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Identifying Medical Residents' Perceived Needs in Vaccine Education though a Needs Assessment Survey

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Abstract

Background: Vaccine education during residency is not standardized. Little is known about resident perspectives on vaccines and ideal vaccine training.

Methods: A convenience sample of pediatric and family medicine (FM) residents were surveyed using a de novo 22 question survey to understand perspectives on vaccines and current and preferred vaccine education curriculum. Responses were analyzed categorically and compared by resident year using Fisher's Exact test.

Results: In October 2016, 126 residents from 9 pediatric and FM programs completed the survey. Resident respondents' training levels varied. Most were 25-29 years old and female. High familiarity with vaccines and agreeing to defer recommended vaccine(s) increased with additional years of training ($p<0.01$). Most residents want to learn more about vaccine risks, benefits, and communication skills. Preferred training modalities were in-person lectures, online modules, and continuity clinic didactics. Residents rated MMR and Hib vaccines as "highly important" more frequently than they did so for HPV and influenza vaccines. One fifth of respondents reported some degree of hesitancy regarding vaccines.

Conclusion: Results provide insight on framework and scope for development of a vaccine education curriculum. Identification of vaccine hesitancy among residents and the rating of certain recommended vaccines as of variable importance underscores the need for resident vaccine training.

Keywords: Vaccine education; Vaccine safety; Vaccine hesitancy; Needs assessment; Resident vaccine education

Introduction

Parents are increasingly delaying or refusing vaccines for their children and/or themselves (Siddiqui, Salmon and Omer, 2013). Communities with high rates of under-vaccination have higher rates of vaccine preventable disease (Glanz *et al.*, 2009; Glanz *et al.*, 2010; McCarthy, 2015). Primary care physicians need to be prepared to discuss vaccines with hesitant parents in order to optimize vaccination rates. However, standardized evidence-based residency training to manage 'vaccine hesitancy' has not been developed. A 2014 survey of Association of Pediatric Program Directors members showed that most pediatric training programs lacked an organized curriculum on vaccine safety or parental vaccine hesitancy, yet most respondent program directors believed such training would be valuable and important (Williams and Swan, 2014). Further, it is unknown whether residents harbor vaccine hesitant attitudes similar to the general population, which would undermine their vaccine recommendations.

In 2016, our team surveyed pediatric and family medicine (FM) residents to understand their perspectives on vaccination and desired vaccine training. Our goal was to assess the need and structure for the development of an evidence-based vaccine education curriculum for residents by examining residents' confidence, attitudes, hesitancy and training needs related to vaccines.

Methods

This study utilized a needs assessment survey to gauge/obtain pediatric and family medicine residents' needs in vaccine education in the US. Our study was approved by the Institutional Review Board of Children's Mercy Kansas City.

Setting. In October 2016, we surveyed residents from a convenience sample of US pediatric and FM residency programs. Programs were identified through outreach by team investigators.

Survey tool. We developed the resident survey using an iterative approach. First, the overarching goal of the survey was determined: assessment of knowledge, attitudes, confidence, hesitancy regarding vaccines, and preference for training format. All potential questions were developed *de novo* and reviewed by the co-authors for relevancy and understandability. Draft survey items were then piloted with a small sample of pediatric residents from a single institution and their feedback was incorporated as appropriate.

The final survey included 22 questions on perceived vaccine importance, vaccine familiarity, vaccine attitudes, vaccine hesitancy, comfort level in communicating with patients and parents about vaccines, current vaccine training, preferred vaccine educational content, and preferred modalities for training. Most questions were formatted using 3 to 5-point Likert scales. Questions evaluating preferred vaccine educational content, current vaccine training, and preferred training modalities included several response options whereby respondents could select more than one choice. Several questions included optional open-ended response options for "other comments". The survey also included 6 demographic questions (resident type, institution, race/ethnicity, age, gender, and program training year).

Data Collection. The lead site (Children's Mercy Kansas City) sent an email with an introduction and web-link to the survey to program directors at participating programs who then forwarded to their residents for completion. Two email reminders were sent to maximize survey response rate. No incentives were provided for the survey completion. We administered the survey using an encrypted electronic data capture system. Responses were anonymous.

