Published in final edited form as:
J Pediatr Health Care. 2014 ; 28(3): 241–250. doi:10.1016/j.pedhc.2013.05.009.

The Impact of the 2007 Expert Committee Recommendations on Childhood Obesity Preventive Care in Primary Care Setting in the United States

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Abstract

Objectives—This study examined the impact of the Expert Committee Recommendations (ECR) on childhood obesity preventive care during well-child visits in the United States.

Methods—Data from the 2006-2009 NAMCS and NHAMCS-OPD were used to examine frequencies of diet/nutrition and exercise counseling during well-child visits by children aged two to 18 years. Differences in rates of the counseling before and after the ECR were compared.

Results—Only 37% and 22% of all visits in 2006-2007 and 33% and 18% in 2008-2009 were provided with diet/nutrition and exercise counseling, respectively. The frequencies of the counseling among those with obesity diagnosis showed no change. Socioeconomically disadvantaged children received the counseling less frequently after the ECR.

Conclusion—Overall, rates of obesity preventive care were low in all years, with no evidence of improvement with the ECR. Systematic approaches are needed to improve delivery of obesity preventive care irrespective of socioeconomic backgrounds of children.

INTRODUCTION

In hopes to slow down the obesity epidemic and reduce obesity related health consequences, the Expert Committee, consisting of representatives from 15 health organizations and steered by members of the American Medical Association, the Health Resources and Service Administration, and the Center for Disease Control and Prevention, announced its recommendations on the assessment, prevention, and treatment of child and adolescent overweight and obesity in 2007. Based on best available evidence and clinical judgment, the Expert Committee presented a chronic care model approach that emphasized the importance of healthy dietary habit and physical activity from early childhood and a graded treatment approach based on child and family risk factors (Barlow, 2007).

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The Expert Committee Recommendations (ECR) for childhood obesity prevention strategies includes provision of diet/nutrition and exercise consultations at every well-child visit regardless of child's weight status. In addition, based upon assessment of body mass index (BMI) and obesity related child and family risk factors practitioners are encouraged to make decisions for further, more intensive interventions. Evidence from a recent study suggests that normalization of weight status through family-based behavior interventions is more easily achieved when children are aged 8-10 years than later years (Goldschmidt, Wilfley, Paluch, Roemmich, & Epstein, 2012). Similarly, a longitudinal study for behavioral treatment of obese children and adolescent aged six to 16 years has shown age at start of treatment as the single most significant factor for successful weight reduction after three years (Danielsson, Kowalski, Ekblom, & Marcus, 2012). This growing body of evidence suggests that preventive measures and monitoring of child's weight status must start at a young age.

The ECR also called for collaborations among communities, schools, families, and health care providers to create an environment to support healthy food choices and physical activities. As partners of the collaborative team, the role of primary care providers was to continually evaluate child's health status, educate families and children about importance of healthy diets and physical activity during every routine well-child care visits, and make necessary referrals for further interventions (Barlow, 2007; Davis et al., 2007).

Past research has found that documentation of obesity preventive care provisions at primary care provider offices in the United States (US) has been traditionally low (Demerath et al., 2003). For example, Ma and Xiao (2009), using the 2005-2006 National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Care Survey (NHAMCS), reported that an estimated 34% and 23% of preventive care visits made by adolescents aged 13-18 years received diet/nutrition and exercise counseling, respectively. Similarly using the same surveys from 1997 to 2000, Cook, Weitzman, Auinger and Barlow (2005) documented that the frequencies of diet/nutrition and exercise counseling among children aged 2-18 years during preventive care visits were 36.2% and 18.5%, respectively with higher frequencies of receiving diet/nutrition (88.4%) and exercise (69.2%) counseling of all visits with obesity diagnosis. On the other hand, Dilley, Martin, Sullivan, Seshadri and Binns (2007) documented 78% and 36% of visits receiving dietary and physical activity counseling, respectively, among visits made to pediatric primary care providers in inner-city Chicago area. The study investigators did not find differential frequencies in the service provisions across patients' weight status categories. These discrepancies would suggest that obesity preventive practices have significant variations at the primary care practitioner level.

No study has reported how well the ECR on obesity prevention have permeated into primary care practice. A few studies have indicated that primary care providers were aware of the ECR shortly after its announcement but that they were challenged with obstacles to implementing the recommended actions such as time constraints, lack or resources, and lack of confidence in teaching (Klein et al., 2010). Same authors noted that some physicians felt that their providing counseling would not change children's behavior. Others felt that BMI screening and obesity preventive education should be left to schools and communities

instead of at busy physicians' office settings, with an emphasis on community-school-healthcare provider collaborations (Demerath et al., 2003).

