



# US Pediatrician Practices and Attitudes Concerning Childhood Obesity: 2006 and 2017

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**Objective** To compare primary care pediatricians' practices and attitudes regarding obesity assessment, prevention, and treatment in children 2 years and older in 2006 and 2017.

**Study design** National, random samples of American Academy of Pediatrics members were surveyed in 2006, 2010, and 2017 on practices and attitudes regarding overweight and obesity (analytic n = 655, 592, and 558, respectively). Using logistic regression models (controlling for pediatrician and practice characteristics), we examined survey year with predicted values (PVs), including body mass index (BMI) assessment across 2006, 2010, and 2017 and practices and attitudes in 2006 and 2017.

**Results** Pediatrician respondents in 2017 were significantly more likely than in 2006 and 2010 to report calculating and plotting BMI at every well-child visit, with 96% of 2017 pediatricians reporting they do this. Compared with 2006, in 2017 pediatricians were more likely to discuss family behaviors related to screen time, sugar-sweetened beverages, and eating meals together,  $P < .001$  for all. There were no observed differences in frequency of discussions on parental role modeling of nutrition and activity-related behaviors, roles in food selection, and frequency of eating fast foods or eating out. Pediatricians in 2017 were more likely to agree BMI adds new information relevant to medical care (PV = 69.8% and 78.1%), they have support staff for screening (PV = 45.3% and 60.5%), and there are effective means of treating obesity (PV = 36.3% and 56.2%),  $P < .001$  for all.

**Conclusions** Results from cross-sectional surveys in 2006 and 2017 suggest nationwide, practicing pediatricians have increased discussions with families on several behaviors and their awareness and practices around obesity care. (*J Pediatr* 2019;211:78-84).

Childhood obesity is a serious public health concern in the US. More than 13 million children aged 2-19 years (18.5%) were classified as having obesity in 2015-2016.<sup>1</sup> In 2007, the American Academy of Pediatrics (AAP) endorsed Expert Committee Recommendations on childhood obesity.<sup>2</sup> The Recommendations advise screening children  $\geq 2$  years of age for obesity at each well-child visit by measuring height and weight, calculating body mass index (BMI) for age, and plotting these measures on age- and sex-specific growth charts.<sup>2</sup> The US Preventive Service Task Force recommends that clinicians screen for obesity in children and adolescents  $\geq 6$  years of age and offer or refer those with obesity to comprehensive (intensive) behavioral interventions.<sup>3</sup>

Investigators have sought to understand the extent to which healthcare providers implement BMI assessment, behavioral counseling, and referrals to address childhood obesity. Survey findings from nationally representative samples of AAP membership in 2006 and 2010 showed that 59% and 88% of pediatricians computed and/or plotted BMI percentile for children  $\geq 2$  years of age at most or every well-child visit, respectively.<sup>4,5</sup> In 2006, several barriers to addressing childhood obesity were reported, including lack of time and effective recommendations, low reimbursement, low provider self-efficacy, and lack of interest on the family's part.<sup>4</sup>

Since 2006, several efforts have been developed to improve provider assessment of BMI, counseling strategies, self-efficacy, and the quality of primary care.<sup>6</sup> These include training and workflow optimization, securing adequate reimbursement for services provided, and increasing familiarity with addressing the upstream determinants of health, such as food security and socioeconomic dynamics.<sup>6-9</sup>

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AAP	American Academy of Pediatrics
BMI	Body mass index
PV	Predicted value

The purpose of the current study is to examine primary care pediatrician practices and perceptions regarding the assessment of BMI, behavioral counseling, and referrals to address childhood obesity in 2017 and to compare these practices and perceptions since 2006.

## Methods

We analyzed data from the Periodic Survey, an AAP research initiative that routinely surveys a random, nationally representative sample of non-retired, US-based AAP members on current topics in pediatrics, as well as pediatricians' practice characteristics. For most analyses, we compared responses from a Periodic Survey conducted in 2017 with responses collected from identical questions asked in 2006.<sup>4</sup> Both surveys collected respondent demographic and practice characteristics and practices and attitudes on assessment, prevention, and management of overweight and obesity. These questions were developed for the 2006 Periodic Survey by AAP Research, the 2003-2006 AAP Task Force on Obesity, and other experts on childhood obesity.<sup>4</sup> A Periodic Survey that was administered in 2010 included similar questions on demographics and BMI assessment, so we also compared these data with the 2017 responses. The instruments used to collect these data are available from the authors on request.

The surveys were sent to approximately 1600 pediatricians, according to the established Periodic Survey methodology. For all 3 years, the first mailed survey included a \$2 bill as a small token of appreciation, and up to 7 mailed surveys were made to nonrespondents. In 2017, 2 e-mailed contacts (with a link to an online survey) also were made to nonrespondents. The survey return rates were 63.0% (1023/1623) in 2006, 58.7% (956/1628) in 2010, and 52.8% (857/1622) in 2017. Analytic samples (655 for 2006, 592 for 2010, and 558 for 2017) excluded ineligible respondents such as residents, subspecialists, and retired pediatricians ( $n = 73$  in 2006,  $n = 26$  in 2010, and  $n = 232$  in 2017) and those who did not provide health supervision ( $n = 295$  in 2006,  $n = 338$  in 2010, and  $n = 67$  in 2017). In 2017, the number of ineligible respondents is greater because residents were included in the sample, and the number who did not provide health supervision is lower because subspecialists were not included in the sample.