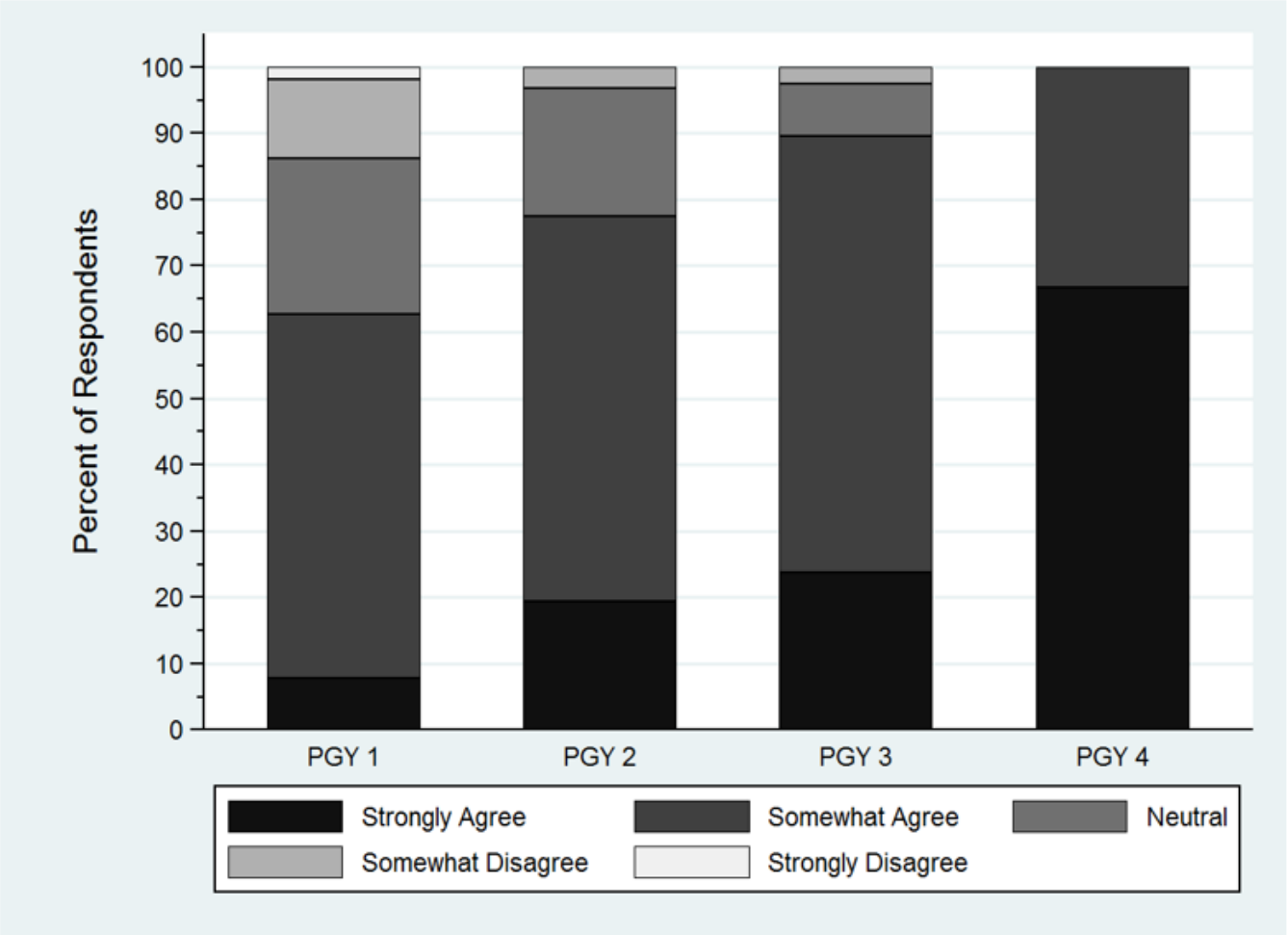
Analysis. Results were analyzed categorically using SAS (v 9.4). The distributions of resident responses to specific items of interest were compared by reported year of training, with Fisher's exact test applied to determine statistical significance.

Results/Analysis

Population. The surveyed population included residents from 9 training institutions (1 FM program, 7 pediatric programs, and 1 program with both FM and pediatric residencies). These institutions were in six states (California, Indiana, Kansas, Missouri, Pennsylvania, Tennessee) and were of various size (range:19 to 108 residents per program). Over a 2-week allotted period, 126 residents (14% of all residents at participating institutions) completed the online survey. Respondent residents' training levels varied [51 were post-graduate year (PGY1), 31 PGY2, 38 PGY3, 3 PGY4, and 3 unspecified]. Most respondents were female (69%) and aged 25-29 years (76%). Respondents identified their race/ethnicity as White (68%), Asian (20%), Hispanic (7%), or African American (2%).

