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Adoption of Body Mass Index Guidelines for Screening and Counseling In Pediatric Practice

Jonathan D. Klein, MD, MPH^a, Tracy S. Sesselberg, MA, MPH^a, Mark S. Johnson, MD, MPH^b, Karen G. O'Connor, BS^c, Stephen Cook, MD, MPH^a, Marian Coon, MS, RD^a, Charles Homer, MD, MPH^d, Nancy Krebs, MD^e, and Reginald Washington, MD^e

^aDivision of Adolescent Medicine, School of Medicine and Dentistry, University of Rochester, Rochester, New York

^bDepartment of Family Medicine, University of Medicine and Dentistry of New Jersey, Newark, New Jersey

^cDivision of Practice and Research, American Academy of Pediatrics, Elk Grove Village, Illinois

^dNational Initiative for Children's Healthcare Quality, Cambridge, Massachusetts

^eDepartment of Pediatrics, University of Colorado, Denver, Colorado

Abstract

OBJECTIVE—The purpose of this study was to examine pediatrician implementation of BMI and provider interventions for childhood overweight prevention and treatment.

METHODS—Data were obtained from the American Academy of Pediatrics (AAP) Periodic Survey of Fellows No. 65, a nationally representative survey of AAP members. Surveys that addressed the provision of screening and management of childhood overweight and obesity in primary care settings were mailed to 1622 nonretired US AAP members in 2006.

RESULTS—One thousand five (62%) surveys were returned; 677 primary care clinicians in active practice were eligible for the survey. Nearly all respondents (99%) reported measuring height and weight at well visits, and 97% visually assess children for overweight at most or every well-child visit. Half of the respondents (52%) assess BMI percentile for children older than 2 years. Most pediatricians reported that they do not have time to counsel on overweight and obesity, that counseling has poor results, and that having simple diet and exercise recommendations would be helpful in their practice. Pediatricians in large practices and those who had attended continuing medical education on obesity were more familiar with national expert guidelines, were more likely to use BMI percentile, and had higher self-efficacy in practices related to childhood and adolescent overweight and obesity. Multivariate analysis revealed that pediatricians with better access to community and adjunct resources were more likely to use BMI percentile.

Address correspondence to Jonathan D. Klein, MD, MPH, American Academy of Pediatrics, 141 Northwest Point Blvd, Elk Grove Village, IL 60006. jklein@aap.org.

Dr Klein's current affiliation is the American Academy of Pediatrics, Elk Grove Village, IL.

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CONCLUSIONS—BMI-percentile screening in primary pediatric practice is underused. Most pediatricians believe that they can and should try to prevent overweight and obesity, yet few believe there are good treatments once a child is obese. Training, time, and resource limitations affect BMI-percentile use. Awareness of national guidelines may improve rates of BMI-percentile use and recognition of opportunities to prevent childhood and adolescent obesity.

Keywords

obesity; pediatrics; BMI; guidelines; CME

Obesity in children, defined as a BMI (kg/m^2) at 95th percentile using the 2000 Centers for Disease Control and Prevention (CDC) growth charts, is related to health problems in children, adolescents, and adults.¹ As many as 16% of US children aged 6 to 19 years are obese, and an additional 15% are overweight (defined as a BMI percentile between 85th and 95th percentile).^{2,3} Racial/ethnic minority children, especially Latino populations, are at increased risk for obesity and its complications.^{4,5}

BMI was first recommended for use in pediatrics in 1991.^{6,7} In 2003, the American Academy of Pediatrics (AAP) published recommendations for management of childhood overweight that included early and ongoing screening and tracking of BMI percentile by age, and encouragement of healthy nutrition and physical activity behaviors.⁸ In October 2006, these recommendations were reaffirmed, echoing an Institute of Medicine 2005 report that called for implementation of BMI-percentile measurement and for using the “best available evidence” for children and families.^{9–11} Specific recommendations for screening for overweight and obesity were published in December 2007.¹²

