Published in final edited form as:

J Pediatr. 2014 November ; 165(5): 1040–1045.e2. doi:10.1016/j.jpeds.2014.07.041.

Pediatricians' Self-Reported Knowledge, Attitudes, and Practices about Child Passenger Safety

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Abstract

Objective—To evaluate pediatricians' self-reported knowledge, attitudes, and dissemination practices regarding the new American Academy of Pediatrics' (AAP) child passenger safety (CPS) policy recommendations.

Study design—A cross-sectional survey was distributed to pediatric primary care physicians via AAP e-mail distribution lists. Knowledge, attitudes, and practices related to current AAP CPS recommendations and the revised policy statement were ascertained.

Results—There were 718 respondents from 3497 physicians with active e-mail addresses, resulting in a 20.5% response rate, of which 533 were eligible based on the initial survey question. All 6 CPS knowledge and scenario-based items were answered correctly by 52.9% of the sample; these respondents were identified as the "high knowledge" group. Pediatricians with high knowledge were more likely to be female ($P < .001$), to have completed a pediatrics residency (vs medicine-pediatrics) ($P = .03$), and have a child between 4 and 7 years of age ($P = .001$). CPS information was distributed more frequently at routine health visits for patients 0-2 years of age vs those 4-12 years of age. Those with high knowledge were less likely to report several specific barriers to dissemination of CPS information, more likely to allot adequate time and discuss CPS with parents, and had greater confidence for topics related to all CPS topics.

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The authors would like to thank Bonnie Koziel and the staff for the American Academy of Pediatrics Council on Injury Violence and Poison Prevention; Rachel Hammond, MS, Lauren M. Corregano, MSW, and Lauren Leverage for help with data management and statistical analyses.

The authors declare no conflicts of interest.

Conclusions—Although CPS knowledge is generally high among respondents, gaps in knowledge still exist. Knowledge is associated with attitudes, practices, barriers, and facilitators of CPS guideline dissemination. These results identify opportunities to increase knowledge and implement strategies to routinely disseminate CPS information in the primary care setting.

Pediatricians are among the primary sources cited by parents for information on child passenger safety (CPS).^{1,2} High parental knowledge about age- and size-specific child restraint recommendations is associated with more appropriate restraint use.³ The American Academy of Pediatrics (AAP) updated its Policy Statement on CPS in March 2011 to provide current evidence-based recommendations.^{4,5} The revised policy statement indicated that all pediatricians were encouraged to know and promote the recommendations at all health supervision visits. The revised recommendations were presented in the form of an algorithm designed to facilitate incorporation into anticipatory guidance. The revised recommendations included increasing the age for children to remain rear-facing in child restraints to age 2 years, or until they outgrow the height and weight limits for their rear-facing seat, and further specificity about the age and size of children most appropriate for forward-facing child safety seats and booster seats.

Research has shown that pediatric primary care providers have variable knowledge and attitudes regarding road traffic safety, with more frequent practices and beliefs about the effectiveness of their efforts when caring for infants and toddlers.^{6,7} Injury prevention anticipatory guidance in the clinical setting has a positive effect on parental knowledge and behavior, especially for CPS.^{8,9} Recent data predating the change in policy from the AAP indicate that pediatricians encounter several barriers to consistently providing CPS recommendations in their practice, including lack of time, knowledge, or competing priorities.^{10,11} We assessed current practices and identified factors that facilitate, as well as inhibit, routine discussion of the recommendations, particularly among primary care pediatricians who were knowledgeable about the revised policy (removing knowledge as a potential barrier). Therefore, the goal of this study was to determine general pediatrician's self-reported knowledge, practices, and beliefs surrounding CPS following the revised 2011 AAP recommendations