The current study was aimed to investigate the impact of the ECR on childhood obesity preventive care provisions at the primary care practice level using a representative sample of preventive care visits in the US. The objectives of this study were to: (1) compare frequencies of diet/nutrition and exercise counseling given during preventive care visits two years before and two years after the ECR, (2) to assess whether the ECR changed the frequencies of the service provision among high risk populations (e.g. minority race/ethnicity, low income, low education), (3) to assess the impact of the ECR among visits with obesity diagnosis, and (4) to examine year trends of the obesity preventive care.

METHODS

Data Source

Data from the NAMCS and NHAMCS were used in this study. These surveys are national surveys completed by the National Center for Health Statistics. The NAMCS is designed to collect annual information on the utilization and provision of ambulatory health services from non-federally employed office-based physicians, whereas the NHAMCS collects patient visit data from hospital emergency and outpatient departments, as well as ambulatory surgery centers in non-institutional general and short-stay hospitals in the US. The current study uses the public-use data files of the 2006-2009 NAMCS and NHAMCS- outpatient department (OPD). During these four years, the NAMCS and NHMACS-OPD recorded a total of 9,373 preventive care visits (Weighted US estimates N = 37.6 million visits per year) made by the children aged between two and 18 years.

Sampling Design

The unit of sampling is the patient-provider encounter or patient visit. The NAMCS and the NHAMCS use multistage probability design. The first stage is the probability selection of primary sampling units (PSUs), which are geographical segments within the US. For the NAMCS, within each PSUs, a probability sample of all eligible physician practices was selected from the stratified physician specialties. Selected physician practices were randomly assigned to one-week data collection period. During this period, patient visits were selected in a systematic random fashion within the practice. For the NHAMCS, a probability sample of all eligible hospitals was selected, which were then randomly divided into 16 subsets with equal size. Each subset of hospitals was then assigned to one of four-week reporting period, which was rotated throughout the survey years. When appropriate weights are applied, the estimates obtained from the public are nationally representative of ambulatory patient visits in the US.

Data Collection Procedure

During the reporting week(s), the physicians, the physician's office personnel, or Census bureau staff completes the one-page Patient Record forms for the sampled visits for the NAMCS and by the hospital staff for the NHAMCS. Trained field representatives provide an explanation on the survey, collect and review the forms to ensure completeness. The

Patient Record forms for both the NAMCS and the NHAMCS-OPD are identical. The form includes patient demographic information, reasons and diagnoses for the visits, vital signs, and service provided during the visits.

Measures

Frequencies of obesity preventive care provision during preventive care visits to primary care providers were the primary outcomes of interest. Diet/nutrition and exercise counseling provision were used as the measures of obesity preventive care in this study. Physicians were asked if diet/nutrition, exercise, and/or other health counseling were provided or relevant referrals were made during patients' visits. Diet/nutrition (or exercise) counseling included topics related to food and beverage consumption by the patients (or physical fitness), and information aimed for health promotion and disease prevention. Frequencies of diet/nutrition and exercise counseling between pre- and post-recommendation periods were compared by demographic and socioeconomic characteristics of patient visits.

Race/ethnicity was categorized into four groups: non-Hispanic white, non-Hispanic black, Hispanic, and others (Asians, Native Hawaiians/other Pacific Islanders, American Indians/ Alaskan Natives, and multiple races) in which Asians are the predominant racial group. Because of high non-response rates to race/ethnicity question (20-30%), non-response for race and ethnicity for the NAMCS and NHAMCS were imputed. Specific methods for the imputation can be found in NAMCS and NHAMCS data file documentations.

The NAMCS and NHAMCS do not have individual income or education information, but provide such information only at the aggregated geographic area levels based on patient zip code and the 2000 US Census data on income and education. Therefore, in their public-use data, *neighborhood poverty level* was based on percentage of the population living below the federal poverty level within the patient's zip code, and expressed in quartiles: Quartile 1 (less than 5%, lowest); Quartile 2 (5-9.99%); Quartile 3 (10-19.99%) ; and Quartile 4 (20% and more, highest). *Neighborhood education level* was based on percentages of adults with bachelor's degree or higher in patient's zip code, and expressed in quartiles: Quartile 1 (less than12.84%, lowest); Quartile 2 (12.84 – 19.66%); Quartile 3 (19.67 – 31.68%); and Quartile 4 (31.69% or more, highest).

