

Prevalence of Parental Concerns About Childhood Vaccines

The Experience of Primary Care Physicians

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Background: Little is known about the effects of increased parental vaccine safety concerns on physicians' vaccine communication attitudes and practices.

Purpose: To assess among pediatricians and family medicine (FM) physicians: (1) prevalence of parental requests to deviate from recommended vaccine schedules; (2) responses to such requests; and (3) attitudes about the burden and success of vaccine communications with parents.

Methods: Survey of nationally representative samples of pediatricians and FM physicians (N=696) conducted during February to May 2009 with analysis in 2010.

Results: Response rates were 88% for pediatricians and 78% for FM physicians. Overall, 8% of physicians reported that $\geq 10\%$ of parents refused a vaccine and 20% reported that $\geq 10\%$ of parents requested to spread out vaccines in a typical month. More pediatricians than FM physicians reported always/often requiring parents to sign a form if they refused vaccination (53% vs 31%, $p < 0.0001$); 64% of all physicians would agree to spread out vaccines in the primary series at least sometimes. When talking with parents with substantial concerns, 53% of physicians reported spending 10–19 minutes and 8% spending ≥ 20 minutes. Pediatricians were more likely than FM physicians to report their job less satisfying because of parental vaccine concerns (46% vs 21%, $p < 0.0001$). Messages most commonly reported as “very effective” were personal statements such as what they would do for their own children.

Conclusions: The burden of communicating with parents about vaccines is high, especially among pediatricians. Physicians report the greatest success convincing skeptical parents using messages that rely on their personal choices and experiences.

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Introduction

Vaccines are among the most effective public health interventions ever introduced.^{1,2} Routine childhood immunization in the U.S. has led to declines in mortality of 96%–100% during the 20th century for the nine diseases for which universal vaccination was recom-

mended before 1990.³ However, the effectiveness of routine vaccination in nearly eliminating once common diseases has resulted in the public's lack of appreciation for the severity of these diseases and the perception that children may no longer be susceptible to these diseases.^{4,5} Against this backdrop of decreased concern about vaccine-preventable diseases, perceptions that vaccines pose safety concerns have grown, and the vaccine schedule has become more crowded and confusing.^{4,5} Unproven theories regarding vaccine adverse effects and emotional case reports are widely available.⁶ The combination of these factors may lead increasing numbers of parents to refuse vaccines or insist on delaying some vaccines.^{7,8}

The effects of heightened parental concerns on immunization delivery are not well understood. Although healthcare providers are consistently named parents'

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most trusted source of vaccine information,^{7–9} relatively little is known about the extent to which parents voice their concerns to their children's doctors and how this affects clinical practice. The objectives of this study were to assess the following among national samples of pediatricians and family medicine (FM) physicians: (1) perceived prevalence of parents' vaccine safety concerns and requests to deviate from recommended vaccine schedules; (2) physician communication practices regarding vaccination and responses to parental requests to deviate from vaccination schedules; (3) vaccine communication barriers; and (4) physician attitudes regarding the burden and success of communicating with parents about vaccines.

Methods

Study Setting

From February to May 2009, a survey was administered to two national networks of primary care physicians. The human subjects review board at the University of Colorado Denver approved the present study as exempt research not requiring written informed consent.

Population

Recognizing that all methods for drawing unbiased physician samples suffer from limitations,¹⁰ a method was developed for obtaining rapid and high response rates to surveys about policy-relevant immunization issues, as part of a CDC-funded project. Networks of physicians were recruited from the American Academy of Pediatrics (AAP) and the American Academy of Family Physicians (AAFP) who agreed to respond to several surveys a year. After obtaining approximately twice the number of recruits needed for each network, a quota strategy was applied to ensure the representativeness of the samples.^{10,11} A population-based sampling matrix was constructed using demographic and practice data from randomly drawn samples of the AAP and AAFP memberships.