Methods

The study was designed as a cross-sectional survey that was deemed exempt from review by the institutional review boards at The Children's Hospital of Philadelphia, Centers for Disease Control and Prevention, and Oregon Health & Science University. The requirement for written consent was waived, and consent was implied by completion of the survey. The survey had 29 items, and required approximately 5-10 minutes to complete. The survey was distributed electronically to physicians identified by the AAP's membership database, following permission by the AAP Office of the Executive Director. The AAP maintains member e-mail lists by Section or Council, corresponding to areas of interest and/or pediatric subspecialty. We were interested in targeting the survey to full and part-time primary care pediatricians in a wide range of practice settings. Eligible subjects included those with board certification in general pediatrics from the following AAP groups: Council on Injury, Violence, and Poison Prevention; Council on School Health; Section on Internal

Medicine-Pediatrics; Council on Community Pediatrics; and Section on Young Physicians. Participants were excluded if they had a subspecialty board certification (predetermined by the AAP membership information) or if they were not a primary care pediatrician practicing at least 8 hours each week (self-reported on the first survey question). If an e-mail address was identified in more than one group database, only one survey request was sent to the address.

The electronic survey was designed and distributed by using the software Research Electronic Data Capture, hosted at the Children's Hospital of Philadelphia Center for Biomedical Informatics.¹² After the initial e-mail, 2 reminders were sent out approximately every 2 weeks to nonrespondents. The survey was available online 30 days after the second reminder e-mail. There was no incentive for participation.

The survey included multiple-choice, Likert-scale, and free-text questions. Variables included provider demographics, self-reported knowledge of current AAP policy statements and CPS recommendations (through answers to multiple choice questions and responses to clinical case scenarios), barriers to providing recommendations, confidence in providing recommendations, and practice/clinic information. We categorized pediatricians as having “high knowledge” if they answered 6 questions correctly (3 knowledge-based and 3 scenario-based [ie, a correct response to hypothetical questions posed by parents]) based on the updated AAP recommendations, and “lower knowledge” if they incorrectly answered one or more questions. The survey is available from the authors upon request.

Statistical Analyses

Data from Research Electronic Data Capture were downloaded into Stata (version 10.0; StataCorp, College Station, Texas) to conduct analyses. Standard descriptive summaries were used for demographic variables. Categorical variables were compared using χ^2 and Fisher exact tests, depending on the sample size.

Results

There were 718 respondents from the 3497 physicians with active e-mail addresses, resulting in a 20.5% response rate (Figure). Among responders, 184 (25.6%) were determined to be ineligible on the basis of their response to the first survey question regarding amount of practice hours spent in primary care, and 1 did not complete the survey, yielding a final eligible study sample of 533 primary care pediatricians. The demographics of the 533 who were eligible and completed the survey are shown in Table I.

All 6 CPS knowledge and scenario-based items were answered correctly by 52.9% of the sample; these respondents were identified as having “high knowledge.” Among all 533 respondents, 90.9% knew the recommended age/conditions at which to switch a child from rear-facing to forward-facing (age 24 months or when they reach the maximum weight and height for the rear-facing seat), 91.5% knew the height and age variables at which children can fit in a vehicle seat belt (4 feet 9 inches and typically between 8 and 12 years of age), and 63% knew the age at which children may ride in the front seat (13 years).

Respondents were more likely to address CPS during routine health supervision visits in the previous 6 months “Often” or “Always” for younger age groups of patients (birth to < 12 months, 89.4%; 12-24 months, 85.8%) vs older-age groups (4 to < 8 years, 65.0%; 8-12 years: 60.0%) Pediatricians with high knowledge about the revised recommendations were more likely to “often/always” provide CPS recommendations for every age group of children compared with those with lower knowledge (Table II).

Barriers to providing CPS recommendations to parents of children younger than 2 years old are in Table III, with inadequate time the most common (45.2%). Compared with respondents with high knowledge, those with lesser knowledge were more likely to report 5 of the 6 barriers listed. Recurrent themes from qualitative comments of other barriers in a free-text option included, in order of decreasing frequency: cost and access of child safety seats, appropriateness of providing recommendations (because of the patients’ predominant use of public transportation), inconsistency of recommendations with state laws that parents regard highly, access to understandable and succinct educational resources, language barriers, parent disagreement or lack of motivation to implement recommendations, and professional disagreement with recommendations.

