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Benjamin H. Levi

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ARTICLE

Addressing Parents' Concerns About Childhood Immunizations: A Tutorial for Primary Care Providers

Benjamin H. Levi, MD, PhD

Departments of Pediatrics and Humanities, Penn State College of Medicine, Hershey, Pennsylvania

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ABSTRACT

BACKGROUND. Despite the dangers of vaccine-preventable infections and efforts by health care professionals to promote immunization, parents' resistance to routine childhood immunizations continues to grow. This phenomenon can give rise to frustration among health care providers, as well as create barriers in providing medical care to children in need. In response, we developed a CD-ROM–based tutorial that (1) explains the nature and origins of parents' concerns, (2) addresses clinical implications of resistance to immunization, (3) explores ethical and professional obligations that physicians have toward children and their parents, and (4) discusses how physicians can effectively address parents' concerns.

OBJECTIVE. Our goals were to evaluate the tutorial's effectiveness in improving physicians' (1) general knowledge about parents' resistance to childhood immunizations, (2) knowledge of adverse effects of immunization, and (3) attitudes toward parents' resistance to childhood immunization.

DESIGN/METHODS. After pretesting, expert review, and revision, the 45-minute Penn State Immunization Project tutorial was pilot tested with pediatric and family medicine residents at 7 training programs in 4 states (Pennsylvania, New York, Maryland, and Iowa). Knowledge and attitudes were assessed by using a 26-item pretest/posttest, the results of which were then analyzed by using standard statistical methods.

RESULTS. A total of 122 residents completed the pretest/posttest. Statistically and clinically significant improvements were seen in residents' general knowledge, knowledge of adverse events, and all 5 attitudinal measures regarding childhood immunizations.

CONCLUSIONS. The tutorial *Addressing Parents Concerns About Childhood Immunizations: A Tutorial for Primary Care Providers* is effective in improving resident physicians' general knowledge, knowledge of adverse events, and attitudes. As such, this tutorial has the potential to enhance communication between parents and primary care providers and, more generally, improve clinicians' response to the growing resistance toward routine childhood immunizations.

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Key Words
immunization, pediatricians, professionalism, education, attitudes

Abbreviation
PSIP—Penn State Immunization Project

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Address correspondence to Benjamin H. Levi, MD, PhD, Departments of Pediatrics and Humanities, Penn State College of Medicine, 500 University Dr, Room C1743, Hershey, PA 17033. E-mail: bhlevi@psu.edu

DESPITE THE SUCCESS of routine childhood immunizations, parental resistance continues to grow.[1–13] Although often arising in geographic clusters,[14,15] concern among parents is present in communities throughout the United States, as evidenced by news accounts, new legislation to eliminate state vaccination laws, and clinicians' own experiences.[16–18] This opposition is growing despite the dangers of vaccine-preventable infections,[19–21] reassurance from researchers and oversight bodies as to the safety and efficacy of vaccines,[22–26] and efforts by health care professionals to promote immunization.[26–33] In part, this resistance is because of a proliferation of articles, books, and Web sites questioning the safety and value of routine childhood immunizations.[10,34–37] Also contributing are the mixed messages parents receive from within the scientific and medical community,[13,27,38–45] combined with parents' confusion over the benefits versus risks of immunization.[27,46–49]

Another important ingredient, however, is the response that physicians provide when questioned by parents. Though pediatricians and family practice clinicians have a reputation as friendly and approachable, there are reports of parents having their concerns over immunization dismissed and/or disparaged, sometimes aggressively so.[46] One recent study found that 24% to 39% of pediatricians reported they would dismiss a child from their practice if the parents refused ≥1 of the recommended vaccinations.[50] It is not clear where these children would then go. But when parents' concerns are not effectively addressed, often the end result is that children do not get the medical care they need and deserve.

To help clinicians better understand and deal with parents' concerns over immunizations, we developed, through the Penn State Immunization Project (PSIP), a CD-ROM entitled *Addressing Parents' Concerns about Childhood Immunizations: A Tutorial for Primary Care Providers*. This CD-ROM–based tutorial explains the nature and origins of parents' concerns, including the historical, ideological, and scientific roots of resistance to immunization. It also addresses clinical implications of resistance to immunization, ethical and professional obligations physicians have toward children and their parents, and how physicians can effectively address parents' concerns (see Table 1) The 2 primary goals of this tutorial are to increase knowledge and change attitudes about parental resistance to routine childhood immunizations.