We examined BMI assessment across 3 years (2006,<sup>4</sup> 2010,<sup>5</sup> and 2017), including how often pediatricians or their staff calculate and plot BMI. We compared pediatrician practices and attitudes on assessment, prevention, management of overweight and obesity, and healthy behavior counseling practices for 2006 and 2017.

To assess nonresponse bias, we compared each analytic sample to its target sample using demographics in the AAP database (age, sex, and geographic region). For each year, we conducted  $\chi^2$  tests and  $t$  tests to compare the analytic sample to the target sample. Descriptive statistics summarized demographic characteristics by survey year.

Logistic regression models separately estimated independent associations of survey year with (1) assessment for overweight and obesity, (2) discussion of healthy behaviors, (3) attitudes and experiences toward assessment and screening, (4) perceived barriers to assessment and management of overweight and obesity, (5) practices on management of overweight and obesity, and (6) perceptions of counseling. Variables included as controls in the models were age, sex, hours worked per week in direct patient care, 50% or more time in general pediatrics, and practice area, setting, and region. All multivariable results presented in **Tables I-IV** include these variables as controls, which are commonly included in analyses of Periodic Survey data on pediatrician practices and attitudes.<sup>4,10,11</sup> Descriptive responses and predictive values (PVs) for outcomes in 2006, 2010, and 2017 are presented. PVs were calculated using logistic regression, and the control variables (described previously) were held constant at their means. As such, they represent covariate-adjusted percentages for each outcome by year (providing the independent effect of year) and provide a more intuitive alternative to ORs.<sup>12</sup>

The number of cases in each statistical analysis varied slightly because of missing values. Data were analyzed using Stata 15 (Stata Corp, College Station, Texas), using a  $P \leq .05$ . The surveys were considered exempt by the AAP institutional review board.

## Results

In 2017, the analytic sample was older than the target sample (mean ages of 45.8 and 43.2, respectively;  $P < .001$ ) but there were no other differences. For 2010, there were no differences for age, sex, and region. For 2006, there were more women in the analytic sample than the target sample (56.3% and 51.9% female, respectively,  $P < .01$ ) without any other differences.

Respondent characteristics in 2006, 2010, and 2017 differed by sex, age, and hours worked in direct patient care (**Table V**; available at [www.jpeds.com](http://www.jpeds.com)). In 2017, respondents were more likely than in 2006 or 2010 to be female. They were also slightly older than the 2006 respondents and worked fewer hours in direct patient care than the 2010 respondents.

Significantly more pediatricians in 2017 reported calculating and plotting BMI at every well-child visit (96%) than in 2006 or 2010 (**Figure 1**; available at [www.jpeds.com](http://www.jpeds.com)). More pediatricians in 2017 than 2006 reported plotting weight-for-length on a growth chart for children  $<2$  years old at every well-child visit (PV = 65.5% in 2006 and 87.5% in 2017,  $P < .001$ ).

Pediatricians reporting discussion of healthy behaviors with all children  $>2$  years old during well-child visits significantly increased when comparing 2006 with 2017 for screen time (PV = 77.6% and 89.1%, respectively), sugar-sweetened beverages (PV = 65.9% and 80.9%), and eating meals together as a family (PV = 51.7% and 67.9%;  $P < .001$  for all) (**Table I**). No significant differences

**Table I. Pediatrician reported discussion of healthy behaviors with all patients 2 years and older at well-child visits in 2006 and 2017**

% of pediatricians reporting at every visit	Descriptive results		Multivariable results*				
	2006 (n = 642)	2017 (n = 556)	2006		2017		2006 vs 2017†
			PV	95% CI	PV	95% CI	
Variety of fruits and vegetables daily	89.0	92.0	90.3	87.8-92.7	93.0	90.8-95.2	.09
Being physically active	86.7	90.4	87.8	85.1-90.5	91.0	88.5-93.5	.08
Amount of screen time	76.1	88.2	77.6	74.2-81.1	89.1	86.3-91.8	<b>&lt;.001</b>
Amount of sugar-sweetened beverages	65.4	80.4	65.9	62.0-69.8	80.9	77.5-84.3	<b>&lt;.001</b>
Eating meals together as a family	51.0	68.0	51.7	47.6-55.8	67.9	63.8-72.0	<b>&lt;.001</b>
Positive role modeling by parents for nutrition and activity	46.9	53.1	47.5	43.4-51.6	51.2	46.8-55.6	.23
Parent and child roles in food selection	48.8	50.4	49.4	45.3-53.5	50.4	46.0-54.8	.75
Frequency of eating fast foods/eating out	43.9	47.0	43.5	39.4-47.6	45.9	41.5-50.3	.43

\*Multivariable results are the PV for the dependent variable at each survey year holding all other variables at their means; model covariates include survey year, sex, age, region, work area, work setting, practice time in general pediatrics >50% of time, and total hours worked per week in direct patient care.

†P value for PV for 2006 vs PV for 2017; bolded P values indicate PV for 2006 is significantly different from PV for 2017 ( $P < .05$ ).

between years were found for discussions of other healthy behaviors, including frequency of eating fast foods or eating out.