Table IV (available at www.jpeds.com) shows strategies reported by pediatricians to provide evidence-based recommendations for CPS for children younger than 2 years of age. The most common recommendations were prompts in the electronic health record (56.5%) and educational resources designed by a professional organization (34.3%). Compared with respondents with lesser knowledge, there were more respondents with high knowledge who indicated that allotting adequate time during a visit (19.5% vs 30.1%, $P = .005$) was a strategy to providing CPS recommendations. Although few providers stated that CPS information provision was part of their compensation or incentive (3.4%), those with lesser knowledge were more likely to identify this as a strategy (6.0% vs 1.1%, $P = .002$).

The vast majority of respondents (86.7%) stated they answered parental questions about CPS in the previous 2 months. Of those, the most common modes of addressing questions were talking with parents (85.2%) and distributing educational materials (36.4%) (Table V; available at www.jpeds.com). Those with high knowledge were more likely to talk with parents (91.5% vs 78.5%, $P < .001$) and direct parents to a website (18.8% vs 7.6%, $P < .001$).

When asked about their perceived influence on improving safety of patients through educating parents about CPS, 73.8% indicated that parental education would influence the safety of their patients, with no significant difference between those with high knowledge vs lower knowledge (75.5% vs 71.5%, $P = .278$).

Table VI (available at www.jpeds.com) shows pediatricians’ confidence about providing recommendations for various CPS topics. Confidence was universally high, with greater confidence for topics related to younger children, and more confidence among participants with high knowledge for every CPS topic.

Discussion

The 2011 release of the AAP revised CPS Policy Statement generated significant interest in the lay press, primarily because of the change in policy language regarding age limits for rear-facing child safety seats. Given the significant interest of parents in the revised recommendations, it is incumbent upon pediatricians to remain knowledgeable about CPS and to provide the updated evidence-based recommendations as part of their routine health supervision visits. We designed this study (2 years following publication of the revised policy statement) to be able to ascertain current knowledge and practices among primary care pediatricians at a time when all practicing pediatricians should have become aware of the revised recommendations and identified ways to incorporate them into their practice. Our sample of respondents was highly knowledgeable about and confident in providing the recommendations, particularly for younger ages; however, even among this motivated sample, knowledge gaps and barriers in the actual provision of these recommendations still existed.

High knowledge was strongly associated with both pediatrician confidence about CPS topics and the frequency of providing recommendations in practice for all age groups of children, indicating that maintaining a knowledge base is fundamental to being able to successfully provide anticipatory guidance on CPS. Lesser knowledge was associated with more frequent reporting of several items as barriers. Lesser knowledge also was associated with providers more likely providing CPS information as part of a compensation or an incentive. Although the overall proportion of respondents identifying this strategy was low, it is possible that incentivizing this behavior might enable some who would not otherwise disseminate CPS information. Of note, the Affordable Care Act covers all Bright Futures health and disease-prevention services for children, including provision of CPS recommendations, with no-cost sharing.¹³

The results in our current study demonstrating the association of CPS knowledge and dissemination practices aligns with previous work in other populations of clinicians caring for children. Two recent surveys of emergency medicine physicians showed that even though these providers are supportive of using the emergency department setting to endorse CPS information, they did not have adequate knowledge about CPS, nor did they regularly disseminate it in their practice.^{14,15} Another recent study described the effect of a brief educational intervention to promote CPS knowledge among 217 physicians, nurses, social workers, pediatric residents, and pediatric trauma response team members from various US cities.¹⁶ Pre- and posttesting revealed that baseline CPS knowledge was low, but improved with a didactic session by a CPS instructor.