The main target audience for the tutorial are primary care providers in their last stage of training (ie, pediatric and family practice residents, nurse practitioner students, etc), and community providers.

TABLE 1 Overview of PSIP Tutorial

1. Historical, ideological, and scientific roots of the issue
   - A. Current status of routine childhood immunizations
     - i. Epidemiology of vaccine preventable illnesses
     - ii. Immunization guidelines
     - iii. Immunization rates
     - iv. Adverse events
     - v. Risks of diminishing immunization coverage
   - B. Opposition to immunizations
     - i. Rationales
       - a. Ineffective
       - b. Injurious
       - c. Medical contraindications
       - d. Epidemiology
       - e. Unnatural
       - f. Religious objection
       - g. Political objection
       - h. Alternative health belief
     - ii. Research data
     - iii. Patient advocacy
     - iv. Ideological origins
     - v. Historical origins
     - vi. Social policy concerns
     - vii. Origins of parents' concerns
2. Clinical implications
   - A. Research issues
   - B. Individual health concerns
   - C. Public health concerns
3. Ethical and professional obligations
   - A. Benefiting the patient
   - B. Curbing feelings of indignation
   - C. Shared decision-making
   - D. Policy concerns
     - i. Maximizing benefit
     - ii. Promoting justice
4. Responding to parents' concerns
   - A. Timeframe for working with parents
   - B. Resources: Professional and Public
   - C. Depicting/communicating risk
   - D. Professionalism
     - i. Identify points of disagreement/conflict
     - ii. Acknowledge limitations (personal, legal, relational)
     - iii. Trust (as a rate-limiting variable)
     - iv. Identify additional resources for parents
   - E. Putting concerns into context
     - i. Evidence versus misinformation
     - ii. Credible versus non-credible sources
     - iii. Fear versus reasoned perspective
     - iv. Priorities

METHODS

Before developing the PSIP tutorial, we conducted a comprehensive review of (1) English-language professional and lay literature on opposition to childhood vaccinations (using PubMed, Google Scholar, and an extensive review of complementary and alternative medicine publications)[51]; (2) immunization handbooks and related government-sponsored educational materials from Australia, Britain, Canada, New Zealand, and the United States; and (3) online resources from organizations both in support of (eg, World Health Organization, National Network for Immunization Information, American Academy of Pediatrics) and opposition to (eg, National Vaccine Information Center) vaccination.

We identified allegations levied against routine childhood immunization practices, examined common responses to these challenges, and surveyed the relevant

literature on risk communication and conflict management. We then used these themes to develop an alpha-version of the computer-based tutorial, and after obtaining institutional review board approval, tested it with a convenience sample of pediatric residents at the Penn State Hershey Medical Center. This testing included both a written pretest/posttest instrument (developed for this project) and a standardized patient exercise in which residents were videotaped (preintervention and postintervention) interacting with mothers (actually, paid actors) who resisted having their infants immunized. Based on test results and feedback from residents, we refined the alpha version of the tutorial and developed a beta version that was reviewed by experts in adult education, medical education, and professional development, as well as a group of 8 practicing pediatricians. Revisions were incorporated into the final 45-minute PSIP tutorial, which was then pilot tested with a convenience sample of pediatric and family medicine residents at 7 training programs in 4 states (Pennsylvania, New York, Maryland, and Iowa). The present version was delivered in a lecture format by the author; however, a freestanding version of the CD-ROM–based tutorial is in its final stage of development.

Residents' knowledge and attitudes were assessed before and after the intervention using a written 26-item self-administered instrument. Twelve items assessed general knowledge about immunizations, such as immunization rates, impact of physician response on parental behavior, sources of opposition to vaccination, laws concerning immunization, and so on. Eight items assessed knowledge of adverse events from vaccination (proven versus alleged). All 20 of these items used a true/false/would-be-guessing scale. In addition to recording correct and incorrect responses, we also wanted to assess the magnitude of change, including responses of uncertainty (ie, would be guessing). As such, changes in preintervention versus postintervention responses were graded as shown in Table 2.