Other variables included were age of patient (ages 2-5 years, 6-11 years, and12-18 years), gender (male, female), insurance type (private, Medicaid, self-pay, and others), whether or not height or weight was measured, presence of obesity diagnosis, provider seen (e.g. seen by a physician = yes/no; seen by a nurse practitioner = yes/no), and physician specialty (categorized into general practice, pediatrics, other, and outpatient clinic). The last category was added into the variables for the current study because NHAMCS-OPD contains no variable specifying physician specialties.

Statistical Analysis

The 2006 and 2007 survey data were combined to represent patient visits before the ECR, and the 2008 and 2009 for after the ECR. The Taylor series linearization method was used for all analyses for estimations of variances for the complex survey data. To estimate annual

average estimates from combined two survey year data (e.g. data for 2006-2007 or 2008-2009), sampling weight was adjusted to one half of what was specified by the data source (i.e. ½[PATWT]). Chi-square tests were used to compare frequencies of the visit characteristics as well as diet/nutrition and exercise counseling provisions in the 2006-2007 survey years with those in 2008-2009. Analyses were re-run with the samples restricted to the visits with obesity diagnosis to examine if obesity diagnosis would (or would not) change the frequencies of the service provisions. Trends of obesity preventive care provisions from 2006 to 2009 by race/ethnicity, neighborhood poverty and education levels were also examined. Statistical significance was set at $\alpha = 0.05$. All analyses were done using SAS version 9.2 (SAS Institute, Cary, NC).

RESULTS

Characteristics of preventive care visits made by children aged 2-18 years during the 2006-2007 and the 2008-2009 survey periods are shown in Table 1. There was no significant difference between the two survey periods in any of the characteristics. Height was documented more frequently in 2008-2009 than in 2006-2007, but the difference in the frequencies did not reach statistical significance ($X^2 = 3.45$, $p = 0.0632$). In both pre- and post-ECR periods, over 90% of all visits were documented as being seen by physicians; only 3% of all visits in the current study were documented as seen by nurse practitioners (results not shown).

Objectives 1 & 2: Comparisons of Service Provisions before and after the ECR

Table 2 shows the frequencies of diet/nutrition and exercise counseling before and after the ECR. During the 2006-2007 survey years, an estimated 37% (95%CL = 32 – 43) and 22% (95%CI = 18 – 26) of all preventive care visits in the US included some diet/nutrition and exercise counseling, respectively; whereas 33% (95%CL = 27 – 38) and 18% (95%CI = 14 – 23) of all preventive care visits during 2008-2009 survey years included diet/nutrition and exercise counseling, respectively. Rao-Scott Chi-square tests showed no significant difference in the frequencies of diet/nutrition and exercise provisions between the year 2006-2007 and the year 2008-2009 ($\chi^2 = 1.6183$, $p = 0.2033$ for diet/nutrition; $\chi^2 = 1.2749$, $p = 0.2589$ for exercise; Table 2).

The frequencies for the obesity preventive care by sex, age, insurance type, documentation of height/weight, obesity diagnosis, and physician specialty had no significant difference when compared before and after the ECR (Results not shown). Small number of patient visits seen by nurse practitioners made the estimates imprecise; diet/nutrition counseling rates by nurse practitioners changed from 31% (95%CI = 19-44) before the ECR to 17% (95%CI = 18-44) after the ECR ($X^2 = 4.1293$, $p=0.0421$), while exercise counseling rates had no significant change before (17%, 95%CI = 8-25) and after the ECR (12% 95%CI = 5-18; $X^2 = 0.9633$, $p=0.3264$).

Subgroup analyses among high risk populations showed a significant decrease in both diet/nutrition and exercise counseling in non-Hispanic blacks pre and post ECR. Among this racial group, diet/nutrition counseling decreased from 35% (95%CI = 27-43) in 2006-2007 to 22% (95%CI = 15-29) in 2008-2009 ($p = 0.0141$), and exercise counseling from 21%

(95%CI = 14-28) in 2006-2007 to 9% (95%CI = 4-14) in 2008-2009 (p = 0.0033). Furthermore, within poverty category, the visits from the second highest neighborhood poverty level (Quartile 3) showed a marginal decrease in diet/nutrition counseling provision: only 27% (95%CI = 21-32) of them received the service in 2008-2009 compared to 36% (95%CI = 27-45) in 2006-2007 (p=0.0568). Within education category, the visits from the lowest neighborhood education level (Quartile 1) also showed a marginal decrease in exercise counseling provision: 10% (95%CI = 7-13) in 2008-2009 compared to16% (95%CI = 11-22) in 2006-2007 (p = 0.0524).