Authors have indicated that weight status is not accurately identified by visual assessment alone, and that healthy weight tends to be overestimated.¹³ According to several studies, the majority of clinicians do not document overweight through BMI-percentile tracking, although they perceive high BMI percentile more seriously than weight and height measures.¹⁴ When documentation occurs, screening, counseling, and referral rates increase.^{15,16}

Treatment for overweight and obesity demands significant time and resources.¹⁷ Nonetheless, pediatricians have the potential to influence behaviors affecting weight and an ability to make referrals to other health care providers during office visits. Pediatricians often identify barriers to screening and management of overweight or obesity, including lack of parent involvement, lack of patient motivation, lack of support services, and physicians’ perceived low efficacy in behavior management strategies, parenting techniques, and addressing family conflicts.¹²

Training pediatricians in weight management has been effective in changing practice behaviors. In 1 study, training improved pediatricians’ awareness of expert committee recommendations, BMI-percentile use, and follow-up of overweight patients.¹⁸ The authors of another study found awareness led to greater self-efficacy in obesity counseling, but practices did not change.¹⁹ Delivery of other clinical preventive services and asthma

guideline-based practice changes have been demonstrated through skills-based training of pediatricians.^{20–22}

Pediatric clinicians want more training in weight management, but need effective training opportunities.²³ Recently, focus groups found few providers using BMI percentile to diagnose childhood overweight, with many still using traditional growth charts or visual assessment to track children's weight trends.²⁴ Numerous barriers to physicians following practice guidelines have been identified.²⁵ The authors of previous studies and recommendations have discussed the importance of system changes to allow for effective BMI screening.²⁴ The US Preventive Services Task Force (USPSTF) recommended in 2003 that BMI be used to screen all adults for obesity by using BMI.²⁶ At that time, BMI and BMI percentiles were found to be reliable and valid for identifying adults and children at increased risk as a result of obesity. The USPSTF recommended use of BMI because it is commonly used and has been linked with the broadest range of health outcomes.²⁶ Currently, in 2009, the USPSTF has concluded that there is now evidence that moderate- and high-intensity counseling are effective for obesity interventions in children older than 6 years.²⁷ The authors of other studies have found that providers are more likely to discuss overweight if it has been diagnosed.¹⁶

Earlier studies of provider obesity-related clinical interventions have relied on small or convenience samples or have been limited by low response rates.²³ Much evidence on attitudes and practices of pediatric clinicians predates current guidelines and new attention to obesity public health priorities. The objective of our study was to collect data from a representative sample of pediatricians on implementation of guideline-based screening and interventions for childhood and adolescent overweight, including use of BMI percentile, clinical decision-tools, counseling and referrals, and community resources.

METHODS

Periodic Survey No. 65

Periodic survey No. 65 was developed in collaboration with the 2003–2006 AAP Task Force on Obesity and other experts on childhood overweight. We convened a series of meetings in which we discussed baseline data needs, created questions, and revised as necessary. Up to 7 rounds of a self-administered survey were mailed to a random sample of 1622 active AAP members between March and August 2006. The AAP estimates that 80% of all board-certified pediatricians are AAP members. At the time of the survey, “at risk of overweight” and “overweight” were used to describe children who would now be categorized as “overweight” and “obese,” respectively.³ Thus, the terms used on the survey are used to describe the results.

Measures and Analysis

The survey included questions about the (1) attitudes and practices regarding prevention, screening, and interventions for overweight, (2) barriers to screening and intervention, (3) treatment and referral practices, and (4) resources in the office setting and community. We examined differences by provider demographics, including gender, age, and self-reported

clinician BMI, as well as by percent of time spent in general pediatrics, practice type (solo or 2-physician practice; group practice or health maintenance organization, medical school, hospital, or community health center based practices), and practice area (urban, suburban, or rural). In addition, we examined the effect of obesity continuing medical education (CME), presence of electronic medical records (EMRs) within the practice, and other factors described below.