Comparing 2006 and 2017 data, there were significant increases in pediatricians who reported they strongly agreed or agreed that BMI added new information relevant to medical care (PV = 69.8% and 78.1%,  $P = .002$ ) and they have staff support for screening (PV = 45.3% and 60.5%,  $P < .001$ ) (Table II). Significantly fewer pediatricians in 2017 agreed that families and patients are not familiar with BMI,  $P < .001$ . In both years, 60% of pediatricians agreed that families wanted to discuss overweight (no significant differences between years).

In both 2006 and 2017, most respondents agreed that pediatricians should address obesity at well-child visits (PV = 95.7% and 97.8%,  $P = .04$ ) and can help prevent childhood obesity (PV = 73.8% and 88.1%,  $P < .001$ ) (Table III). Relative to 2006, the percentage in 2017 who agreed there are effective means of treating pediatric obesity (PV = 36.3% and 56.2%,  $P < .001$ ) and they have adequate time to counsel on overweight and obesity (PV = 17.9% and 25.8%,  $P = .002$ ) increased. In 2017, about one-half of pediatricians indicated that adequate

health insurance coverage of obesity-related services remains a problem. In both years, one-half of pediatricians agreed there is a lack of resources in their area to refer for weight management, and 1 in 5 perceived that families were not interested in addressing obesity. An increasing number reported not wanting to offend families by talking about weight (PV = 10.4% in 2006 and 21.6% in 2017,  $P < .001$ ).

Pediatricians who reported making referrals to community-based weight management programs increased when comparing 2006 with 2017 responses for children with overweight (PV = 14.6% and 20.4%,  $P = .02$ ), obesity without complications (PV = 44.4% and 52.3%,  $P = .01$ ), and obesity with complications (PV = 60.1% and 68.2%,  $P = .007$ ) (Figure 2; available at [www.jpeds.com](http://www.jpeds.com)). There were no significant differences between years in pediatricians who reported monitoring BMI more frequently for children with overweight (PV = 56.5% and 52.3%,  $P = .18$ ), obesity without complications (PV = 84.0% and 81.9%,  $P = .35$ ), and obesity with complications (PV = 90.4% and 91.5%,  $P = .52$ ), data not shown.

Pediatricians reporting that dietitians were available to their patients at academic or regional medical centers

**Table II. Pediatrician attitudes towards assessment/screening for overweight and obesity: 2006 and 2017**

% of pediatrician respondents who strongly agree or agree	Descriptive results		Multivariable results*				
	2006 (n = 644)	2017 (n = 557)	2006		2017		2006 vs 2017†
			PV	95% CI	PV	95% CI	
Using BMI adds new information	69.2	78.0	69.8	66.0-73.6	78.1	74.4-81.7	<b>.002</b>
Families want me to discuss overweight/obesity	59.2	62.5	60.2	56.1-64.2	62.6	58.4-66.9	.42
I have staff support for screening	45.2	60.0	45.3	41.2-49.4	60.5	56.3-64.8	<b>&lt;.001</b>
Families and patients are not familiar with BMI	72.3	30.8	73.0	69.4-76.7	30.6	26.5-34.7	<b>&lt;.001</b>
Time constraints make screening difficult	21.0	17.6	20.3	17.0-23.6	17.9	14.5-21.2	.32
I am unfamiliar with BMI recommendations	14.7	13.1	14.4	11.5-17.3	12.6	9.7-15.5	.38
I don't think screening will make a difference	12.7	7.0	12.2	9.5-15.0	5.6	3.6-7.5	<b>&lt;.001</b>

Data not collected in 2010.

\*Multivariable results are the PV for the dependent variable at each survey year holding all other variables at their means; model covariates include survey year, sex, age, region, work area, work setting, practice time in general pediatrics >50% of time, and total hours worked per week in direct patient care.

†P value for PV for 2006 vs PV for 2017; bolded P values indicate PV for 2006 is significantly different from PV for 2017 ( $P < .05$ ).

**Table III. Pediatrician perceptions of barriers to assessment and management of obesity: 2006 and 2017**

% of pediatricians who strongly agree or agree	Descriptive results		Multivariable results*				
	2006 (n = 644)	2017 (n = 557)	2006		2017		2006 vs 2017†
			PV	95% CI	PV	95% CI	P value
Pediatricians should address pediatric obesity at well-child visits	95.5	97.8	95.7	94.0-97.4	97.8	96.6-99.1	<b>.04</b>
Pediatricians can help prevent childhood obesity	73.1	87.8	73.8	70.2-77.5	88.1	85.3-90.9	<b>&lt;.001</b>
There are effective means of treating pediatric obesity	36.2	55.8	36.3	32.4-40.3	56.2	51.8-60.5	<b>&lt;.001</b>
Parents/patients are not interested in addressing obesity	23.2	20.2	22.4	18.9-25.8	19.5	16.1-23.0	.25
There is adequate time during preventive care visits to counsel on overweight and obesity	18.9	27.7	17.9	14.8-21.1	25.8	21.9-29.7	<b>.002</b>
I do not want to offend families by talking about weight	11.4	21.4	10.4	7.9-13.0	21.6	18.0-25.3	<b>&lt;.001</b>
Insurance and payment barriers							
Many of my patients are not able to pay for uncovered services	81.4	81.2	82.7	79.6-85.9	82.2	78.8-85.6	.81
There is a lack of adequate services/resources in my practice area to refer children/families for weight management	53.3	52.0	54.8	50.7-59.0	53.2	48.8-57.6	.60
There is insufficient payment by insurers for obesity counseling	56.4	50.5	57.4	53.2-61.5	51.0	46.5-55.4	<b>.04</b>
Weight-management programs are generally not covered by health insurance	68.9	48.8	70.9	67.1-74.6	48.1	43.7-52.6	<b>&lt;.001</b>
I am unfamiliar with billing codes for obesity counseling/treatment	62.3	46.5	62.6	58.6-66.6	46.7	42.3-51.1	<b>&lt;.001</b>
Dietitian services are generally not covered by health insurance	52.9	40.1	53.1	49.0-57.3	40.3	36.0-44.7	<b>&lt;.001</b>
I am usually paid by insurers for obesity counseling/treatment as part of a follow-up visit distinct from regular well-child care	14.6	25.2	14.8	11.8-17.7	24.5	20.6-28.3	<b>&lt;.001</b>