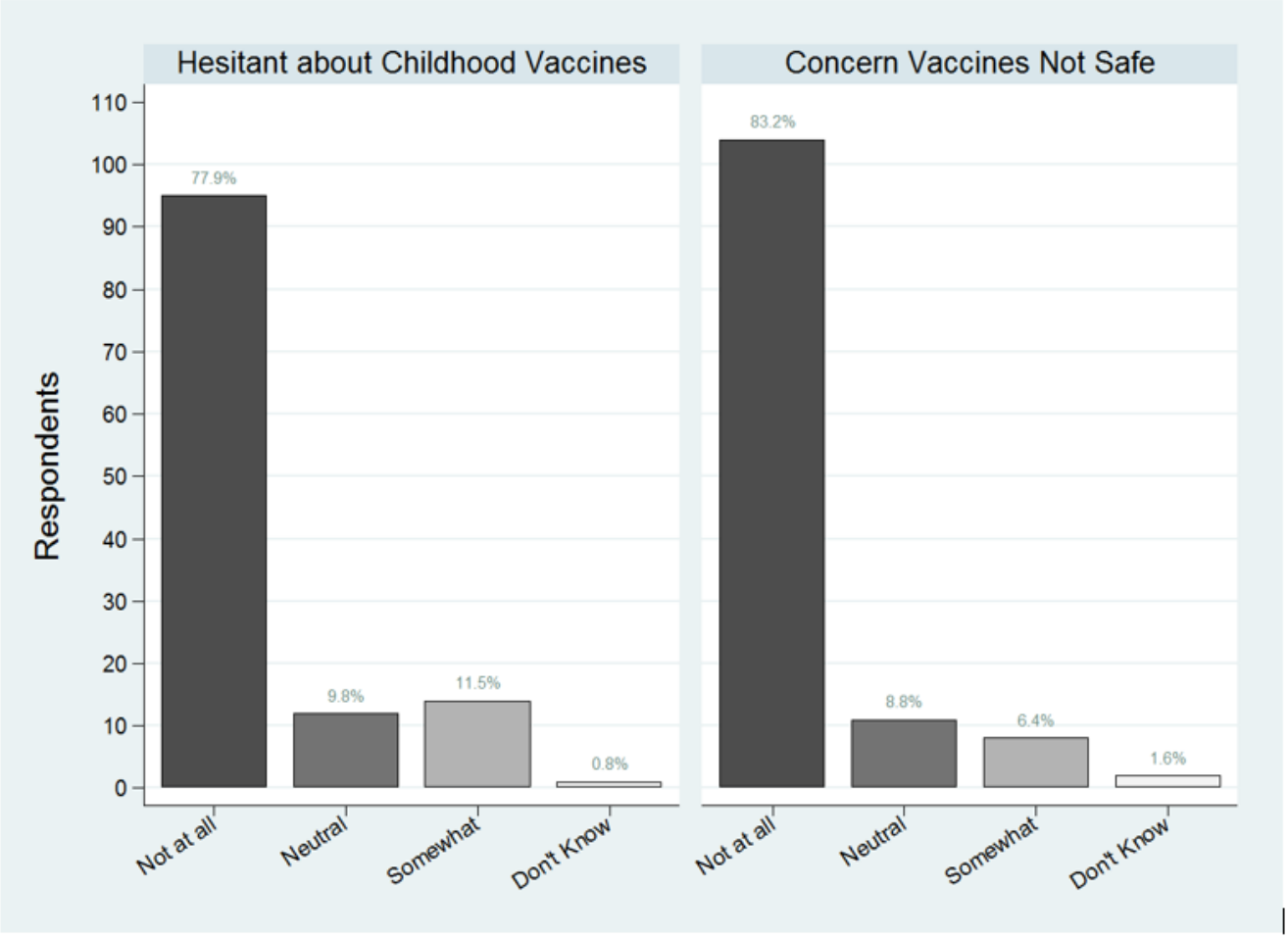
Resident Confidence. (Figure 1) Almost all residents reported moderate or high familiarity with childhood immunizations. Regarding the statement "I am confident answering questions about vaccines", 17.5% of residents strongly agreed, 58.7% somewhat agreed, 16.7% were neutral, and 6.3% somewhat disagreed. The proportion of residents strongly agreeing or agreeing to this question increased with each additional year of training ($p<0.01$).