χ^2 analyses and analysis of variance were used to determine differences in BMI-percentile use and other practices related to overweight and obesity in practice. Principal components factor analysis was used to identify overarching factors associated with BMI-percentile use, and logistic regression was used to model the association between BMI-percentile use and other variables. Data were coded and double-entered by using Microsoft Access (Redmond, WA); SPSS (SPSS Inc, Chicago, IL) was used for all analyses. The study was approved by institutional review boards at the AAP and the University of Rochester.

RESULTS

Pediatrician Demographics and Practice Characteristics

We received responses from 1013 (62%) pediatricians. Of these, 336 (33%) do not provide health supervision for children, and thus were not eligible, resulting in a final sample of 677 completed surveys (67% completion rate). Pediatrician demographics are shown in Table 1. Respondents were similar demographically to AAP members, except that slightly more female respondents than male respondents completed and returned surveys and were eligible. About half had participated in CME related to overweight in the previous 3 years. Pediatricians' estimates of the prevalence of obesity in their practice ranged from 1% to 70%, with a mean of 23%. Sixty-one percent of pediatricians had a self-reported BMI in the normal range; 37.3% were overweight or obese.

Practices by Pediatricians and Staff at Well Visits

Table 2 shows routine practices by pediatricians during well-child visits. Nearly all respondents reported measuring height and weight and visually assessing children for overweight at visits. Half of the respondents reported assessing BMI for children older than 2 years at most or every visit. Tools most commonly used to calculate BMI and/or BMI percentile were BMI wheels (39%) and handheld calculators (35%). BMI-percentile tables/charts, EMRs, BMI calculators, and personal digital assistants were less frequently used. Most pediatricians reported routinely discussing 5-a-day fruit and vegetable consumption (89%), physical activity (86%), and the amount of time spent using television, computers, and video games at well visits (76%). Many also reported regular discussion on sugar-sweetened beverages (65%), snacks (55%), fast food/dining out (44%), and the food pyramid (31%).

Attitudes and Perceptions Toward Managing Childhood Overweight and Obesity

Pediatricians have differing views on prevention of childhood overweight and obesity versus treatment of childhood overweight and obesity. Nearly all pediatricians (92%) were interested in childhood overweight prevention. Half believe that there is evidence that

overweight is preventable, and more believe that pediatricians can and should help to prevent it. There was widespread disagreement on whether prevention of overweight should be addressed through community policies (eg, through reduction of fast-food availability). Overall, 56% percent of respondents reported being very or somewhat familiar with AAP guidelines. Half were neutral on whether AAP recommendations are easy to follow, and many reported being unfamiliar with BMI recommendations (72%). A similar proportion believe that families are unfamiliar with BMI recommendations (72%), but believe nonetheless that BMI adds new information (69%) and that screening will make a difference (69%). Only 21% of respondents reported that time constraints make BMI screening difficult; given that many practices have implemented EMR systems, this is not surprising. Less than half (45%) of the respondents have staff support for screening but 68% have tools for BMI calculations. However, most reported not having enough time during well visits for counseling (67%) despite strongly believing that counseling parents is the best way to change childhood overweight.

It is interesting to note that although most physicians believe that they should address overweight at well visits and 74% are not worried about offending families by talking about weight, only 59% believe that families want it discussed, and only half believe that families are interested in addressing overweight. Most pediatricians feel comfortable (92%) and prepared (89%) to counsel children and parents about weight. Although most pediatricians believe that counseling has poor results, they also reported that simple diet and exercise recommendations for use in practice would be helpful to them and their patients. Providers' opinions about treatment of overweight, however, are very different.

Only 23% of respondents believe that there are good treatment strategies for overweight, and disagree on whether treatment is effective. Half of the respondents believe that overweight physicians lack credibility when counseling about overweight.

Twenty percent of respondents reported having a dietitian or nutritionist available in their practice. However, more than half of respondents reported a lack of referral services for weight management. Similarly, more than half said that dietitian services are not covered by insurance and that insurance does not cover weight management programs (69%). Many pediatricians (62%) are unfamiliar with billing codes for overweight; only 15% of providers reported they can bill for overweight counseling and treatment separately from well visits, and 56% reported that reimbursement is insufficient. There was strong agreement that many patients are not able to pay for uncovered services (82%).