Objectives 3: Comparisons of Service Provisions within Visits with Obesity Diagnosis

As shown in Table 1, the prevalence of an obesity diagnosis included on a preventive care visit showed little change before and after the ECR. Among non-Hispanic white, the rate of visits receiving an obesity diagnosis rose from 1.4% (95%CI = 0.6-2.2) in 2006-2007 to 3.4% (95%CI = 2.1-4.7) in 2008-2009 (p= 0.0076). Among non-Hispanic black and Hispanic visits, the prevalence of obesity diagnosis did not change significantly after the ECR. Among non-Hispanic black, 5.4% (95%CI = 2.1-8.8) received an obesity diagnosis in 2006-2007 while 5.0% (95%CI = 2.8-7.1) in 2008-2009 (p=0.8201). Among Hispanics, there was a slight but statistically non-significant decline (p = 0.3070) in the rate of obesity diagnosis from 6.5% (95%CI = 3.7-9.3) to 4.8% (95%CI = 2.6-7.0). When proportions of racial/ethnic group membership within those with an obesity diagnosis were examined, a significant shift was noted. As seen in Table 3, the race/ethnicity distribution of those with an obesity diagnosis changed significantly post ECR. Non-Hispanic whites made up 23% of all those with an obesity diagnosis in 2006-2007, but increased significantly to 54% in 2008-2009 (p < 0.0001).

Examining only visits with an obesity diagnosis (Table 4), there was little change in the rates of diet/nutrition or exercise counseling before and after the ECR. Frequencies of diet/nutrition and exercise counseling in 2006-2007 were 75% (95%CI = 64-87) and 53% (95%CI = 40-66), respectively, whereas those in 2008-2009 were 68% (95%CI = 21-42) and 53% (95%CI = 42-64), respectively. Comparisons of the two time periods for each group characteristic were constrained by the small sample sizes. Except for the visits by non-Hispanic blacks with an obesity diagnosis receiving less exercise counseling in 2006-2007 (56%, 95%CI= 35-76) than in 2008-2009 (37%, 95%CI = 23-50, p=0.0912), no differences in the frequencies of the service provisions before and after the ECR were observed for each racial group. Among neighborhood poverty levels, those from the second highest neighborhood poverty areas (Quartile 3) received exercise counseling less frequently in 2008-2009 (38%, 95%CI = 21-55) than in 2006-2007 (61%, 95%CI = 43-78), but this difference was not significant (p=0.0645). Among neighborhood education levels, the frequencies of the service provisions for those with obesity diagnosis showed no change before and after the ECR except for those from the second *highest* neighborhood education areas (Quartile 3) receiving diet/nutrition counseling provisions much less frequently in 2008-2009 (64%, 95%CI = 45-82) than in 2006-2007 (93%, 95%CI = 82-100; p = 0.0053).

Objectives 4: Year Trend

Overall, frequencies of diet/nutrition counseling provided (vs. not provided) during preventive care visits in these four years had a declining trend (40% in 2006, 35% in 2007, 34% in 2008, and 31% in 2009), whereas frequencies of exercise counseling remained low but stable (22% both in 2006 and 2007, 18.5% both in 2008 and 2009). For racial/ethnic groups, the frequencies in diet/nutrition and exercise counseling among non-Hispanic whites showed a significant dip in diet/nutrition provision in 2007, but overall trend was stable. For Hispanics, frequencies of both diet/nutrition and exercise counseling provisions showed a slight increase in 2007 and stayed relatively stable for the survey years 2008 and 2009. For non-Hispanic blacks, frequency of diet/nutrition and exercise provisions increased slightly in 2007, but dramatic dips in both service provisions were observed in 2008.

For neighborhood poverty levels, both diet/nutrition and exercise counseling provisions showed stable trends for all poverty levels except for a relatively large decline among the visits from the lowest neighborhood in 2007. Differences in the frequencies in diet/nutrition counseling between the highest and lowest poverty levels in 2006 are no longer present in 2009. But the disparities persisted for exercise counseling provisions. For neighborhood education levels, similar trends in diet/nutrition counseling were observed.

DISCUSSION

This study examined the impact of the ECR on obesity preventive care provision during preventive care visits to primary care providers, and compared frequencies of the service provisions two years before and after its announcement. Frequencies of diet/nutrition counseling provisions had a decreasing trend during those four years, while frequencies of exercise counseling provisions remained low but stable. When data were compared two years before and after the ECR, frequencies of diet/nutrition and exercise counseling provisions had changed little. The ECR had no impact on the frequencies of obesity diagnosis or on frequencies of the service provisions among those with an obesity diagnosis. Some unfavorable changes in these service provisions were observed after the ECR especially among socioeconomically disadvantaged groups, such as visits by non-Hispanic blacks, children from relatively high poverty areas, and children from low education neighborhoods.