Five additional items used a 5-point Likert scale (strongly agree to strongly disagree) to measure residents' attitudes regarding (1) the nature and etiology of parents' resistance to vaccination and (2) the appropriateness of physician responses to such resistance. Each increment of change along this scale toward the "desired"* attitude was measured as +1, and each increment of change away from the desired attitude was measured as −1. Thus, the score for each item could range from −4 to +4. The mean change for each item was calculated by summing the positive and negative amounts of change, and averaging this sum by the number of individuals who changed their responses from the pretest to posttest. Because of how results were subsequently grouped, some changes (eg, from agree to strongly agree) may not be transparent in the aggregate report of pretest versus posttest results. The final test item identified the respondent's residency discipline and year.

TABLE 2 **Pretest/Posttest Scoring**

Pretest Response	Posttest Response	Score
Incorrect	Incorrect	No score
Incorrect	Guess	+0.5
Incorrect	Correct	+1
Guess	Guess	No score
Guess	Incorrect	−1
Guess	Correct	+1
Correct	Correct	No score
Correct	Incorrect	−1
Correct	Guess	−1

TABLE 3 **Demographics**

Characteristic	*n* (%)
PGY 1	45 (37)
PGY 2	34 (28)
PGY ≥3	43 (35)
Pediatrics	60 (49)
Pediatrics/internal medicine	12 (10)
Family practice	50 (41)
Iowa	29 (24)
Maryland	14 (11)
New York	42 (34)
Pennsylvania	37 (30)

PGY indicates postgraduate year. Due to rounding, numbers may not add to 100%.

STATISTICAL ANALYSIS

Changes in preintervention versus postintervention responses were calculated as described in "Methods." Descriptive statistics were generated including means, medians, and SDs for change variables and frequency tables for the original pretest and posttest responses. Differences between residency year/type and the outcome measures were characterized by using contingency table analysis; significance levels were determined by Pearson's χ^2 statistic and 2 sample *t* tests.

RESULTS

In the 7 residency programs surveyed, there was a total of 281 residents. Of these, 122 (43%) were able to attend the lecture presentation, 100% of whom completed the pretest/posttest. Table 3 describes their distribution in terms of year and program.

Residents' general knowledge improved significantly postintervention on 11 of 12 items (Table 4). Overall, 91% of postintervention responses were correct, compared with 50% of preintervention responses (see Fig 1). Fifty percent of the residents changed their response from pretest to posttest, with a mean change of +0.84 on a −1 to +1 scale. There were no statistically significant

*A given attitude was determined to be "desired" on the basis of existing evidence regarding immunization and risk (see refs 2, 12, 13, 23, 25, 41, 42, 44, 48, and 54), expert advice (see refs 2, 9, 27, 30, 46, 49, 50, 55, 60, 69, 71, and 73), and American Academy of Pediatrics policy (see refs 59 and 61).

TABLE 4 **Change in General Knowledge**

Test Item (Correct Answer)	Percent Correct		*P*
	Pretest	Posttest	
In the United States, >95% of 3- to 4-year-old children are up-to-date for their immunizations. (False)	57	85	<.0001
Though primarily intended for use by physicians, the National Vaccine Information Center (NVIC) is also a good resource for parents. (False)	2	89	<.0001
Opposition to vaccination is a fairly recent phenomenon, arising over the past 20–30 years. (False)	40	98	<.0001
Evidence shows that physicians' responses have little impact on whether parents vaccinate their children. (False)	64	98	<.0001
For an injury to be reported and recorded in the Vaccine Adverse Events Reporting System, it must be shown to have to been caused by a vaccine. (False)	31	79	<.0001
Drug company funded research is much more likely (compared to independent research) to favor drug products being brought to market. (True)	67	96	<.0001
Prominent physicians have voiced concern about the safety of routine childhood immunizations. (True)	41	98	<.0001
In parts of the world, unsafe injection practices have linked immunization with hepatitis and HIV. (True)	44	92	<.0001
In the United States, the risk of contracting vaccine preventable illnesses is still quite high. (False)	49	83	<.0001
With regard to attending public school, state laws typically permit parents to refuse immunizations for their children if their decision is based on a religious belief. (True)	75	98	<.0001
With regard to attending public school, state laws typically permit parents to refuse immunizations for their children if their decision is based on a philosophical (nonreligious) belief. (False)	37	80	<.0001
State laws require that children receive all childhood immunizations recommended by the American Academy of Pediatrics. (False)	53	57	0.49