Using population-based estimates, quotas were created for each cell of the 36-cell matrix, which crossed U.S. regions, practice location, and type of practice. Cells were then filled by randomly selecting from the pool of recruits to yield a total of approximately 400 physicians in each network. As described elsewhere,¹⁰ the representativeness of these networks has been examined in a systematic manner. Demographic characteristics, practice attributes, and reported attitudes about a range of vaccination issues were similar when network physicians were compared with physicians of the same specialty who were randomly sampled from the American Medical Association (AMA) master physician listing.¹⁰

Survey Design

The survey instrument was developed collaboratively with the CDC with input from advisory groups of pediatricians and family physicians from six representative states. It was pilot tested in national samples of physicians and modified based on piloting. Portions of the survey regarding desirability of vaccination were theoretically based on the Health Belief Model.¹² Potential parental immunization concerns, barriers to physicians communicating

about vaccines with parents, and potential physician strategies for communicating with parents were based on the literature, previous surveys,^{13–15} and issues raised by physician advisory groups.

The survey provided the following definitions: *vaccine refusal* was "outright refusal without acknowledging that the vaccine would be considered at a later date"; *spreading out* was "postponing one or more vaccines with the intent of receiving them later." Physicians were asked to report percentages of parents who refused or asked to spread out vaccines rather than numbers of patients per given time period, in order to adjust for differences in the amount of children seen by providers in different settings and specialties.

Survey Administration

Physicians were surveyed by Internet or mail, based on preference. The Internet survey was administered using a web-based program (Vovici Corp., Dulles VA). The Internet group received an initial email and up to eight email reminders, whereas the mail group received up to three mailed surveys. The Internet group received one final paper survey by mail if they had not responded.

Analytic Methods

Internet and mail surveys were pooled for all analyses, as physician attitudes have been found to be comparable when obtained by either method.¹⁶ Items regarding physician attitudes, current practices, and potential barriers to vaccine use were asked using 4-point Likert-type scales. Chi-squares were used for comparisons of characteristics of respondents and nonrespondents, and Kolmogorov-Smirnov tests in comparisons of overall distributions of responses to Likert-type scales between respondents in the two specialties. Significant differences between specialties were footnoted in each table and differences of importance discussed in the text. Ninety-five percent CIs are presented in parentheses after each survey response point estimate.

Results

Response rates were 88% (366/416) for pediatricians and 78% (330/423) for FM physicians. Nine (3%) pediatricians and 68 FM physicians (21%) subsequently were excluded because they reported not giving vaccines to children aged <2 years. Respondents did not differ significantly from nonrespondents by physician demographic factors, practice region, location, type of practice, and number of providers (Table 1).

Prevalence of Safety Concerns and Parental Requests to Deviate from Recommended Vaccine Schedules

Compared to 5 years ago, 43% (95% CI=39%, 47%) of physicians thought parents' level of concern had greatly increased; 28% (95% CI=24%, 32%) thought it had moderately increased; and 29% (95% CI=26%, 33%) that it had stayed the same or decreased.

In a typical month, 60% (95% CI=56%, 63%) of physicians reported refusals for 1%–4% of children and 8% of physicians (6%–10%) reported refusals for ≥10% of children; 79% (95% CI=75%, 82%) reported at least one vaccine

refusal in a typical month. Eighty-nine percent (95% CI=86%, 91%) reported at least one request to spread out vaccines in a typical month; 20% (95% CI=17%, 23%) of physicians reported that more than 10% of parents requested to spread out vaccines in a typical month. Table 2 identifies the major issues physicians perceived to be contributing to vaccine refusal in parents of young children.

Vaccine Communication Practices and Responses to Parental Requests to Deviate from Vaccination Schedules

Addressing vaccine concerns at prenatal visits was relatively common; beyond that, few physicians reported using any methods to provide vaccination information outside of well visits (Table 3). Most physicians used information sheets about the severity of vaccine-preventable diseases (57%, 95% CI=53%, 61%), but fewer used any other aids, such as listing of websites (29%, 95% CI=25%, 32%); detailed information sheets about specific concerns such as autism (28%, 95% CI=24%, 31%); pictures of children affected by vaccine-preventable diseases (7%, 95% CI=5%, 9%); or graphs demonstrating decreasing mortality from diseases (4%, 95% CI=3%, 6%).