Data not collected in 2010.

\*Multivariable results are the PV for the dependent variable at each survey year holding all other variables at their means; model covariates include survey year, sex, age, region, work area, work setting, practice time in general pediatrics >50% of time, and total hours worked per week in direct patient care.

†P value for PV for 2006 vs PV for 2017; bolded P value indicates PV for 2006 is significantly different from PV for 2017 ( $P < .05$ ).

increased between years (2006 PV = 54.2% and 2017 PV = 67.5%,  $P < .001$ ), data not shown. Those reporting such availability at local or community hospitals slightly decreased (2006 PV = 67.3% and 2017 PV = 61.2%,  $P < .05$ ). No significant differences between years were found for pediatricians reporting that dietitians were available to their patients at their practice (PV = 16.7% and 18.9%, respectively,  $P = .35$ ) and other settings in the community (PV = 46.5% and 45.4%, respectively,  $P = .68$ ). Very few pediatricians reported dietitians were not available to their patients (PV = 2.4% in 2006 and 3.0% in 2017,  $P = .48$ ).

Nearly all pediatricians in 2017 reported they were very or somewhat prepared to counsel patients and their parents on obesity and comfortable discussing obesity with patients and their parents (Table IV). These pediatricians were also more likely to feel very or somewhat effective in counseling on obesity prevention (PV = 39.1% and 61.5%,  $P < .001$ ) and management (PV = 38.2% and 54.9%,  $P < .001$ ).

## Discussion

In our study of national samples of primary care pediatricians in 2006 and 2017, we assessed practices and attitudes regarding obesity assessment, prevention, and treatment in children. Our findings suggest many improvements, as well as some areas for improvement that might inform educational and public health efforts to further increase pediatricians' counseling on childhood obesity. Improvements include that most pediatricians in 2017 report they calculate and plot BMI on age and sex appropriate growth charts and have discussions of healthy behaviors, including screen time, sugar-sweetened beverages, and physical activity at well-child visits. Their attitudes toward assessment (eg, 80% now

believe BMI adds new information) and perceived counseling effectiveness (eg, 60% perceive their counseling on prevention to be effective, a 57% increase from 2006) are also encouraging. Areas for improvement include counseling on other healthy behaviors, such as parental role modeling of nutrition and frequency of eating fast foods or eating, and perceived barriers including time to address overweight and obesity during well-child visits and adequate insurance coverage and payment.

The significant improvement in BMI assessment parallels the upward trends in national and state level screening practices using data from electronic records<sup>13,14</sup> as well as pediatrician use of such records for patient care.<sup>15,16</sup> Similar improvements were noted for plotting weight-for-length for children <2 years old.

Regarding discussions with families on healthy behaviors, our study found some encouraging results and some areas that may be targets for improvement. Given the importance of counseling early on to prevent overweight and obesity, the finding that most pediatricians (81% or more) in 2017 reported discussions of fruit and vegetable consumption, physical activity, screen time, and sugar-sweetened beverages at every well-child visit with children  $\geq 2$  years is reassuring. Significantly more pediatricians in 2017 than in 2006 reported discussions of screen time, sugar-sweetened beverages, and eating meals together as a family. Research using the Medical Expenditure Panel Surveys on children who receive both dietary and physical activity counseling from 2002-2011 showed counseling rates increased for children with overweight and obesity.<sup>17</sup> In our study, there were no significant increases in counseling on daily fruits and vegetables and physical activity; however, >90% of pediatricians are discussing these topics during well-child

**Table IV. Pediatrician perceptions of preparedness, comfort, and effectiveness of their own counseling on obesity: 2006 and 2017**

% of pediatricians reporting very or somewhat	Descriptive results		Multivariable results*				
	2006 (n = 647)	2017 (n = 554)	2006		2017		2006 vs 2017†
			PV	95% CI	PV	95% CI	P value
Overall, how well prepared do you feel you are to counsel patients and their parents about obesity?	89.2	96.0	90.0	87.5-92.5	96.3	94.6-97.9	<b>&lt;.001</b>
How comfortable do you feel discussing obesity with patients with obesity and their parents?	92.1	95.7	92.2	90.0-94.4	96.1	94.4-97.7	<b>.004</b>
How effective do you think your counseling on prevention of obesity is among patients and their parents?	40.4	61.6	39.1	35.0-43.1	61.5	57.2-65.8	<b>&lt;.001</b>
How effective do you think your counseling on obesity management is among your patients and their parents?	38.9	55.2	38.2	34.2-42.2	54.9	50.5-59.3	<b>&lt;.001</b>

\*Multivariable results are the PV for the dependent variable at each survey year holding all other variables at their means; model covariates include survey year, sex, age, region, work area, work setting, practice time in general pediatrics >50% of time, and total hours worked per week in direct patient care.