Figure 1: Residents' responses to question regarding confidence in answering all vaccine questions ("I am confident answering questions about vaccines"), by resident year



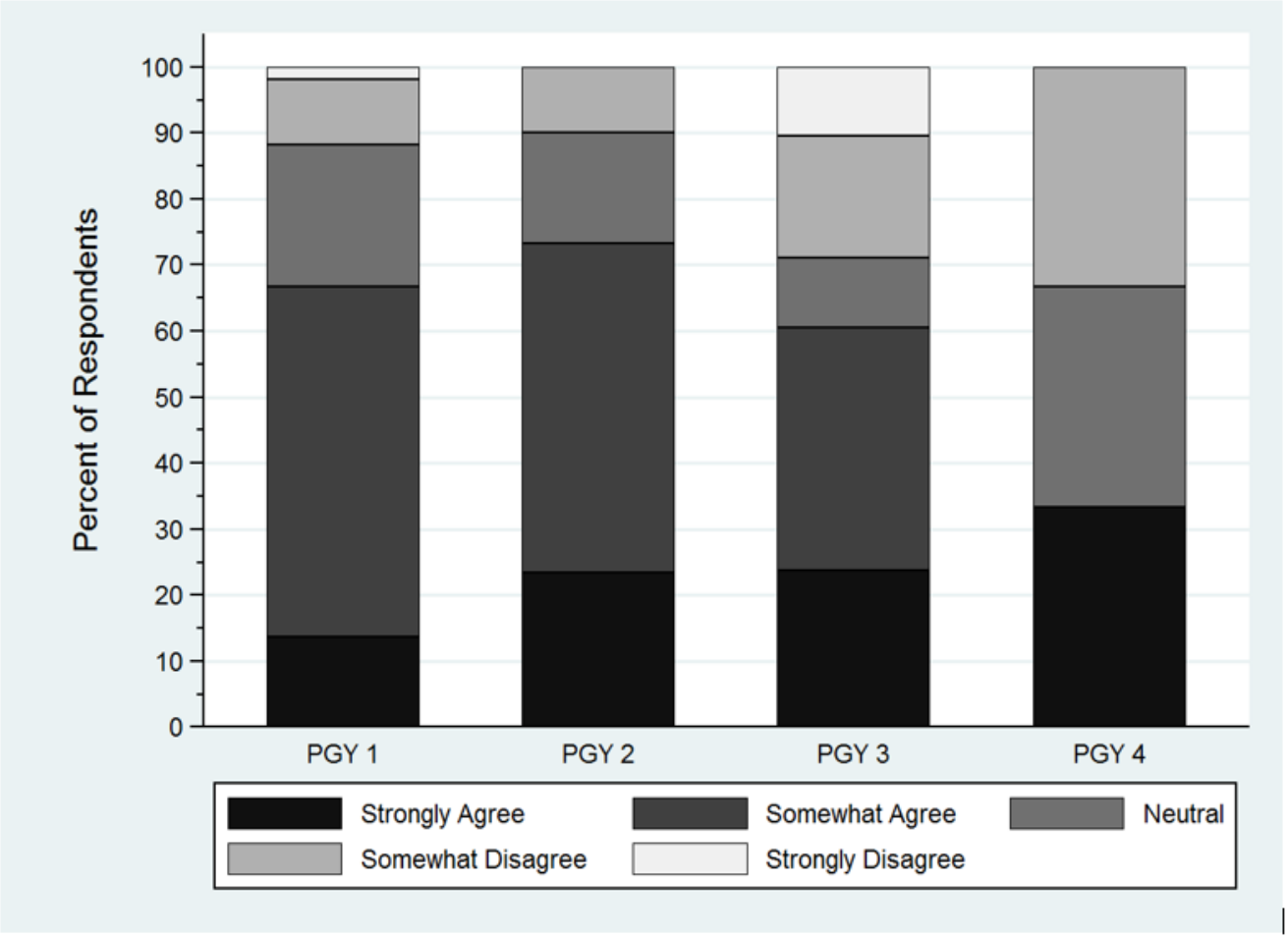
Resident Vaccine Attitudes and Hesitancy. All respondents considered vaccines to be an important part of children's care. The proportion of residents rating individual vaccines as "highly important" varied by specific vaccine (e.g., >99% for MMR and Hib, but fewer for HPV (68%) or influenza (61%) vaccines). In response to the question "Overall, how hesitant about childhood vaccines would you consider yourself to be?", 21% of respondents selected "somewhat hesitant" or "neutral". In response to the question "How concerned are you that one or more of the recommended childhood vaccines may not be safe?", 14% reported being "neutral", "unsure" or "somewhat concerned" (Figure 2). The proportion of residents who reported not giving all recommended vaccinations for reasons other than illness or allergy (e.g., parent refusal) increased with each additional year of training ($p<0.01$).