Table 1. Comparison of survey respondents versus nonrespondents and additional characteristics of respondents, % unless otherwise indicated

Characteristic	Respondents (n=696)	Nonrespondents (n=143)	p-value ^a
Age (years; M)	50.1	49.3	0.37
Male gender	50	62	0.01
Region of the country	—	—	—
Midwest	25	24	0.81
Northeast	20	17	—
South	33	35	—
West	21	24	—
Location of practice	—	—	—
Urban, inner-city	35	34	0.79
Urban non-inner-city/suburban	46	48	—
Rural	19	19	—
Type of practice	—	—	—
Private	79	76	0.91
Community or hospital-based	17	19	—
MCO	4	5	—
Practice size	—	—	—
1 (solo) physician	13	14	0.36
2–5 physicians	42	46	—
≥6 physicians	44	39	—
Patient insurance	—	—	—
SCHIP and Medicaid	—	—	—
<10%	34	—	—
≥10%	66	—	—
Uninsured	—	—	—
<10%	79	—	—
≥10%	21	—	—
Patient race/ethnicity	—	—	—
Black/African-American	—	—	—
<10%	53	—	—
≥10%	47	—	—
Hispanic/Latino	—	—	—
<10%	52	—	—
≥10%	48	—	—

^ap-value represents comparison between respondents and nonrespondents; statistical analyses used: chi-square, t test

SCHIP, State Child Health Insurance Program

As shown in Table 3, overall, 40% (95% CI=40%, 47%) of physicians reported always or often requiring parents to sign a form if they refused vaccination. Significant interspecialty differences were seen; 53% (95% CI=47%,

Table 2. Based on the physician's experience, how much do each of the following contribute to vaccine refusal among parents of children aged <2 years in their practice (n=614)

Concern/belief	A lot	Some	A little/not at all
Concern that their child will suffer long-term complications from vaccines ^a	68 (64, 72)	24 (20, 27)	8 (6, 10)
Concern that their child could develop autism as a result of vaccination ^a	62 (58, 66)	25 (22, 29)	12 (10, 15)
Concern about possible ill effects of thimerosal ^a	33 (29, 36)	39 (35, 42)	29 (25, 32)
Belief that their child is unlikely to get a vaccine-preventable disease	32 (29, 36)	37 (34, 41)	30 (27, 34)
Concern that vaccines will weaken their child's immune system ^a	18 (15, 21)	35 (31, 38)	48 (44, 52)
General worries about vaccines without a specific concern ^a	19 (16, 22)	43 (39, 47)	38 (34, 42)
Belief that vaccine-preventable diseases are not severe enough to warrant vaccination	11 (9, 14)	43 (39, 47)	46 (42, 50)
Concern that their child will suffer immediate, short-term effects (such as fever, pain, or excessive crying)	10 (7, 12)	29 (25, 33)	61 (57, 65)
Opinion that vaccination recommendations are driven by profit considerations of drug companies	6 (4, 8)	24 (20, 27)	70 (66, 74)
Belief that vaccines are not very effective	2 (1, 3)	17 (14, 20)	81 (78, 84)

Note: Values are % (95% CI). Boldface indicates significance.

^aPediatricians more likely than family medicine physicians to report ($p < 0.001$ by Kolmogorov–Smirnov test)

58%) of pediatricians reported this practice compared with 31% (95% CI=26%, 37%) of FM physicians ($p < 0.001$ by Kolmogorov–Smirnov test). The majority of physicians in both specialties would agree to spread out vaccines in the primary series at least sometimes. Among pediatricians, 25% (95% CI=20%, 29%) would dismiss families from their practice always, often, or sometimes if they refused vaccines in the primary series, whereas only 3% (95% CI=1%, 5%) of FM physicians reported doing so ($p < 0.001$ by Kolmogorov–Smirnov test).