In addition to inadequate knowledge, pediatricians reported insufficient time and resources as barriers to providing CPS recommendations, despite three-quarters of them reporting they perceived having a significant influence on patients' safety through CPS education. With many competing priorities and shorter visits allotted for well child care, providers are less likely to include CPS anticipatory guidance,¹⁷ despite the AAP's reinforcement of the pediatrician's role in providing this information to patients and families.⁴ One option to overcome this barrier is to use technology and screening to target education and messaging

to parents. Kiosks have been shown to successfully screen patients and provide tailored results of injury risk assessments and safety needs.¹⁸ Implementing this process in a waiting room setting or integrating screening into electronic health records can help efficiently target injury prevention practices in the primary care setting. In fact, one recent study demonstrated that tailored injury-prevention information led to the more frequent adoption of a new injury prevention behavior compared with more generic injury prevention information, particularly for less-educated parents.¹⁹ Another use of technology is to integrate point-of-care CPS decision support tools into electronic health records, which was the most frequently endorsed facilitator of CPS information provision in our study. This could prompt the provider to ask about CPS while they navigate the electronic health record during the visit, and could also provide “just-in-time” reminders about best practice CPS recommendations to educate the provider and family.²⁰

Motor vehicle crash-related injury remains a leading cause of death in children.^{21,22} In our current study, pediatricians were less likely to routinely provide CPS information in children greater than 4 years of age, and other recent estimates show that restraint use in children decreases with increasing age.²³ Therefore it is particularly important to target CPS messaging for children older than 4 years of age. In addition, for children 4-7 years of age in 2011, 25% prematurely transitioned from a belt positioning booster to a seatbelt, 10% were unrestrained, and 19% of those who died in crashes were unrestrained.²³ Although 2 recent industry surveys and 1 observational study showed that parents are making some changes based on the new policy statement, not all are following the recommendations.^{2,24,25}

The study did have limitations that should be addressed. First, the lower response rate could have resulted in a selection bias favoring pediatricians among respondents who are more knowledgeable and motivated on topics of CPS. Respondents are likely to be motivated to answer a survey if they are interested and knowledgeable in a topic.²⁶ The sample represented a diverse group of pediatricians in a wide range of practice settings from a variety of nonpediatric specialty AAP groups; however, there could have been sampling bias in the groups chosen, and our estimates of the proportion of pediatricians with high knowledge should still be interpreted with caution. Although there was no demographic information available for nonresponders, the strength of the association between knowledge and pediatrician attitudes and practices observed in this study is likely conservative, and a stronger association may have been observed when applied to a larger population of providers.

Even though overall pediatrician knowledge about CPS and the revised recommendations from the AAP were high, there remain several gaps in knowledge among general pediatricians about the revised CPS recommendations. Because knowledge is associated with confidence about CPS topics, current pediatrician practices, and perceived barriers to dissemination, continued education of primary care pediatricians about CPS recommendations is needed. Previous evidence has shown that when primary care providers do provide CPS anticipatory guidance to families, it is well-received and effective in increasing parental knowledge and safety practices.^{2,3,6,8,9} Pediatricians identified several specific strategies to facilitate the consistent provision of evidence-based recommendations in their practice, including prompts in the electronic health record, educational resources by

third-party groups, and increasing adequate time to discuss these topics. More widespread adoption of these strategies can overcome existing barriers and help further promote dissemination of CPS information to parents and caregivers.

Acknowledgments

Supported by the National Institutes of Health, *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (1K08HD073241-01). The views presented are those of the authors and not necessarily the views or official position of the National Institutes of Health or the Centers for Disease Control and Prevention.

Glossary

AAP	American Academy of Pediatrics
CPS	Child passenger safety

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Figure.
Flow diagram of survey participants. Data from AAP.

Table I

Survey respondent demographics and practice characteristics (N = 533)