†P value for PV for 2006 vs PV for 2017; bolded P values indicate PV for 2006 is significantly different from PV for 2017 ( $P < .05$ ).

visits. In 2017, the frequencies of discussions on parental role modeling of nutrition and activity related behaviors, parental and child roles in food selection, and the frequency of eating fast foods or eating out did not exceed 51%, indicating that these areas may be targets for practice improvement.<sup>18</sup>

Our study highlights important findings in pediatrician attitudes toward assessing and managing overweight and obesity. For instance, from 2006 to 2017, there were significant increases in pediatricians who reported BMI added new information relevant to medical care and they have staff support for screening. There was a corresponding decrease in pediatricians who perceived that families and patients are not familiar with BMI. These findings are consistent with increased awareness of how to assess and manage overweight and obesity in childhood and related strategies.<sup>7,19</sup> Only 60% of pediatricians perceive that their patients' families want to discuss overweight and obesity. This may indicate the need for increasing awareness of the seriousness of overweight and obesity and related comorbidities, the importance of counseling, and matching physician perceptions with the needs of families.

We found several significant increases in management practices for children with overweight or obesity without/with complications. For children with overweight, a greater portion of pediatricians in 2017 than in 2006 reported referring to community-based weight management programs. Similar trends were observed for pediatricians reporting referral to community-based management programs for children with obesity and without/with complications.

Our findings add to the limited research on current patterns of childhood obesity management and referral practices in the US. A nationally representative survey of ambulatory and hospital-based data showed as few as 7% of primary care visits in children with obesity receive referrals to other healthcare services, regardless of comorbidity status.<sup>20</sup> A study of a large primary care network found that among children with BMI  $\geq$ 85th percentile eligible for referral to a weight-management program, only 26% were referred and 27% of those referred actually enrolled.<sup>21</sup>

Differences in sampling methods and the use of other assessments in clinical studies may account for the different results in reported studies.

Several differences emerged between 2006 and 2017 in perceived barriers in the assessment and management of overweight and obesity. An increasing proportion of respondents indicated that pediatricians can help in preventing childhood obesity and fewer agreed there is insufficient payment and coverage of counseling services and weight management programs by health insurance. However, about one-half of pediatricians in 2017 still believe there is inadequate payment by insurers, highlighting the importance of adequate coverage for screening, counseling, and referrals.<sup>7,22</sup> Although our finding that more pediatricians in 2017 than 2006 reported having adequate time during well-child visits to counsel on overweight and obesity is encouraging, only 28% of pediatricians in 2017 indicated they had enough time. In addition, nearly all pediatricians believed obesity should be addressed during well-child visits. Therefore, adequate time to address overweight and obesity during well-child visits remains a problem. There is little national information on current perceptions of barriers, but regional and single-center experiences report time constraints, limited staff, and resources, including provider education and training, are critical.<sup>23-25</sup> Our finding that the percent of pediatricians who "do not want to offend families by talking about weight" doubled over our study period was surprising, given the other findings in the survey. The growing awareness of weight bias<sup>26-28</sup> and the possibility that pediatricians could be more empathetic may help explain this finding.

There were significant increases from 2006 to 2017 in pediatricians reporting they felt prepared to counsel and comfortable discussing obesity-related issues with children and their families, with nearly all pediatricians reporting this in 2017. Large increases across years were found in pediatricians' perceptions of their counseling effectiveness in preventing (39% in 2006 and 62% in 2017) as well as managing obesity (38% in 2006 and 55% in 2017). These results suggest both an improvement in counseling practices

and a continued need for pediatricians to engage and counsel children and families on preventing and managing overweight and obesity,<sup>8,29</sup> given that obesity prevalence remains high. It also supports the need for a public health approach to obesity.

There is little information in the literature on the perceived self-efficacy of pediatricians regarding their counseling efforts.<sup>4,30,31</sup> In a primary-care based study exploring the use of motivational interviewing to improve nutrition and physical activity counseling, researchers reported an increase in the provider's self-efficacy in assessing patient readiness to change.<sup>32</sup>

Limitations of this study include that the survey was only sent to AAP members and has the inherent limitations associated with survey research (eg, self-reported data, risk of social desirability, and recall bias). Response rates for the 2006 and 2017 surveys (50%-63%) were similar or better than other surveys of pediatricians.<sup>33-36</sup> We did not have data in 2010 for the majority of our outcomes. Our study gathered pediatrician attitudes and perceptions but did not capture information on the quality and effectiveness of counseling or information from parents (eg, their self-efficacy, receipt and understanding of counseling, and ability to implement behavior change).<sup>37</sup> Furthermore, our study investigated trends in referrals but did not explore whether families accessed referrals. Factors influencing family access to referrals include logistical and cost reasons as well as mismatched expectations.<sup>38,39</sup>