Barriers to Vaccine Communication

Among all physicians, the most commonly reported barriers (either *major* or *somewhat of a barrier*) to vaccination discussions were the amount of time these discussions take (62%, 95% CI=58%, 66%); other health issues taking precedence (37%, 95% CI=33%, 41%); perceiving that discussion would be unlikely to change parents' minds (27%, 95% CI=23%, 31%); physicians not knowing enough about vaccine safety evidence (20%, 95%

Table 3. Frequency of practices for dealing with risk communication (n=605)

	Often or always	Sometimes	Never/rarely
Require parents to sign a form if they refuse vaccination ^a	44 (40, 47)	18 (15, 21)	39 (35, 42)
Address vaccine concerns at a prenatal visit ^a	31 (28, 35)	32 (28, 36)	37 (33, 40)
Dismiss families from their practice if they refuse vaccines in the primary series for their child	10 (8, 13)	5 (4, 7)	84 (81, 87)
Agree to spread out vaccines in the primary series ^b	13 (10, 16)	51 (47, 55)	36 (33, 40)
Send information about vaccines to parents before visits ^b	9 (7, 12)	9 (7, 12)	81 (78, 84)
Schedule an extra visit solely to address vaccine concerns	2 (1, 4)	16 (13, 39)	81 (78, 84)
Refer parents who are concerned about vaccine safety to one provider in the practice with interest and expertise in this area	0 (0, 0)	4 (2, 5)	96 (95, 98)
Hold group information meetings for parents to be educated about vaccine safety	0 (0, 0)	1 (0, 1)	99 (99, 100)

Note: Values are % (95% CI). Boldface indicates significance.

^aPediatricians more likely than family medicine physicians to use ($p < 0.001$ by Kolmogorov–Smirnov test)

^bPediatricians more likely than family medicine physicians to use ($p < 0.01$ by Kolmogorov–Smirnov test)

CI=17%, 23%); thinking that parents would not understand risk/benefit information (19%, 95% CI=16%, 22%); and physicians not knowing how to communicate about risk (19%, 95% CI=15%, 22%).

Physician Attitudes Regarding Burden and Success of Vaccine Communication

Most physicians reported comfort with addressing parental questions and concerns and endorsed the importance of establishing parents’ trust and the appropriateness of parents questioning whether their child needed vaccinations (Table 4). Pediatricians were more likely to report that their job was less satisfying because of the need to discuss parents’ questions or concerns about vaccines and to perceive that when parents disagreed with their recommendations it showed a lack of respect for their medical judgment and experience ($p < 0.001$ by Kolmogorov–Smirnov test). However, few physicians had considered stopping administering vaccines because of the burden of discussing vaccine risks and benefits with parents.

When discussing vaccines for the first time with first-time parents of infants, 49% (95% CI=45%, 53%) of physicians in both specialties reported personally spending ≤ 4 minutes; 42% (95% CI=38%, 46%) reported spending 5–9 minutes; and 9% (95% CI=7%, 11%) reported spending ≥ 10 minutes. However, when discussing vaccines with parents who had substantial concerns about vaccines, only 4% (95% CI=2%, 5%) of physicians reported spending ≤ 4 minutes; 36% (95% CI=32%, 39%) reported spending 5–9 minutes; 53% (95%

CI=49%, 57%) reported spending 10–19 minutes; and 8% (95% CI=5%, 10%) reported spending ≥ 20 minutes. The two communication practices most commonly reported as *very effective* in convincing skeptical parents to vaccinate their children were personal statements by physicians about what they would do for their children or about their personal experiences with vaccine safety among their patients (Figure 1).

Discussion

The results of this national survey suggest that primary care physicians perceive that parental concerns about vaccine safety are increasingly frequent, and that vaccine refusal and requests to delay vaccination are also increasing. The data presented here also demonstrate how much time and effort physicians spend discussing childhood immunizations. Differences existed by specialty, notably that pediatricians report lower levels of job satisfaction as a result of this issue and a higher likelihood of dismissing parents from their practice or requiring them to sign a form if they refused vaccines. Most physicians reported that time constraints and competing demands in primary care were the major barriers to these discussions. However, about one in five reported that they did not believe that parents would understand risk/benefit information about vaccines or that they themselves did not know enough about evidence of vaccine safety. Most perceived that personal messages, such as what they would do with their own children, resulted in the most success in convincing skeptical parents.