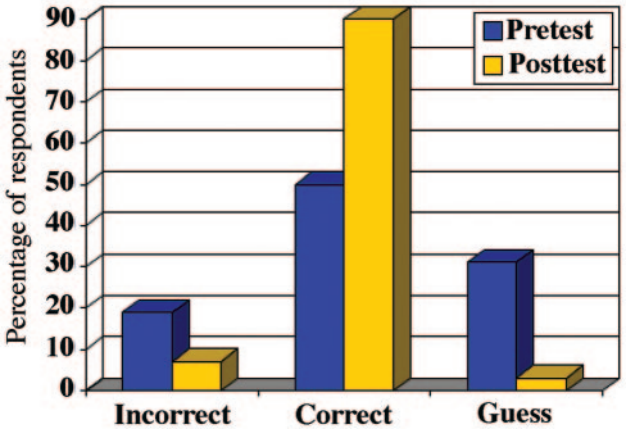

FIGURE 1
Change in 12 general-knowledge items.

differences based on respondents' year in residency, type of residency program, or geographic location.

Residents' knowledge of adverse events also improved significantly on 5 of 8 items (Table 5). Overall, 89% of posttest responses were correct, compared with 56% pretest (see Fig 2). Forty-two percent of the residents changed their response from pretest to posttest, with a mean change of +0.72 on a −1 to +1 scale. There were no statistically significant differences based on respondents' year in residency, type of residency program, or geographic location.

Change in attitude was assessed by measuring differences in preintervention/postintervention responses to the following statements, all 5 of which showed significant changes. For the statement "It is understandable

TABLE 5 **Change in Knowledge of Adverse Events**

There is good scientific evidence that in some children immunizations cause/precipitate . . . (Correct Answer)	Percent Correct		*P*
	Pretest	Posttest	
Anaphylaxis (True)	66	93	<.0001
Inconsolable crying (up to 3–4 h) (True)	65	99	<.0001
Sudden infant death syndrome (False)	72	95	<.0001
Hypotonic reactions (incidence ~1 in 2000 kids) (True)	26	79	<.0001
Anorexia (up to 48 h) (True)	33	91	<.0001
Behavior disorders (chronic) (False)	74	79	.419
Fever >102°F (incidence 5%–10%) (False)	20	0	<.0001
Seizures (incidence ~1%) (True)	23	23	.013

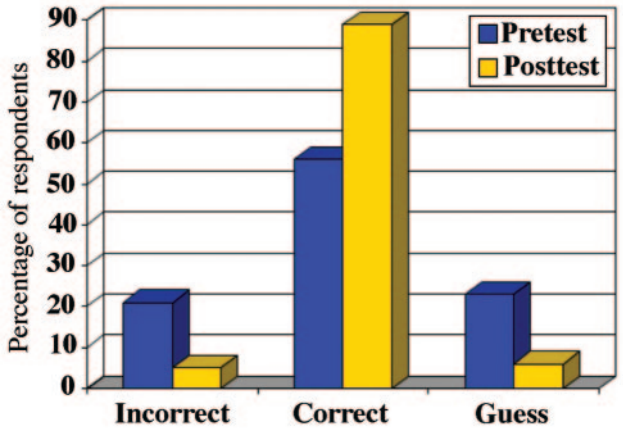

FIGURE 2
Change in 8 knowledge-of-adverse-events items.

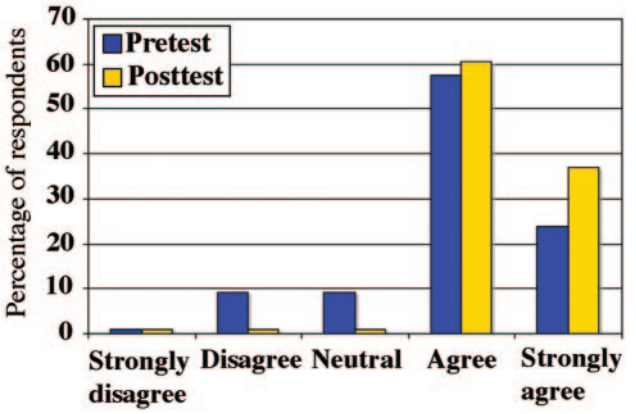

FIGURE 3
"It is understandable that many parents are concerned about the risks of vaccination." Twenty-nine percent changed their response (mean change: 1.31; $P < .0001$) to agree/strongly agree (81% pretest vs 98% posttest).