Our findings indicate areas for improvement and vigilance, including counseling effectiveness, parental role modeling, and access to referrals. Future efforts should examine how best to address each of these remaining gaps. Simultaneous efforts should continue to investigate and address barriers described by families in receiving and understanding counseling advice and in successfully completing referrals to community-based resources. ■

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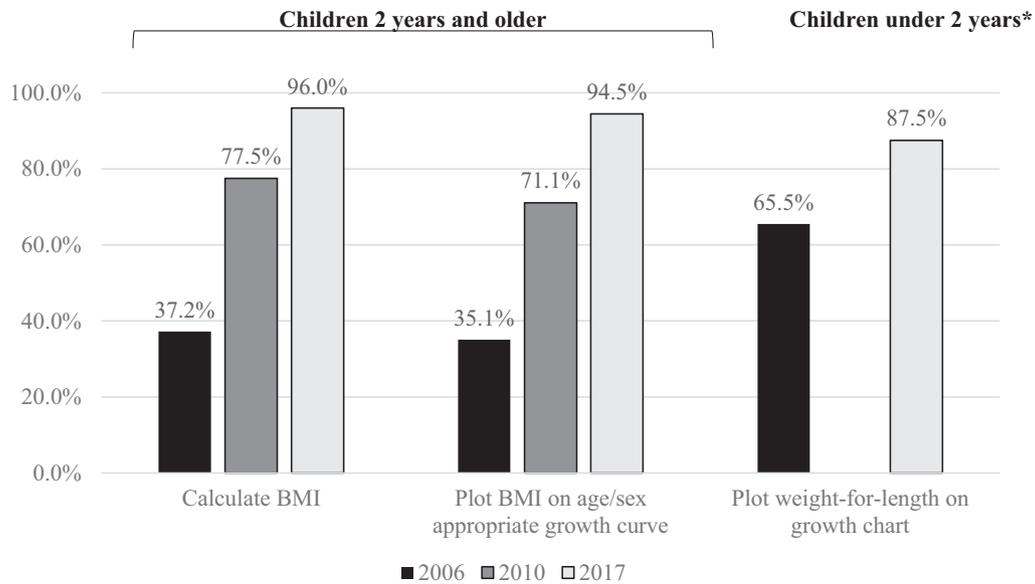
## Data Statement

Data sharing statement available at [www.jpeds.com](http://www.jpeds.com).