Table 4. Physician attitudes toward communicating with parents about the risks and benefits of vaccination ($n=619$)

	Strongly agree	Somewhat agree	Somewhat/strongly disagree
Physician feels comfortable addressing parents’ questions or concerns about vaccines.	84 (81, 87)	16 (13, 18)	1 (0, 2)
Establishing trust is the most important part of convincing skeptical parents to accept vaccines.	60 (56, 64)	34 (30, 38)	6 (4, 7)
Parents who question whether or not their child should have a vaccine are doing their job as responsible parents.	23 (20, 26)	51 (47, 55)	26 (22, 29)
The physician believes his or her job is less satisfying because of the need to discuss parents’ questions or concerns about vaccines. ^a	6 (4, 7)	30 (26, 33)	65 (61, 68)
When parents disagree with the physician’s recommendations about vaccination, he or she feels it shows a lack of respect for his or her medical judgment and experience. ^a	4 (2, 5)	29 (26, 33)	67 (63, 71)
The physician has considered no longer administering vaccines in his or her practice because of the burden of discussing vaccine risks and benefits with parents.	0 (0, 1)	4 (2, 5)	96 (95, 98)

Note: Values are % (95% CI). Boldface indicates significance.

^aPediatricians more likely than family medicine physicians to report ($p < 0.001$ by Kolmogorov–Smirnov test)

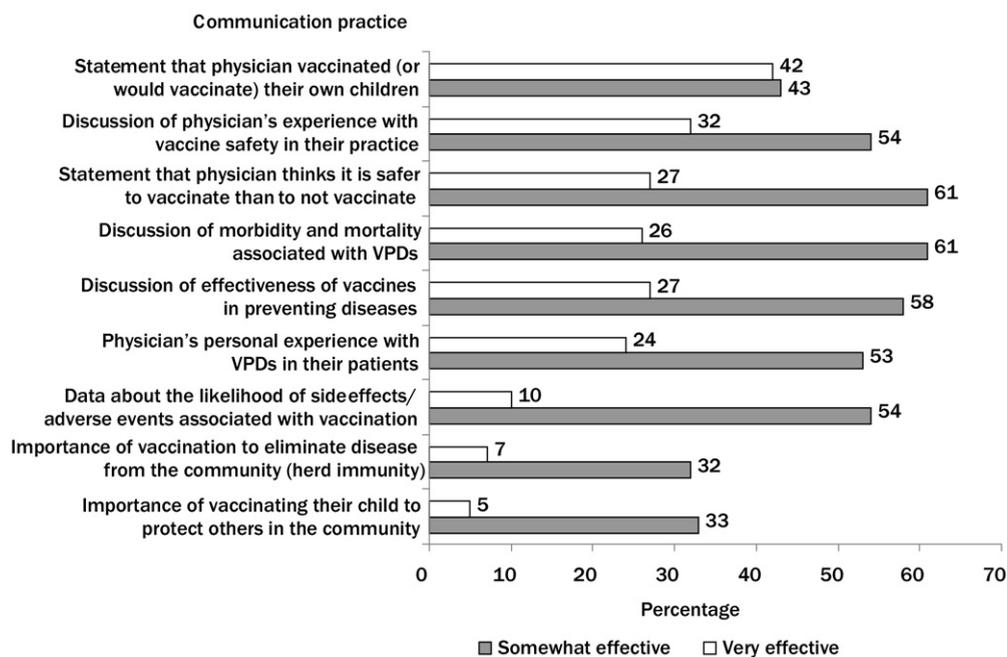


Figure 1. Perceived effectiveness of risk-communication practices (pediatricians/family medicine physicians combined), $n=605$
 Note: All 95% CIs around point estimates $< \pm 5\%$.
 VPD, vaccine-preventable disease

A comparison of the rates of vaccine refusals reported here with earlier studies suggests that such requests have increased. A national survey¹⁷ of FM and pediatric physicians in 2000 found that 93% of pediatricians and 60% of FM physicians reported one or more parental vaccine refusals in the past year. In the present study, 89% of respondents reported at least one vaccine refusal per month, with almost 10% reporting that 10% or more of parents refuse one or more vaccines in a typical month. The current study's data also demonstrate that requests to spread out vaccines are more common than refusals, which is consistent with previous parental survey findings.⁵ The increased number of vaccines recommended during the past decade should be considered, however. In 2000,¹⁸ 13–16 separate administrations were recommended in the primary series, whereas in 2009,¹⁹ this had grown to 20–28 separate administrations for the primary series plus yearly influenza immunization.