Figure 2: Proportion of residents' responses to two questions, "Overall, how hesitant about childhood vaccines would you consider yourself to be?" and "How concerned are you that one or more of the recommended childhood vaccines may not be safe?".



Training Needs. Residents reported that education on childhood vaccines was somewhat or very important for their future careers (99%), yet 56% reported not having, or not knowing if their residency program had a vaccine training curriculum. Most (88%) residents wanted to learn more about recommended childhood vaccines, most frequently citing a need to learn vaccine communication skills (80%) and vaccine benefits (65%) (Figure 3, responses not mutually exclusive). Vaccine safety, vaccine effectiveness, vaccine side effects, and risk of serious adverse events were also frequently selected as needed educational topics. Most preferred modalities for vaccine training included in-person lectures (66%), online modules (60%), and continuity clinic didactics (56%) (not mutually exclusive).

Figure 3: Resident respondents' reported need to learn more about vaccine benefits, by resident year



Discussion

Our survey found that residents have high familiarity with vaccines and desire additional vaccine training. Although confidence in discussing vaccines increased with additional years of training, residents were more likely to skip recommended vaccines for non-medical reasons with increased years of training. Surprisingly, 21% of survey respondents were "somewhat hesitant" or "neutral" toward vaccines, and a substantial fraction value HPV and influenza less than other routinely recommended vaccines. Results from this survey support the need that standardized, evidence-based vaccine education in residency programs is needed to 1) clarify the important risks and benefits of vaccination, 2) equip residents with communication skills to address vaccine concerns, and 3) counter the vaccine hesitancy that may exist in the residents themselves.

Evidence supports that a strong provider recommendation for vaccines is one of the most powerful mechanisms to affect parents' vaccination decision-making (Opel *et al.*, 2012). Thus, identification of vaccine hesitancy among future healthcare providers who will be recommending vaccines for the community is concerning. It is critical that we adequately educate our future healthcare providers about the scientific evidence regarding the importance and safety of vaccines, and about how to counter any vaccine hesitancy, during the formative years of training.

A vaccine curriculum should also include topics that may be less understood by healthcare providers, such as the

process for determining and ensuring vaccine safety and the impact vaccination has had on public health. For example, since a third of respondents do not believe influenza vaccine is very important, the curriculum could highlight that influenza is the leading cause of vaccine preventable death in children and one of the leading causes of vaccine preventable death in adults, resulting in more than 100 pediatric deaths and 12,000 to 56,000 adult deaths annually (Centers for Disease Control and Prevention, 2010; Centers for Disease Control and Prevention, 2017; Shang *et al.*, 2018). Further, the curriculum could teach residents that half of recent pediatric influenza deaths occurred among previously healthy children, and these children were less likely to be vaccinated. Residents need an evidence-based vaccine curriculum that teaches providers the importance of *all recommended vaccines* and the burden of the vaccine preventable diseases.

Limitations of this study include that the respondents were recruited from a small number of residency programs using a convenience sample. The nine programs included two specialties and six states, but it is possible that volunteer programs had weaker than average immunization training. Similarly, the resident survey response rate was low, and it cannot be discerned if a biased sample responded (e.g., a high proportion of pro-vaccination residents).

Conclusion

This survey of pediatric and family medicine residents demonstrated a clear need for better vaccine education. A substantial proportion of residents self-reported vaccine hesitancy. Recognition of the importance of HPV and influenza vaccines was also often lacking. As future health care providers, it is critical for trainees to understand the importance and safety of all vaccines and to learn how to communicate with patients and families who have vaccine concerns.

Take Home Messages

- Pediatric and Family Medicine residents want to learn more about vaccine benefits.
- Some residents have concerns about the safety and/or necessity of vaccines (vaccine hesitancy).
- Confidence in vaccine communications is related to year of training.

Notes On Contributors

Sarah Williams MD, MPH: Assistant Professor of Pediatrics in the Department of Pediatrics at Vanderbilt University Medical Center in Nashville, Tennesse. Her research focuses on pediatric immunization and medical education across the spectrum of lifelong learners.

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Donald Middleton MD: Professor of Family Medicine at the University of Pittsburgh Medical Center. He has dedicated his career to advocating and teaching prevention medicine.

Kadriye O. Lewis Ed.D: Professor and Director of Evaluation and Program Development in the Department of Pediatrics at Children's Mercy Hospital in Kansas City, Missouri with extensive experience in developing, implementing, and evaluating education techniques and curricula for medical providers.

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Appendices

None.

Declarations

The author has declared the conflicts of interest below.

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Ethics Statement

Approved through the Institutional Review Board of Children's Mercy Kansas City (IRB 16050332).

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