We used analysis of variance and χ^2 tests to determine if there were significant differences in providers' practices and self-efficacy on the basis of familiarity with guidelines. Providers who had attended CME sessions on overweight or obesity were more familiar with AAP guidelines, with 60% of those who had CME reporting they are very familiar with guidelines, compared with 40% of those who had not received CME ($P < .001$), and those who had attended CME had significantly higher scores on the familiarity scale (2.7 vs 2.45, $P < .001$). Providers who said they were "somewhat" or "very" familiar with the AAP guidelines were significantly more likely to report using *Pediatrics*, *AAP News*, other

journals, the AAP Web site, and the CDC Web site than providers who said they were not familiar or only vaguely familiar with the AAP guidelines.

In addition, pediatricians who were more familiar with the AAP guidelines were more likely to report using BMI percentile to assess growth, overweight, and obesity (mean score: 2.77 vs 2.37 for those who did versus those who did not use BMI percentile; $P < .001$). Those who were more familiar with guidelines also felt significantly more prepared to counsel patients, felt more comfortable discussing overweight, and believed that their counseling on overweight and prevention was more effective than those who were less familiar with guidelines. Compared with those who were not familiar or only vaguely familiar, providers who were somewhat or very familiar with guidelines were also significantly more likely to refer families to a dietitian when the parents were obese (67% vs 33%; $\chi^2 = 4.921$; $P = .027$).

Factors Associated with BMI-Percentile Use in Multivariate Analyses

Because we asked a series of questions related to attitudes and self-efficacy factors affecting pediatricians' screening and treatment practices for childhood and adolescent overweight, we used principal components factor analysis²⁸ to determine what underlying mechanisms explain the responses. The factor analysis identified 1 strong factor and 2 weaker factors. Varimax and quartimax rotations did not yield simplified solutions or clearer factors. Survey questions included in the 3 factors identified and the mean scores on each question are shown in Table 3. The strongest factor related to pediatricians' feeling of helplessness or skepticism at making a difference in a patient's overweight. This "self-efficacy" factor explained 16% of the variance in responses (Eigen value: 6.685). Two weaker factors included items related to reimbursement such as insufficient reimbursement for dietitian referral services and weight management programs (the "reimbursement" factor), and resources available to the physician including time, tools, and staff support (the "resources" factor). These factors explained 6% and 5% of the variance, respectively. Factor variables were created by using summary scores. Those who reported using BMI had lower scores reflecting greater self-efficacy (mean: 26.3 vs 27.5; range: 10 – 47; $P = .019$) and higher scores on the resources factor than those not using BMI (mean: 15.9 vs 13.5; range: 4 – 20; $P = .001$), reflecting more resource availability.

Logistic regression models were used to examine the association between BMI-percentile use at most or all visits and demographic and other variables (Table 4). Despite significant bivariable relationships, neither gender, provider BMI, CME training, nor practicing in large practice settings were significantly associated with BMI-percentile use. In our model, clinicians practicing in medical schools, hospitals, or clinics were more likely to be using BMI (odds ratio [OR]: 2.034 [95% confidence interval (CI): 1.01–4.09]) and clinicians who had more practice resources (higher scores on the resources factor) were more likely to be using BMI (OR: 1.25 [95% CI: 1.17–1.33]). In our final model, the setting variable was no longer significant, leaving reported availability of resources as the only significant predictor of BMI use. Interactions between demographic variables were not significant, nor were provider age, BMI, practice location, self-efficacy or reimbursement factors, or proportion of minority and publicly insured patients in the practice.

DISCUSSION

Our study is one of the first to examine and provide baseline data on BMI-percentile implementation and obesity counseling and intervention since the widespread release of several new guidelines and recommendations for obesity prevention interventions for children and families. Although findings are encouraging regarding physicians' interest and attention to obesity and overweight, there remain significant opportunities for improvement, both in attitudes and in the evidence base for interventions and clinical practice.