Persistent low rates of obesity preventive care even after the 2007 ECR were disappointing. These results were mirrored by the trends shown by other national surveys. A report from Medical Expenditure Panel Survey conducted through the Agency for Healthcare Research and Quality (AHRQ) showed that in 2008 only 50% and 34% of parents reported that their health care providers talked about healthy diet and exercise, respectively, during visits to their children's healthcare providers in the past two years (AHRQ, 2012). These frequencies were much higher than those reported in the current study probably due to difference in data collection methods: parental self-report vs. medical record audits.

This low impact of the ECR was also demonstrated among the visits with obesity diagnosis. We found that those with an obesity diagnosis received the obesity preventive services at consistently higher rates than the general population; however the proportions of those

receiving the obesity preventive counseling did not change. A similar trend was also demonstrated among obese adult population. The National Healthcare Disparity Report 2011 showed 49% and 57% of obese adults in the U.S. receiving healthy eating and exercise advice, respectively, by their healthcare professionals in 2008 (AHRQ, 2012). Frequencies of the obesity care provisions among this population for 6 years proceeding to the statistics showed little change (AHRQ, 2012). In addition, our findings indicated that non-Hispanic white visits received the diagnosis more frequently than those from other racial/ethnic groups after the ECR. This may be a sign of the ECR only impacting only a certain group of practitioners, especially those who provide their service primarily to non-Hispanic white children. Taken together, a considerable effort may be needed to improve assessment, prevention, and treatment of childhood obesity at the primary practitioners' level.

The ECR include assessment and counseling of dietary patterns, physical activity levels, and sedentary behaviors as a part of obesity preventive care in all pediatric patients at each preventive care visit (Davis et al., 2007). Contrary to the ECR, our results showed that only a handful of these children were provided with diet/nutrition or exercise counseling. For example, of visits made by non-Hispanic black children in 2008-2009, 22% were provided with diet/nutrition and 21% with exercise counseling. Although a direct comparison is not appropriate because the unit of measure in the current study is a patient visit but not a child, this means that the obesity preventive counseling may have only reached less than one half of already overweight children (BMI ≥ 85%ile for age and gender) of the same racial group with their childhood overweight or obesity prevalence rate nearly reaching to 40% (Ogden, Carroll, Kit, & Flegal, 2012). Given the fact that non-Hispanic black children are at higher risk for obesity, these low counseling rates are worrisome.

Reasons for the low rate of obesity preventive care provisions especially for disadvantage population may be complex. Poverty, single parenthood, as well as unsafe neighborhood may become obstacles for practicing healthy dietary habits and physical activities (Bowdoin, 2008). Alternatively, poor family, socioeconomic, and physical environmental circumstances may influence practitioners' decisions for providing counseling for diet/nutrition and physical activity. Physician-patient racial mismatch has also been reported to be associated with low probability of non-Hispanic black adult patients receiving physical activity counseling (Bleich, Simon, & Cooper, 2012). This may be also true in pediatric settings because counseling is usually provided to parents and guardians. However, this alone cannot explain the worsening rate of the exercise education/referral provision found in this study among non-Hispanic black visits after the ECR.

Other reasons for the low rates of obesity preventive care provision may include practitioners' lack of confidence to deliver effective obesity preventive education, lack of resources for referrals (Rausch, Perito, & Hametz, 2011), time constraints during preventive care visits, and lack of knowledge regarding reimbursement for the service (Klein et al., 2010), or simply lack of reimbursement for the service (Lee, Sheer, Lopez, & Rosenbaum, 2010). Concerns that in-clinic counseling by practitioners alone may not lead to behavioral change in dietary habits and physical activities (Stark et al., 2011; Wake et al., 2009) may lead some providers to simply not provide these services. Indeed, a randomized control study of overweight and obese children aged three to five years (Bocca, Corpeleijn, Stolk, &

Sauer, 2012) shows that providing parents with information about healthy diet and exercise alone is inferior to more comprehensive multidisciplinary treatment approaches for successful weight reduction in these children. Efforts to establish health care systems that streamline provider education to appropriate professionals and community resources may be necessary for successful childhood obesity prevention.