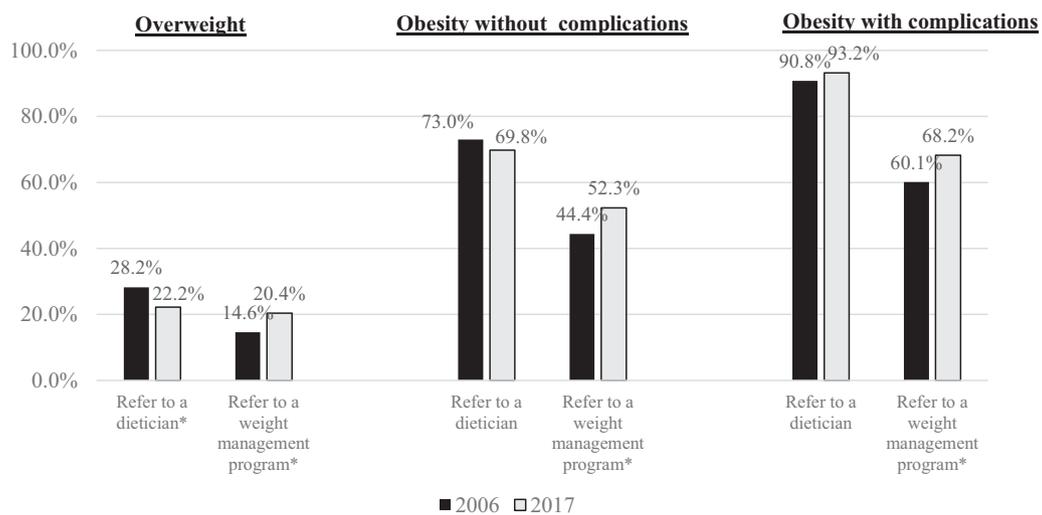
## References

- Hales CM, Carroll MD, Fryar CD, Ogden CL. Prevalence of obesity among adults and youth: United States, 2015-2016. *NCHS Data Brief* 2017;(288):1-8.
- Barlow SE, the Expert Committee. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. *Pediatrics* 2007;120(suppl 4):S164-92.
- US Preventive Services Task Force Grossman DC, Bibbins-Domingo K, Curry SJ, Barry MJ, Davidson KW, Doubeni CA, et al. Screening for obesity in children and adolescents: US Preventive Services Task Force recommendation statement. *JAMA* 2017;317:2417-26.
- Klein JD, Sesselberg TS, Johnson MS, O'Connor KG, Cook S, Coon M, et al. Adoption of body mass index guidelines for screening and counseling in pediatric practice. *Pediatrics* 2010;125:265-72.
- Klein JD, Cull WL, O'Connor K, Hassink SG. Periodic Survey #76 Trends in BMI Screening in Pediatric Care 2006-2010 [Internet]. Pediatric Academic Societies Annual Meeting; 2011 [cited 2016 Sep 20]. <https://www.aap.org/en-us/professional-resources/Research/Pages/Trends-in-BMI-Screening-in-Pediatric-Primary-Care-2006-2010.aspx>. Accessed April 8, 2019.
- American Academy of Pediatrics Institute for Healthy Childhood Weight. Featured Resources [Internet]. [cited 2018 Aug 20]. <https://ihcw.aap.org/resources/Pages/default.aspx>. Accessed April 8, 2019.
- Willfley DE, Staiano AE, Altman M, Lindros J, Lima A, Hassink SG, et al. Improving access and systems of care for evidence-based childhood obesity treatment: conference key findings and next steps. *Obesity (Silver Spring)* 2017;25:16-29.
- Daniels SR, Hassink SG, AAP Committee on Nutrition. The role of the pediatrician in primary prevention of obesity. *Pediatrics* 2015;136:e275-92.
- Moving Health Care Upstream. Profiles of the innovative population health initiatives of three children's hospitals [Internet] [cited 2018 Aug 20]. [https://www.movinghealthcareupstream.org/wp-content/uploads/2018/07/FINAL\\_MHCU\\_Childrens-Hospital-Brief.pdf](https://www.movinghealthcareupstream.org/wp-content/uploads/2018/07/FINAL_MHCU_Childrens-Hospital-Brief.pdf). Accessed April 8, 2019.
- Feldman-Winter LB, Schanler RJ, O'Connor KG, Lawrence RA. Pediatricians and the promotion and support of breastfeeding. *Arch Pediatr Adolesc Med* 2008;162:1142-9.
- Balk SJ, O'Connor KG, Saraiya M. Counseling parents and children on sun protection: a national survey of pediatricians. *Pediatrics* 2004;114:1056-64.
- Persoskie A, Ferrer RA. A most odd ratio: interpreting and describing odds ratios. *Am J Prev Med* 2017;52:224-8.
- National Committee on Quality Assurance: The State of Health Care Quality [Internet] [cited 2018 Aug 20]. <http://www.ncqa.org/report-cards/health-plans/state-of-health-care-quality>. Accessed April 8, 2019.
- Centers for Medicaid & Medicare Services. Health Care Quality Measures. Quality of Care for Children in Medicaid and CHIP: Findings from the 2017 Child Core Set. [Internet] [cited 2019 Mar 14]. <https://www.medicaid.gov/medicaid/quality-of-care/downloads/performance-measurement/2018-child-chart-pack.pdf>. Accessed April 8, 2019.
- Sisk B, Kirkendall E, Krams L, Schneider J, Lehmann C. Trends in EHR Adoption and Attitudes among Pediatricians, 2009-2016 [Internet]. Pediatric Academic Societies Annual Meeting; 2017 [cited 2018 Oct 23]. <https://www.aap.org/en-us/professional-resources/Research/research-findings/Pages/Trends-in-EHR-Adoption-and-Attitudes-among-Pediatricians-2009-2016.aspx>. Accessed April 8, 2019.
- Lehmann CU, O'Connor KG, Shorte VA, Johnson TD. Use of electronic health record systems by office-based pediatricians. *Pediatrics* 2015;135:e7-15.
- Odulana A, Basco WT, Bishu KG, Egede LE. Dietary and physical activity counseling trends in U.S. children, 2002-2011. *Am J Prev Med* 2017;53:9-16.
- Heredia NI, Ranjit N, Warren JL, Evans AE. Association of parental social support with energy balance-related behaviors in low-income and ethnically diverse children: a cross-sectional study. *BMC Public Health* 2016;16:1182.
- American Academy of Pediatrics Institute for Healthy Childhood Weight. Pediatric e-Practice: Optimizing your Obesity Care [Internet]