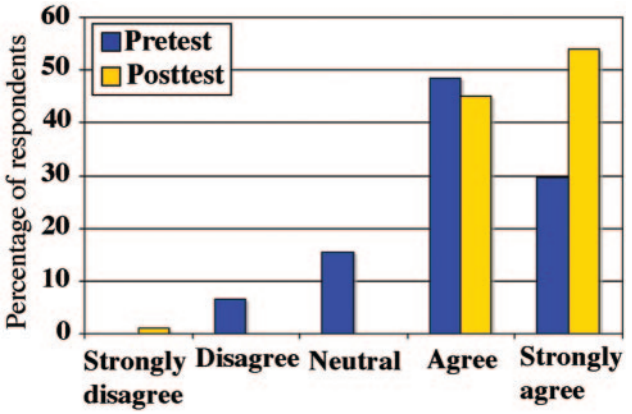

FIGURE 4
"Parents receive mixed messages about routine childhood immunizations." Forty-eight percent changed their response (mean change: 1.05; $P < .0001$) to agree/strongly agree (78% pretest vs 99% posttest).

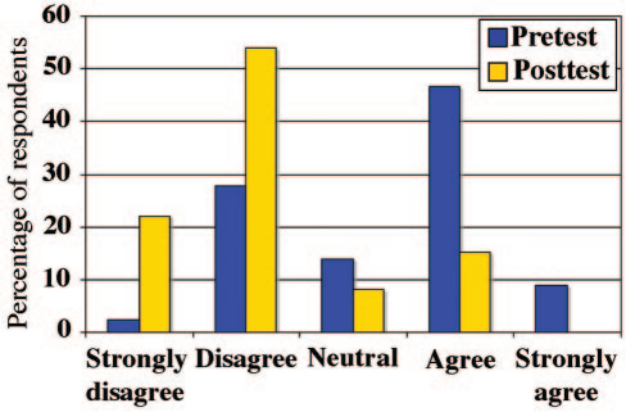

FIGURE 5
"Most adverse reactions to routine childhood immunizations are insignificant by any measure." Sixty-nine percent changed their response (mean change: 1.67; $P < .0001$) to disagree/strongly disagree (30% pretest vs 76% posttest).

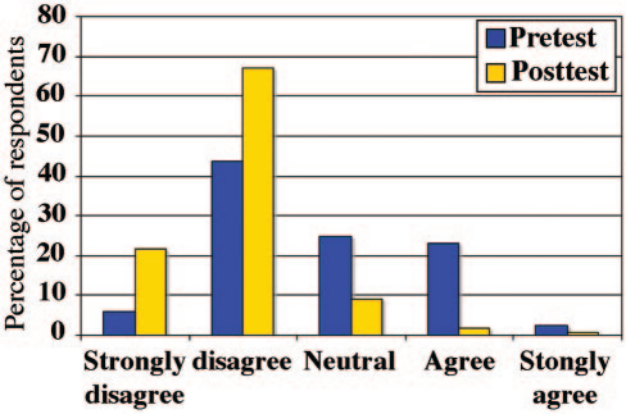

FIGURE 6
"Most parents who resist/oppose vaccinating their children are unreasonable." Sixty-one percent changed their response (mean change: 1.28; $P < .0001$) to disagree/strongly disagree (49% pretest vs 88% posttest).

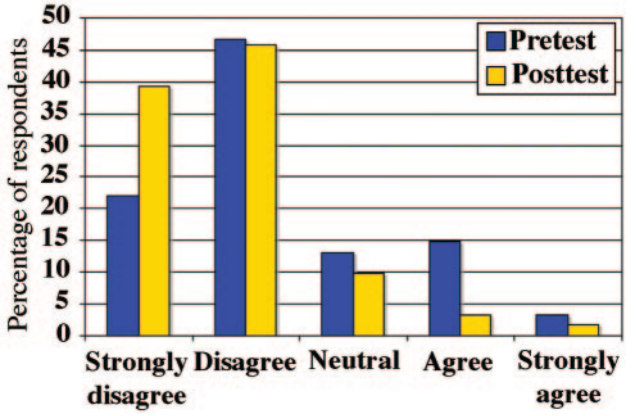

FIGURE 7
"Physicians are professionally justified in refusing to care for children whose parents oppose routine childhood immunizations." Forty-five percent changed their response (mean change: 1.07; $P < .0001$) to disagree/strongly disagree (68% pretest vs 85% posttest).