Our study highlights the importance of educating pediatricians about care guidelines for overweight children and adolescents. We found that those who are more familiar with guidelines have significantly higher self-efficacy and feel more comfortable discussing the topic. Although many pediatricians are unfamiliar with guidelines and BMI recommendations, they are nevertheless interested in learning more about treatment strategies for overweight patients. Pediatricians believe that overweight should be addressed at well visits and that families want them to discuss overweight. However, more than half of the pediatricians in our sample had not received recent CME training on childhood overweight, and, not surprisingly, those who did receive CME were more likely to use BMI, and felt more confident in screening and counseling patients and families. Setting and environment are often important determinants in providers' practices and adherence to guidelines.²⁵ Improving opportunities for smaller practices to access CME and strategies to ensure reimbursement of services related to overweight and dietitian referrals may help. In addition, the self-efficacy factor identified in our study may partially explain providers' lack of adherence to overweight screening and treatment guidelines; Cabana et al²⁵ also found that low self-efficacy can lead to poor adherence, although whether improving self-efficacy through training and providing resources will significantly improve screening is not known. Alternatively, low self-efficacy may reflect that many clinicians believe that treatment for severe obesity is outside the scope of what can be realistically addressed in primary care settings, or that non-health care strategies may be more effective for addressing the problem.

Pediatricians in our study reported discussing physical activity and healthy eating with most patients, but reported that simple diet and exercise recommendations and tools to help with BMI calculation would help them and that they do not have enough time to counsel. Again, this perhaps suggests that pediatricians believe more involved and detailed counseling is needed than they currently are able to provide. This will require more time and more extensive training. Nevertheless, CME training may improve physician knowledge and behaviors related to obesity management. Flower et al²⁴ found that patient education materials and access to dietitians enhanced physicians' confidence in effectively treating obesity, but noted that additional work was needed to make recommendations useful to pediatricians. Although it was encouraging that a high percentage of pediatricians report "usually" discussing 5-a-day fruits and vegetables, recent expert committee findings suggest that discussing sugar-sweetened beverages and fast food/eating out may be more important for children. Changing practice to keep pace with the best available evidence will require ongoing education of clinicians, sustained over time.²⁰ As noted by the USPSTF, moderate intensity counseling services may be beyond the capability of many primary care clinicians.²⁷ Essential components of an ideal CME program for obesity identified by Robert

Wood Johnson Foundation include nutrition, physical activity, behavior change, educational value, practicality in the providers' settings, and efficacy.²⁹ Ensuring that all of these are incorporated may further enhance the effectiveness of training on clinician practice.

Despite the association between familiarity with guidelines and increased BMI use, significant barriers in pediatric practice still exist. Providers who were more familiar with guidelines were more likely to report sources such as *Pediatrics*, *AAP News*, and other journals for information on prevention, counseling, and treatment of childhood overweight. Those who were less familiar with guidelines were less likely to refer to these sources, possibly reflecting their lack of time or interest; perhaps targeted CME could reach these providers. Adequate community and practice resources were a significant predictor of whether providers used BMI. Resources include time, staff support, and tools to compute BMI. Pediatricians face many competing priorities during well visits,²⁴ and facilitating practice change to support BMI calculation and counseling, and use of BMI-specific tools such as BMI wheels, wall charts, or other techniques, can help reduce the time required. As practices transition to using EMR systems, calculation of the BMI will become automatic and, therefore, easier and faster. Community and health care system barriers also impact the likelihood of screening. Reimbursement limitations impact pediatricians' prevention priorities, and previous studies have revealed that physicians are more likely to spend time on obesity if the time is reimbursable.^{16,30} Few of our respondents reported being able to bill for interventions or familiarity with obesity billing codes. More importantly, referral services and coverage for adjunct services are perceived as limited for over half the pediatricians in this study. These gaps in coverage further restrict the services and referrals available for overweight patients.

