pursuit involves another "bid," what is the nature of the resistance in the guardian's response?	1 = Explicit rejection of some/all of proposal	I don't want him vaccinated today"; "I want to go slow and just do the MMR"
	2 = Demurral	"I haven't really thought about it"; "I don't know"
	3 = Cites contingency	We're flying tomorrow"
	4 = Raises questions or concerns, brief	"That's a lot of shots" or "pained" reaction
	5 = Raises concern, extended (3 or more)	
	99 = N/A (no code 0 in 5b)	
6. Pediatrician's final move: How does the pediatrician respond to or pursue the guardian's response to the subsequent move? (T5)	1 = Pursues previous bid (ie, does not back down); resists completely	"He really needs these shots"; "If he was my child I would definitely go ahead"
	2 = Pursues mitigated version of previous bid, but still more than what parent is going for; resists partially	"We could them when you come back in 2 months"; "We could spilt them up"
	3 = Accepts verbally or implicitly accepts by virtue of moving on in next turn	"Let's check him over" (new activity)
	99 = N/A due to no pursuit (ie, 5a = 3)	
7a. Global: Number of guardians' vaccine-related questions asked before acceptance of vaccination	Code frequency (0–X); ratio-level data	Note that, by "question," we mean any move that solicits information about vaccines, directly or indirectly.
7b. Global: Number of guardians' vaccine-related questions asked after acceptance of vaccination	Code frequency (0–X); ratio-level data	
8. Global: Does doctor explicitly solicit some/any questions/concerns?	0 = No 1 = Yes	See 3a: "Do you have questions about the vaccines?"
9. Global: Does pediatrician give rationale for immunization?	0 = No 1 = Yes	"Haemophilus is a bacteria that lives in our noses and throats and when I was a kid growing up it was the number 1 cause of meningitis in babies"
10. Global: Does pediatrician discuss side effects?	0 = No 1 = Yes	"We've got the Tylenol and Motrin dosing back here so if she does seem to have any fussiness or fever or soreness after today's shots go ahead and do that."

Hep B, hepatitis B; MMR, measles-mumps-rubella; N/A, not applicable; T1, 1st turn of talk; T2, 2nd turn of talk; T3, 3rd turn of talk; T4, 4th turn of talk; T5, 5th turn of talk.

## The Architecture of Provider-Parent Vaccine Discussions at Health Supervision Visits

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