Recognition of child's weight status is an important first step in childhood obesity prevention. As shown in Table 1, frequency of height documentation had a small but significant increase in 2008-2009 compared to in 2006-2007. Previous studies reported that when both height and weight are documented, obesity preventive education is more likely to be provided during the patient visits (Ma & Xiao, 2009). Further, Coleman and colleagues (Coleman et al., 2012) reported that diet/nutrition and exercise counseling rates for overweight and obese children improved from 1% in 2007 to 50% in 2010 after a managed care organization implemented a pediatric weight management initiative, which included a computer assisted decision tools as well as physician education on obesity preventive care provisions. Although counseling rate of 50% in overweight and obese children may be still far from the recommendation, their organization-wide approach to improving pediatric obesity prevention/care is worth noting. Disappointingly the increases in rate of height measurements and documentations shown in the current study did not necessarily translate to an increase in rate of obesity preventive counseling. Taken together, these results again show the importance of a systematic approach to lead to success in childhood obesity prevention (Lazorick et al., 2011; Rausch et al., 2011).

A major strength of the current study is that we used a nationally representative sample of preventive care visits by children aged 2 and 18 years in the US. However, these data are limited to what is documented in the records and may not reflect the actual care provided. This may be especially true if the counseling provided is not subject to reimbursement. Second, the NAMCS and NHAMCS survey data only permit calculating frequencies of obesity preventive counseling; quality of the counseling provided cannot be assessed. Third, neighborhood poverty and education levels were based on the 2000 Census data, and do not account for changes occurred at the neighborhood (or zip code) level between May 2000 and 2009. Fourth, because the NAMCS collects data from physician offices and nurse-managed clinics are not included, it tends to underestimate frequencies of patient-nurse practitioners encounter (Morgan et al, 2007); therefore, the estimates for obesity preventive care by nurse practitioners in the current study may not represent true trends of the practice by primary care nurse practitioners in the US. A final limitation is because of the public-use data availability our analyses are limited to the trends up to two years after the ECR. Changes in practice culture may occur in much slower pace; therefore, examinations of more recent survey data and in a longer period of time are warranted.

Conclusions and Implications for Pediatric Nurse Practitioners

The current study demonstrated that two years after the 2007 Expert Committee announced its recommendations obesity preventive care provisions have shown little change at the practitioner level. Unfortunately, this may be also true for primary care nurse practitioners. The ECR may have resulted in unfavorable impact on obesity preventive care provisions to

some socioeconomically disadvantaged groups. While it is recognized that childhood obesity prevention at the primary healthcare provider level alone may not be sufficient and that multidisciplinary team and community involvement in the prevention effort may be imperative, systematic approaches to obesity prevention is needed for consistent delivery of the care irrespective of racial/ethnic and socioeconomic backgrounds of children.

The AHRQ estimated that approximately 56,000 nurse practitioners were practicing primary care in the US (AHRQ, 2011). With the Affordable Care Act in place, more nurse practitioners are expected to be in the primary care workforce, with an increase in the number of nurse-managed clinics in poor, underserved geographic areas throughout the US. The nursing primary focus on health promotion and disease prevention promises that nurse practitioners are in the best position to lead the collaborative effort for obesity prevention at the primary care level. Furthermore, the 2009 position statement on childhood obesity prevention by the National Association of Pediatric Nurse Practitioners (NAPNAP, 2009) clearly supports the approach outlined in the ECR. More efforts are needed to improve practice behaviors targeting childhood obesity prevention through preparatory and continuing education.

Future efforts also include advocating for changes in governmental, institutional as well as insurance policies that encourage streamlining childhood obesity preventive programs, which may include establishment of provider education programs, user-friendly documentation and reimbursement systems. Follow-up of obesity preventive provisions by primary care providers with more recent data as these become available is warranted to track the progress on childhood obesity prevention efforts.

Acknowledgments

The project described was supported by Award Number F31NR012878 from the National Institute of Nursing Research. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Nursing Research or the National Institutes of Health.

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Table 1

Characteristics of preventive care visits made by children aged 2-18 years to primary care providers in 2006-2007 and 2008-2009 in the United States