- [cited 2018 Aug 20]. <https://ihcw.aap.org/programs/pediatricpractice/Pages/default.aspx>. Accessed April 8, 2019.
20. Walsh CO, Milliren CE, Feldman HA, Taveras EM. Factors affecting subspecialty referrals by pediatric primary care providers for children with obesity-related comorbidities. *Clin Pediatr (Phila)* 2013;52:777-85.
  21. Barlow SE, Butte NF, Hoelscher DM, Salahuddin M, Pont SJ. Strategies to recruit a diverse low-income population to child weight management programs from primary care practices. *Prev Chronic Dis* 2017;14:E138.
  22. Hampl SE, Davis AM, Sampilo ML, Stephens KL, Dean K. Insurer and employer views on pediatric obesity treatment: a qualitative study. *Obesity (Silver Spring)* 2013;21:795-9.
  23. Hill SG, Phan T-LT, Datto GA, Hossain J, Werk LN, Abatamarco D. Integrating childhood obesity resources into the patient-centered medical home: provider perspectives in the United States. *J Child Health Care* 2019;23:63-78.
  24. Nelson JM, Vos MB, Walsh SM, O'Brien LA, Welsh JA. Weight management-related assessment and counseling by primary care providers in an area of high childhood obesity prevalence: current practices and areas of opportunity. *Child Obes* 2015;11:194-201.
  25. Rhee KE, Kessl S, Lindback S, Littman M, El-Kareh RE. Provider views on childhood obesity management in primary care settings: a mixed methods analysis. *BMC Health Serv Res* 2018 30;18:55.
  26. Puhl RM, Peterson JL, Luedicke J. Parental perceptions of weight terminology that providers use with youth. *Pediatrics* 2011;128:e786-93.
  27. Pont SJ, Puhl R, Cook SR, Slusser W. Section on Obesity, the Obesity Society. Stigma experienced by children and adolescents with obesity. *Pediatrics* 2017;140:e20173034.
  28. Nutter S, Russell-Mayhew S, Alberga AS, Arthur N, Kassan A, Lund DE, et al. Positioning of weight bias: moving towards social justice. *J Obes* 2016;2016:3753650.
  29. Committee on Accelerating Progress in Obesity Prevention, Food and Nutrition Board, Institute of Medicine. In: Glickman D, Parker L, Sim LJ, Del Valle Cook H, Miller EA, eds. *Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation* [Internet]. Washington (DC): National Academies Press (US); 2012 [cited 2019 Feb 27]. <http://www.ncbi.nlm.nih.gov/books/NBK201141/>. Accessed April 8, 2019.
  30. Story MT, Neumark-Stzainer DR, Sherwood NE, Holt K, Sofka D, Trowbridge FL, et al. Management of child and adolescent obesity: attitudes, barriers, skills, and training needs among health care professionals. *Pediatrics* 2002;110(1 Pt 2):210-4.
  31. Frintner MP, Liebhart JL, Lindros J, Baker A, Hassink SG. Are graduating pediatric residents prepared to engage in obesity prevention and treatment? *Acad Pediatr* 2016;16:394-400.
  32. Christison AL, Daley BM, Asche CV, Ren J, Aldag JC, Ariza AJ, et al. Pairing motivational interviewing with a nutrition and physical activity assessment and counseling tool in pediatric clinical practice: a pilot study. *Child Obes* 2014;10:432-41.
  33. Feldman-Winter L, Szucs K, Milano A, Gottschlich E, Sisk B, Schanler RJ. National trends in pediatricians' practices and attitudes about breastfeeding: 1995 to 2014. *Pediatrics* 2017;140(4).
  34. Federico SG, Cull W, Olson L, Garg A, Racine AD, Fisher A, et al. United States pediatricians' attitudes regarding public policies for low-income children and their profession's advocacy priorities. *Acad Pediatr* 2018;18:783-8.
  35. Saul RA, Trotter T, Sease K, Tarini B. Survey of family history taking and genetic testing in pediatric practice. *J Community Genet* 2017;8: 109-15.
  36. de Ferranti SD, Rodday AM, Parsons SK, Cull WL, O'Connor KG, Daniels SR, et al. Cholesterol screening and treatment practices and preferences: a survey of United States pediatricians. *J Pediatr* 2017;185: 99-105.e2.
  37. Perrin EM, Flower KB, Garrett J, Ammerman AS. Preventing and treating obesity: pediatricians' self-efficacy, barriers, resources, and advocacy. *Ambul Pediatr* 2005;5:150-6.
  38. Hampl S, Demeule M, Eneli I, Frank M, Hawkins MJ, Kirk S, et al. Parent perspectives on attrition from tertiary care pediatric weight management programs. *Clin Pediatr (Phila)* 2013;52:513-9.
  39. Kulik NL, Thomas EM, Iovan S, McKeough M, Kendzierski S, Leatherwood S. Access to primary care child weight management programs: Urban parent barriers and facilitators to participation. *J Child Health Care* 2017;21:509-21.



**Figure 1.** PVs of pediatricians who report they assess for overweight/obesity at every well-child visit by survey year. Adjusted percentages are presented. In multivariable logistic regression, 2006 and 2010 responses are significantly lower than 2017 ( $P < .01$ ), controlling for sex, age, region, work area, work setting, practice time in general pediatrics >50% of time, and total hours worked per week in direct patient care. \*Plot weight-for-length on growth chart was not asked in 2010.



**Figure 2.** PVs of pediatricians reporting they make referrals for children and adolescents with overweight, obesity without complications, and obesity with complications: 2006 and 2017. Adjusted percentages are presented. \*In multivariable logistic regression, 2006 responses are significantly different than 2017 ( $P < .05$ ), controlling for sex, age, region, work area, work setting, practice time in general pediatrics >50% of time, and total hours worked per week in direct patient care.

**Table V. Practice and personal characteristics of respondents: 2006, 2010, and 2017**

Characteristics	2006 (n = 656)	2010 (n = 590)	2017 (n = 558)
Sex, % <sup>*,†</sup>			
Male	39.9	43.6	32.1
Female	60.1	56.4	67.9
Age, y, mean* (median)	46.2 (45)	47.9 (47)	49.1 (48)
Region, %			
Northeast	26.3	25.3	27.6
Midwest	22.4	21.7	22.2
South	33.6	32.7	30.1
West	17.7	20.3	20.1
Practice location, %			
Inner city	19.1	15.1	16.2
Urban	21.7	24.4	22.1
Suburban	44.3	47.5	46.7
Rural	14.9	13.1	15.0
Primary practice setting, %			
Solo/2-physician	19.8	19.2	17.2
Group/HMO	63.8	62.1	64.8
Hospital/clinic/medical school	16.4	18.7	18.1
Hours per week in direct patient care, mean <sup>†</sup> (median)	37.4 (40)	38.9 (40)	35.9 (35)
50% or more time spent in general pediatrics, %			
Yes	95.0	94.5	94.8
No	5.0	5.5	5.2

HMO, health maintenance organization.

\* $P < .01$  for 2006 compared with 2017.

† $P < .01$  for 2010 compared with 2017.