Respondents	Total, N = 533	Lower knowledge, n = 251 (47.1%)	High knowledge, n = 282 (52.9%)	P value
Sex, female (%)	72.6%	65.7%	78.9%	<.001
Residency training				
Pediatrics	71.7%	67.0%	75.8%	.03
Medicine-pediatrics	28.3%	33.0%	24.2%	
Practice area (%)				
Urban	39.6%	38.9%	40.2%	.42
Suburban	43.8%	42.1%	45.3%	
Rural	16.6%	19.0%	14.6%	
What best describes your type of practice? (%)				
Private practice	36.9%	40.0%	34.1%	.25
Practice within a community hospital or network	23.1%	24.3%	21.9%	
Practice within an academic hospital or network	31.0%	26.6%	34.9%	
Other, please specify	9.0%	9.0%	9.0%	
Number of providers in practice				
1-5	36.8%	37.1%	36.6%	.14
6-10	27.6%	23.9%	30.9%	
11-20	13.7%	16.7%	11.0%	
21 +	22.0%	22.3%	21.6%	
Years in practice				
<5	26.8%	27.3%	26.4%	.06
5-10	30.5%	25.0%	35.3%	
11-20	28.8%	29.9%	27.9%	
21+	13.9%	17.9%	10.5%	
Age groups of respondents' children (%) *				
Birth to 1 year	11.1%	8.8%	13.1%	.11
1-3 years	30.0%	25.9%	33.7%	.05
4-7 years	37.3%	30.2%	43.6%	.001
8+ years	44.8%	44.2%	45.4%	.79
No children	18.3%	21.6%	15.4%	.08

* Does not equal 100% because respondents may have more than 1 child.

Table II

In the past 6 months, the frequency of addressing CPS during routine health supervision visits

Age range of child	% “Often” or “Always” on a 5-point Likert scale			P value
	Total	Lower knowledge	High knowledge	
Birth to < 12 months old	89.4	85.4	92.9	.005
12-24 months old	85.8	78.0	92.6	<.001
4 to < 8 years old	65.0	57.5	72.6	.001
8-12 years old	51.0	44.3	56.8	.004

Table III

Barriers to providing recommendations for motor vehicle safety to parents of children younger than 2 years of age during health supervision visits

Barriers	% selecting 4 or 5 (“Significant Barrier”) on a 5-point Likert scale			P value
	Total	Lower knowledge	High knowledge	
Inadequate time during appointments	45.2	49.8	41.1	.045
Office staff not adequately trained	24.1	28.6	19.9	.02
Topic is not a priority when compared to other anticipatory guidance	19.9	24.5	15.4	.007
Parents are not interested in learning about motor vehicle safety	19.9	21.6	18.3	.34
Inadequate educational resources available	14.5	17.6	11.8	.06
Inadequate understanding of AAP guidelines	8.1	11.3	5.4	.01
Discouraged by practice, clinic, hospital, etc. to discuss motor vehicle safety with parents	0	-	-	-

Table IV

Strategies used to provide evidence-based recommendations for motor vehicle safety considerations during health supervision visits for children younger than 2 years of age

Strategies	%	% lower knowledge	% high knowledge	<i>P</i> value
Prompts in paper or electronic health record	56.5	55.4	57.5	.63
Educational resources designed by a professional organization (eg, AAP, SafeKids)	34.3	31.1	37.2	.14
Adequate time allotted during visit	25.1	19.5	30.1	.005
Information provided by office staff before or after time with medical provider	17.8	19.1	16.7	.46
Education resources designed by a practice, hospital, or a governing care network	17.3	18.3	16.3	.54
Providing this information is considered part of my compensation or an incentive	3.4	6.0	1.1	.002
Ability to bill for providing this information to families	1.7	2.8	0.7	.09

Table V

Modes of addressing parental questions about CPS in the previous 2 months (N = 462 responding “yes” to addressing questions)

Modes	Total %	% lower knowledge	% high knowledge	<i>P</i> value
Talking with parents	85.2	78.1	91.5	<.001
Distributing educational materials such as pamphlets and brochures	36.4	32.3	40.1	.06
Directing parents to a website	13.5	7.6	18.8	<.001
Having a member of my office staff address the questions	11.1	10.4	11.7	.62
Showing parents an informational video	0.8	1.2	0.4	.26

Table VI

Confidence about providing recommendations for various CPS topics

Topics	% selecting 4 or 5 ("Very confident") on a 5-point Likert scale			<i>P</i> value
	Total	Lower knowledge	High knowledge	
Rear-facing car seats	91.5	87.1	95.4	.001
Convertible and forward-facing car seats	83.2	74.1	91.1	<.001
Booster seats	77.7	68.6	85.7	<.001
When a child can use an adult seat belt without a booster seat	77.2	66.9	86.1	<.001
When a child can sit in the front seat	76.5	62.4	89.0	<.001