	2006-2007		2008-2009		
	Frequency	**Weighted National Estimate of Percentage (95%CI)**	**Frequency**	**Weighted National Estimate of Percentage (95%CI)**	**p-value***
Total	4790		4583		
Sex (Male)	2009	45 (43-48)	2029	48 (45-50)	0.2818
Age group					0.4522
2-5 yr	1457	32 (30-35)	1477	35 (32-37)	
6-11 yr	1139	27 (24-30)	1149	27 (25-29)	
12-18 yr	2194	41 (37-44)	1957	39 (36-41)	
Race/Ethnicity					0.1120
Non-Hispanic white	1847	55 (49-61)	2044	61 (12-19)	
Non-Hispanic black	1272	15 (12 -18)	1139	15 (12-19)	
Hispanic	1170	21 (16-27)	1013	18 (14-21)	
Others[a]	501	9 (7-11)	387	6 (4-8)	
Insurance					0.9348
Private	1572	59 (53-64)	1676	59 (55-65)	
Medicaid	2528	31 (26-36)	2343	31 (26-35)	
Self-pay	217	3 (2-4)	167	3 (2-4)	
Others[b]	222	4 (2-6)	250	4 (3-5)	
Missing	251	4 (2-5)	147	3 (2-4)	
Neighborhood Poverty Level[c] (percent)					0.7093
Quartile 1 (lowest)	672	26 (21-31)	716	27 (22-33)	
Quartile 2	1031	26 (23-29)	1007	26 (22-30)	
Quartile 3	1572	30 (25-34)	1447	27 (23-30)	
Quartile 4 (highest)	1290	13 (10-16)	1218	14 (11-16)	
Missing	225	5 (3-6)	195	6 (3-9)	
Neighborhood Education Level[d] (percent)					0.6214
Quartile 1 (lowest)	1421	24 (20-29)	1290	21 (17-24)	
Quartile 2	1193	20 (17-23)	1110	21 (18-24)	

	2006-2007		2008-2009		
	Frequency	**Weighted National Estimate of Percentage (95%CI)**	**Frequency**	**Weighted National Estimate of Percentage (95%CI)**	**p-value***
Quartile 3	1063	25 (21-30)	1095	25 (21-28)	
Quartile 4 (highest)	882	26 (21-30)	890	28 (22-33)	
Missing	231	5 (3-6)	198	6 (3-9)	
Height taken	3445	75 (71-78)	3315	79 (76-82)	0.0632
Weight taken	4042	87 (85-89)	3828	88 (86-90)	0.5968
Obesity diagnosis	266	3 (2-5)	262	4 (3-5)	0.6740
Physician/office specialty					0.5159
General practice	474	19 (15-22)	489	16 (14-18)	
Pediatrics	1197	59 (54-63)	1200	62 (58-66)	
Others	300	13 (10-17)	295	12 (10-14)	
Outpatient clinic	2819	10 (8-12)	2599	10 (8-12)	
Visits source					0.9813
NAMCS	1971	90 (88-92)	1984	90 (88-92)	
NHAMCS (OPD)	2819	10 (8-12)	2599	10 (8-12)	

Note: percentage may not add up to 100% due to rounding.

*p-values shown here are from χ^2 tests assessing differences in frequency distributions for each category comparing between 2006-2007 and 2008-2009 survey years.

[a]Other race/ethnicity include Asians, Native Hawaiian, Other Pacific Islanders, American Indians, Alaska Natives, and multiple races.

[b]Other insurance include Medicare, Worker's compensation, no charge/charity, and other (not defined).

[c]Neighborhood Poverty level is expressed by percent of poverty in patient's zip code and divided into quartiles: Quartile 1 (Less than 5%, lowest poverty rate); Quartile 2 (5-9.99% poverty); Quartile 3 (10-19.99% poverty); Quartile 4 (20% or more, highest poverty rate).

[d]Neighborhood Education Level is expressed by percent of adults with bachelor's degree or higher in patient's zip code and divided into quartiles: Quartile 1 (less than 12.84%, lowest neighborhood education); Quartile 2 (12.84-19.66%); Quartile 3 (19.67-31.68%); Quartile 4 (31.69% or more, highest neighborhood education).

Table 2

Frequencies of diet/nutrition and exercise counseling provided during well-child visit in pre- (2006-2007) and post (2008-2009)-recommendation periods

	Diet/Nutrition Counseling			Exercise Counseling		
	2006-2007	2008-2009	p-value	2006-2007	2008-2009	p-value
	Weighted % (95%CI)	Weighted % (95%CI)	Weighted % (95%CI)	Weighted % (95%CI)		
Total	37 (31-43)	33 (27-38)	0.2033	22 (18-26)	18 (14-23)	0.2589
Race/ethnicity						
Non-Hispanic white	39 (32-46)	35 (28-41)	0.4227	24 (18-29)	21 (16-27)	0.5618
Non-Hispanic black	35 (27-43)	22 (15-29)	0.0141	21 (14-28)	9 (4-14)	0.0033
Hispanic	30 (21-38)	29 (22-36)	0.8873	16 (9-22)	15 (10-19)	0.8177
Other	51 (40-62)	47 (31-63)	0.7127	28 (18-38)	25 (16-34)	0.6357
Neighborhood Poverty level						
Quartile 1 (lowest)	46 (37-55)	40 (30-51)	0.4192	26 (17-35)	26 (16-36)	0.9977
Quartile 2	35 (28-42)	33 (26-40)	0.7235	22 (16-28)	19 (13-25)	0.4440
Quartile 3	36 (27-45)	27 (21-32)	0.0568	21 (14-27)	15 (10-19)	0.0908
Quartile 4 (highest)	28 (21-36)	27 (21-33)	0.7430	14 (9-19)	11 (7-15)	0.3530
Neighborhood Education level						
Quartile 1 (lowest)	30 (24-37)	23 (17-29)	0.0933	16 (11-22)	10 (7-13)	0.0524
Quartile 2	32 (24-40)	33 (24-42)	0.8899	20 (14-26)	17 (11-22)	0.4023
Quartile 3	35 (26-44)	29 (23-36)	0.3382	19 (13-26)	17 (12-22)	0.5581
Quartile 4 (highest)	50 (43-58)	42 (32-52)	0.1830	30 (22-39)	28 (18-38)	0.7507