National and local policies to improve health care delivery for childhood obesity are needed if this situation is going to change. Policy can change reimbursement and can enhance behaviors that impact weight, such as physical education and accessibility to nutritious foods. The Institute of Medicine's report on preventing childhood obesity provides a framework to assist physicians both with patients and families and in their communities.¹⁰ Perrin et al found³⁰ pediatricians (87%) willing to take an active role in advocacy, with 24% willing to take a significant role in participating in the policy change process. However, whether advocacy through community leadership can alter self-confidence in behavior management strategies or empower pediatricians to change the environment for patients and families remains to be seen.

This study is limited by several factors. Because these data are based on self-report and subject to social desirability, responses are likely biased toward overreporting rates of BMI use, screening, or counseling, especially given recent public attention to childhood obesity. In addition, those who completed surveys may be more interested and/or proactive in obesity prevention and treatment. Compared with AAP membership data, more female respondents returned the survey; however, this is consistent with other periodic surveys and biases associated with gender have been found to be minimal.³¹

Our findings show that most pediatricians do not feel well prepared to address childhood overweight, but awareness of guidelines and having resources available may improve

providers' use of BMI. Although pediatricians believe that childhood obesity is preventable, they report that access to obesity treatment is often complicated. Pediatricians want simple measurement and counseling tools, better reimbursement, structured messaging for families, and more accessible community referral resources to promote healthy nutrition and physical activity. Overcoming these barriers may help speed BMI screening, counseling, and referrals for overweight children, and thus lead to more families having access to effective lifestyle interventions to prevent and treat obesity.

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ABBREVIATIONS

CDC	Centers for Disease Control and Prevention
AAP	American Academy of Pediatrics
USPSTF	US Preventive Services Task Force
CME	continuing medical education
EMR	electronic medical record
OR	odds ratio
CI	confidence interval

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WHAT'S KNOWN ON THIS SUBJECT

Screening and tracking of BMI percentile by age and encouragement of healthy nutrition and physical activity are recommended, but not universally delivered in pediatric care.

WHAT THIS STUDY ADDS

Most pediatricians want to prevent obesity, yet few believe there are good treatments once a child is overweight. Training, time, and resource limitations affect BMI-percentile use. Awareness of national guidelines may improve BMI-percentile use and prevention of obesity.

TABLE 1Respondent Demographics and Practice Characteristics (*N*= 677)

Demographic or Characteristic	<i>n</i> (%)
Gender	
Male	267 (39.8)
Female	404 (60.2)
BMI	
Underweight	11 (1.7)
Normal weight	388 (60.9)
Overweight	183 (28.7)
Obese	55 (8.6)
Primary practice setting	
Solo or 2-physician practice	126 (19.4)
Pediatric group/multispecialty group/health maintenance organization	411 (63.4)
Medical school/hospital/clinic/community health center	111 (17.1)
Primary practice/position area	
Rural	99 (15.0)
Suburban	290 (43.9)
Urban	272 (41.1)
Specialty	
General pediatrician	635 (94.8)
Specialist	35 (5.2)
CME or training in childhood/adolescent overweight in 3 y	
Yes	319 (48.0)
No	346 (52.0)

TABLE 2

Pediatricians' Practices at Well Visits (*N* = 677)

Practice	<i>n</i> (%)
Measure height and weight at most or every visit	673 (99)
Visually assess for overweight for children >2 y old	
At every well visit	606 (91)
At most well visits	42 (6)
Compute and/or plot BMI for children >2 y old	
At most or every visit	370 (55)
At some visits	189 (28)
Never or rarely	111 (17)
Use of BMI-calculation tools	
BMI wheel	215 (39)
Handheld calculator	197 (35)
CDC BMI table/chart	156 (28)
EMR	123 (22)
BMI calculator	99 (18)
Personal digital assistant	95 (17)
Wall chart	38 (7)
Topics discussed with all patients	
5-a-day fruits and vegetables	592 (89)
Physical activity	574 (86)
Screen time	504 (76)
Sugar-sweetened beverages	432 (65)
Snacks	368 (55)
Fast food/dining out	289 (44)
Food pyramid	201 (31)

TABLE 3Mean Scores on Attitudes and Factor Analysis (*N* = 677)