The observed between-specialty differences may reflect the fact that childhood immunizations are a much larger part of pediatric as compared to FM practice and, therefore, the burden of communication about vaccines may be felt more by pediatricians. These differences may also reflect differences in the attitudes of parents who seek care from a pediatrician as opposed to an FM physician, although the authors found no papers reporting this finding. Having parents sign a form when they refuse vaccines may be more common among pediatricians because of the readily available Refusal to Vaccinate form provided

by the American Academy of Pediatrics.²⁰ Among both specialties, the percentages requesting parental signature were substantially higher than those reported in a 2004 study¹⁷ that suggested approximately one fifth of pediatric and FM physicians would have parents sign a form if they refused a vaccine.

Overall, physicians reported the top barrier to communicating about vaccinations was the time it takes and the competing demands of primary care. Further, a recent study²¹ suggested that nurses in pediatric offices spend roughly three times the amount of time as physicians discussing vaccines with parents. Because the numbers of parents with vaccine questions and concerns are reportedly increasing, the time burden of communicating about vaccines appears to be substantially increasing for physicians and nurses in private practice.

Physicians perceived that the most effective way of convincing skeptical parents was a personal message. The strength of such messages relies on the parents' trust in their provider's judgment and experience. Previous data^{5,22} from parents' perspectives have shown that assurances from trusted providers were the main reasons parents changed their minds about delaying or refusing vaccines.

Recent data from National Immunization Surveys show minimal change in overall 4:3:1:3:3:1 vaccine coverage from 2007 (77.4%) to 2008 (76.1%), suggesting the increase in parental vaccine concerns is not having a direct impact on coverage nationally.^{23,24} However, pockets of vaccine refusal have produced outbreaks in pertussis,²⁵ measles,^{25,26}

and increases in reports of *Haemophilus influenzae* type b disease among unvaccinated children.²⁷ Importantly, national immunization rates also do not convey the high cost that physicians are paying in their efforts to keep vaccination rates up.¹⁷ Although only 4% of physicians in the present study reported they currently were considering no longer administering vaccines because of the communication burden, this percentage potentially translates to thousands of children being unable to receive vaccines at their site of primary care.

The current study has important strengths and limitations. It is the only national study in the past 5 years to document vaccine risk communication practices and how practitioners perceive this communication affects primary care practice. The surveyed physicians are generally representative of members of the AAP and the AAFP,¹⁰ and the response rate was high. Despite this, however, those who agreed to be surveyed may not express similar views as those who declined to be surveyed or who did not respond. In addition, the sentinel networks may not be representative of physicians who are not members of the AAP or AAFP. Finally, the data rely on self-report rather than observation of practice.

The current data have important implications for primary care. Given the difficulties physicians have providing anticipatory guidance on all the subjects recommended for routine pediatric care within the short duration of a well child visit,^{28–31} the amount of time they spend discussing vaccines may limit discussion of other preventive topics. If dissatisfaction with lengthy vaccine communications continues to grow, this issue may contribute to “burn-out” of primary care physicians. Most importantly, the data presented here suggest that the current paradigm of relying on only a time-limited encounter-based discussion of the benefits and risks of vaccines may not be sufficient to deal with current levels of parental concern. Increased use of social marketing as a behavior-change strategy, similar to tobacco-cessation programs and aimed at hesitant parents who have concerns that may be successfully addressed rather than at parents who refuse vaccines, has been advocated.⁶

In addition, communication efforts at the level of the community, state, or nation to directly counter misinformation about vaccines in the media and on the Internet, to reinforce social norms to vaccinate, and to increase awareness of the dangers of vaccine-preventable diseases may be important in reinforcing information provided by physicians. Within the practice, more efficient ways to deliver information and answer parents’ questions such as group visits or educational interventions to increase discussion with only slight increases in time may be helpful.^{7,32} When educational and reassuring messages fail and parents refuse vaccines, there are currently little evi-

dence-based data regarding vaccine risk communication to guide physicians about the most effective ways to respond,³³ highlighting the need for comparative effectiveness studies in the area of parental vaccine refusal.

Conclusion

Increased parental concerns about vaccine safety and the time constraints of the traditional well child visit are hampering primary care physicians’ immunization delivery efforts. More innovative and comprehensive approaches to risk/benefit communication with parents about vaccines are needed.

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