Weighted percentages shown in the table indicate percent of the sample that received diet/nutrition or exercise counseling within the subgroup indicated in the far left column by the period (pre- or post-ECR).The p-values shown here are from Rao-Scott Chi-Square analysis.

Table 3

Characteristics of visits with obesity diagnosis during preventive care visit in 2006-2009 NAMCS and NHAMCS by subgroup

	2006-2007 (n=266)	2008-2009 (n=262)	P-value
	Weighted % (95%CI)	Weighted % (95%CI)	
Race/Ethnicity			<.0001
Non-Hispanic white	23 (11-35)	54 (43-65)	
Non-Hispanic black	23 (14-32)	20 (13-27)	
Hispanic	40 (30-50)	22 (12-32)	
Others	15 (9-20)	4 (3-5)	
Neighborhood Poverty Level (percent)			0.9310
Quartile 1 (lowest)	17 (4-29)*	19 (8-30)*	
Quartile 2	23 (14-32)	18 (8-29)	
Quartile 3	34 (21-47)	39 (28-51)	
Quartile 4 (highest)	22 (15-29)	19 (10-27)	
Neighborhood Education Level (percent)			0.6310
Quartile 1 (lowest)	29 (20-37)	24 (15-32)	
Quartile 2	16 (9-24)	22 (13-32)	
Quartile 3	35 (28-43)	29 (19-39)	
Quartile 4 (highest)	15 (10-21)	20 (11-28)	
Diet/Nutrition counseling	75 (64-87)	68 (21-42)	0.3974
Exercise counseling	53 (40-66)	53 (42-64)	0.9604

CI = confidence interval

* Estimates not reliable due to small sample size (less than 30)

Table 4

Frequencies of diet/nutrition and exercise counseling provision among preventive care visits with obesity diagnosis in 2006-2009 NAMCS and NHAMCS by subgroup

	Diet/nutrition Counseling			Exercise Counseling		
	2006-2007 (n=266)	2008-2009 (n=262)		2006-2007 (n=266)	2008-2009 (n=262)	
	Weighted % (95%CI)	Weighted % (95%CI)	p	Weighted % (95%CI)	Weighted % (95%CI)	p
Race/ethnicity						
Non-Hispanic white	68 (42-94)	67 (52-83)	0.9770	63 (37-88)*	60 (44-76)	0.8662
Non-Hispanic black	79 (72-85)	73 (65-82)	0.5958	56 (35-76)	37 (23-50)	0.0912
Hispanic	70 (55-85)	62 (43-81)	0.6032	46 (34-58)	44 (23-64)	0.8730
Neighborhood Poverty level						
Quartile 1 (lowest)	96 (94-98)*	95 (93-97)*	0.7816	54 (24-83)*	95 (92-97)*	--
Quartile 2	89 (77-100)	73 (68-78)*	0.1168	50 (30-70)*	36 (29-43)*	0.4775
Quartile 3	69 (47-92)	46 (27-64)	0.1778	61 (43-78)	38 (21-55)	0.0645
Quartile 4 (highest)	56 (39-72)	80 (58-100)	0.1762	42 (29-56)	58 (38-77)	0.3652
Neighborhood Education level						
Quartile 1 (lowest)	54 (35-73)	50 (27-72)	0.7815	32 (16-49)	43 (22-64)	0.4921
Quartile 2	63 (31-95)	65 (52-79)	0.9054	70 (39-100)	48 (25-70)	0.2776
Quartile 3	93 (82-100)	64 (45-82)	0.0053	53 (30-77)	41 (20-63)*	0.4001
Quartile 4 (highest)	90 (85-95)*	98 (96-100)*	0.0009	72 (42-100)*	86 (62-100)*	0.3842

CI = confidence interval

*Estimates unreliable due to small sample size (less than 30)