Attitude/Question	1 = Strongly Disagree, 5 = Strongly Agree, Mean (SD)	Factor 1, Self-efficacy, Mean	Factor 2, Reimbursement, Mean	Factor 3, Resources, Mean
There is little pediatricians can do to treat/manage overweight.	—	0.694	—	—
How effective is your counseling on overweight management? (4-point scale)	2.36 (0.69)	−0.691	—	—
How effective is your counseling on prevention of obesity? (4-point scale)	2.36 (0.69)	−0.687	—	—
Pediatricians can help prevent childhood overweight.	3.97 (0.94)	−0.645	—	—
There are effective means of treating overweight.	3.06 (1.10)	−0.579	—	—
I don't think screening will make a difference.	2.10 (1.10)	0.587	—	—
There is no evidence physicians can prevent overweight.	2.58 (0.95)	0.561	—	—
How prepared to counsel about overweight? (4-point scale)	3.18 (0.61)	−0.568	—	—
There are good treatment options for overweight.	2.57 (1.20)	−0.555	—	—
Weight-management programs are not covered by insurance.	3.94 (1.00)	—	0.702	—
Dietitian services are not covered by insurance.	3.65 (1.10)	—	0.670	—
Many patients are not able to pay for uncovered services.	4.25 (0.99)	—	0.505	—
Insufficient reimbursement for counseling.	3.74 (1.20)	—	0.481	—
Time constraints make screening difficult.	2.35 (1.20)	—	—	0.603
There are lack of tools to assist with BMI calculations.	2.08 (1.20)	—	—	0.564
I have staff support for screening.	3.19 (1.30)	—	—	−0.505
I am unfamiliar with BMI recommendations.	2.01 (1.20)	—	—	0.448
Percentage of variance explained by factor.	—	15.92	5.65	5.18

TABLE 4Logistic Regression Analysis Predicting BMI Use in Pediatric Practice (*N* = 677)

Variable	Model 1, OR (95% CI)	Model 2, OR (95% CI)	Model 3, OR (95% CI)	Model 4, OR (95% CI)
Demographics				
Female	1.66 (1.10–2.52)	1.61 (1.04–2.48)	1.56 (0.98–2.47)	1.51 (0.95–2.40)
Age (continuous)	1.00 (0.98–1.02)	1.00 (0.98–1.02)	1.00 (0.98–1.02)	1.00 (0.98–1.02)
Provider BMI (continuous)	1.00 (0.96–1.04)	1.00 (0.96–1.04)	1.00 (0.97–1.05)	1.01 (0.96–1.05)
General pediatrician	0.80 (0.31–2.08)	0.98 (0.36–2.66)	0.98 (0.35–2.73)	0.95 (0.34–2.63)
Practice characteristics				
Small pediatric group	—	—	—	—
Large pediatric group	—	1.79 (1.08–2.96)	1.53 (0.88–2.63)	1.59 (0.92–2.75)
Medical school/hospital/clinic/ community health center	—	2.29 (1.19–4.41)	2.04 (1.01–4.10)	1.86 (0.92–3.79)
Rural	—	1.04 (0.57–1.92)	0.83 (0.43–1.59)	0.93 (0.47–1.82)
Suburban	—	0.84 (0.54–1.31)	0.82 (0.51–1.31)	0.93 (0.56–1.55)
Urban	—	—	—	—
Use EMRs	—	1.70 (1.11–2.60)	1.39 (0.89–2.19)	1.41 (0.90–2.21)
CME on obesity in previous 3 y	—	1.49 (1.01–2.20)	1.44 (0.95–2.17)	1.44 (0.95–2.18)
Attitude factors				
Helpless	—	—	0.99 (0.96–1.03)	1.00 (0.96–1.03)
Reimbursement	—	—	1.01 (0.94–1.09)	1.01 (0.94–1.09)
Resources	—	—	1.25 (1.17–1.33)	1.25 (1.17–1.34)
Percent minority (continuous)	—	—	—	1.01 (1.00–1.02)