that many parents are concerned about the risks of vaccination," 29% changed their response, 98% agreed or strongly agreed on the posttest, compared with 81% pretest, with a mean change of +1.31 ($P < .0001$; Fig 3). For the statement "Parents receive mixed messages about routine childhood immunizations," 48% changed

their response, 99% agreed or strongly agreed on the posttest, compared with 78% pretest, with a mean change of +1.05 ($P < .0001$; Fig 4). For the statement "Most adverse reactions to routine childhood immunizations are insignificant by any measure," 69% changed their response, 76% disagreed or strongly disagreed on the posttest, compared with 30% pretest, with a mean change of + 1.67 ($P < .0001$; Fig 5). For the statement "Most parents who resist/oppose vaccinating their children are unreasonable," 61% changed their response, 88% disagreed or strongly disagreed on the posttest, compared with 49% pretest, with a mean change of +1.28 ($P < .0001$; Fig 6). For the statement "Physicians are professionally justified in refusing to care for children whose parents oppose routine childhood immunizations," 45% changed their response, 85% disagreed or strongly disagreed on the posttest, compared with 68% pretest, with a mean change of + 1.07 ($P < .0001$; see Fig 7). There were no statistically significant differences based on respondents' year in residency or type of residency program for any of these 5 attitudinal items. Geographic location, however, did matter in several state-to-state comparisons, with respondents from New York programs often showing less of a mean positive change. This was particularly true regarding the justifiability of refusing to provide care to those whose parents resisted immunization, with residents based in New York having a mean change of +0.06 compared with a mean change of +1.53 for residents from the other 3 states ($P = .002$).

DISCUSSION

Our educational tutorial was very successful in improving pediatric and family practice residents' general knowledge and knowledge of adverse events regarding childhood immunizations. Although some residents were well informed about the historical and ideological origins of parents' resistance to vaccination, most were not. The majority was unfamiliar with resources for accurate information, the nature of the reporting system for adverse events, physician involvement in the antivaccine movement, and the status of philosophical objections to immunization. A large portion of residents likewise had inaccurate beliefs about many of the clinical features that are (or are not) associated with routine childhood immunizations.

On all but 3 of the clinical measures, posttest knowledge improved significantly. For the 2 of 3 that did not (fever and seizures), it was subsequently noted that the wording and layout of the items in question lent themselves to misinterpretation. In the case of "Fever >102°F (incidence 5%–10%)," for example, 100% of respondents got this wrong on the posttest (the correct incidence being ~1%), presumably because the notation "(5%–10%)" had too small a font. That said, the combined knowledge posttest scores were significantly improved on 17 of 20 items.

Having a solid understanding of the clinical and contextual features that figure into parents' resistance to immunization is crucial to respond appropriately to worried parents, the majority of whom simply are concerned about potential downsides of immunization and are confused about what and whom to believe.[30,49,52–54] For those parents who resist/oppose immunization because of well-defined philosophical, religious, and/or alternative health beliefs, primary care providers must also understand the historical, ideological, and scientific roots of resistance to immunization.[11–13,49,52,55] Our tutorial addresses these issues. It also addresses the clinical implications of resistance to immunization, how to communicate risk, how to deal with conflict that may arise,[56–58] and how to identify reliable resources. Lastly, our tutorial discusses ethical and professional obligations with regard to children and parents, and how to effectively and respectfully help put parents' concerns into context.[59–61]

Physicians are trained to be on the lookout for bad outcomes (including infectious disease) and to do what is feasible to prevent them. So, perhaps it is not too surprising that when a safe and effective tool such as immunizations is available, many physicians react with surprise if not consternation that someone would reject this offer of protection. The section of the tutorial on ethical and professional responsibilities is meant to address the tendency among some physicians to dismiss parents' concerns as simply ignorant and/or confrontational.

Research has shown that how we choose to respond to parents' concerns about immunizations significantly affects the course of action that parents choose, the partnership we have with them, and hence the quality of health care their children receive.[15,55,60,62–65] A recent article examining parents' experiences and decisions regarding immunizations provided the following depiction as not uncommon for parents who resist having their children immunized: "You just feel really painted into a corner and there's really no support in the medical community. I went through. . .a dozen doctors who were just like, 'I will not treat you if you're not going to immunize your child'."[46] Nor are such professional reactions rare.[50,66,67] Significant numbers of physicians hold that failure to immunize is tantamount to child abuse,[66,67] and in 1 study the majority of county health directors believed that criminal charges and injunctions should be brought against parents for failing to immunize their child.[59,61,68]

For those who wish to better understand why it is a parent's right (and responsibility) to decide what is in their child's interests, including immunization, there is a growing literature that deals specifically with the ethics of immunization.[61,69–74] Having already put into context how and why parents may have arrived at their resistance to immunization, the PSIP tutorial educates health

care providers about relevant ethical and professional norms, and further explains how to work with such parents in ways that are respectful and effective.

It is in this regard that the success of our tutorial is perhaps best demonstrated, namely, changes in attitude. After the tutorial, participants not only viewed parents' resistance as more understandable and less unreasonable, given what parents had been exposed to, but also were more likely to believe that we are not professionally justified in refusing to care for children whose parents oppose routine childhood immunizations. On this final measure, 45% of participants reported some change in their attitudes toward parents who oppose immunizations, with only 15% maintaining that it is justified to refuse care because of opposition to immunization, compared with 32% before the tutorial. If the numbers from Flanagan-Klygis et al's study[50] are generalizable, namely, that 24% to 39% of physicians are willing to dismiss from their practice children whose parents refuse some or all immunizations, then our tutorial has the potential to help many physicians build more effective partnerships with the growing number of parents who resist immunizations.

Developing and nurturing a strong relationship with parents establishes trust, and without trust there is little we can do to help children and their parents. In a study that examined decision-making about vaccines, mothers who resisted immunization reported that despite seeking a trusting relationship with traditional pediatricians they felt alienated and turned away.[46] As all pediatricians know, immunization is seldom an urgent matter. In the presence of a trusting relationship, we can normalize the issue as one of many we need to address, and reframe parents' resistance in terms of our common interest in their child's well-being. Our tutorial is designed to help physicians accomplish this goal.

We know from research that doctors who communicate effectively and respectfully are more likely to have their patients follow their recommendations and less likely to be sued.[27,46,62,75–78] Our tutorial is not itself a tool for developing physicians' communication skills, but it is intended to both provide tools to help them communicate with parents who resist immunization, and remind physicians that it is the job of parents to worry, and it is our job to help them figure out what to worry about.

LIMITATIONS

There are several limitations to this study. First, the calculations of mean change on the general knowledge and knowledge of adverse events items do not account for those who did not change their answer pretest to posttest. Second, the present study only examined knowledge and reported attitudes immediately before and after the intervention, not longitudinally. Thus, it is not clear how long the observed changes last. Third, because the study did not examine actual practice habits, it is not known how much behavior would change because of this intervention. In pilot testing of the alpha version of the tutorial, this was addressed with the use of videotaped interactions with "mock moms" preintervention and postintervention, including controls who had 2 preintervention encounters to control for improvement on repetition. Additional such testing would strengthen the present findings. Fourth, because of time and sample size constraints, the present study did not record demographic variables, and so cannot identify outcome differences between men and women, ethnic/racial groups, age cohorts, previous experience with parents, and so on. Fifth, the study included only residents, not board-certified physicians. Thus, it is not clear whether the current findings are generalizable to pediatricians and family medicine physicians out in practice. Additional studies are underway to examine this.

CONCLUSIONS

Routine childhood immunizations are among the most effective preventive health measures of the modern era. Despite their remarkable success, along with the very real dangers of vaccine preventable illnesses, there is growing concern among parents over the appropriateness of immunization. Our tutorial is an educational intervention designed to help physicians better understand the nature and origins of parents' concerns, appreciate relevant ethical and professional issues, and develop a respectful and effective approach for working with parents who resist immunization. The tutorial is intended to be presented in person to physicians or other primary care providers and has sufficient support materials as to allow an interested individual to prepare himself or herself to give the presentation. Our data show that our tutorial is a very effective intervention for resident physicians. Additional study needs to be done to determine whether it is equally effective for physicians (and/or other primary care providers) already in practice.

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Benjamin H. Levi

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