Published in final edited form as:
Prev Med. 2012 July ; 55(1): 28–33. doi:10.1016/j.ypmed.2012.05.005.

Knowledge of Energy Balance Guidelines and Associated Clinical Care Practices: The U.S. National Survey of Energy Balance Related Care among Primary Care Physicians

Nicolaas P. Pronk[1,2], **Susan M. Krebs-Smith**[3], **Deborah A. Galuska**[4], **Benmei Liu**[3], **Robert F. Kushner**[5], **Richard P. Troiano**[3], **Steven B. Clauser**[3], **Rachel Ballard-Barbash**[3], and **Ashley Wilder Smith**[3]

[1]HealthPartners and HealthPartners Research Foundation, Minneapolis, MN

[2]Harvard School of Public Health, Boston, MA

[3]Division of Cancer Control and Population Sciences, National Cancer Institute, Bethesda, MD

[4]Division of Nutrition, Physical Activity, and Obesity; National Center for Chronic Disease Prevention and Health Promotion, CDC, Atlanta, GA

[5]Northwestern University Feinberg School of Medicine, Chicago, IL

Abstract

Objective—To assess primary care physicians' (PCPs) knowledge of energy balance related guidelines and the association with sociodemographic characteristics and clinical care practices.

Method—As part of the 2008 U.S. nationally representative *National Survey of Energy Balance Related Care among Primary Care Physicians* (EB-PCP), 1,776 PCPs from four specialties who treated adults (n=1,060) or children and adolescents (n=716) completed surveys on sociodemographic information, knowledge of energy balance guidelines, and clinical care practices.

Results—EB-PCP response rate was 64.5%. For PCPs treating children, knowledge of guidelines for healthy BMI percentile, physical activity, and fruit and vegetables intake was 36.5%, 27.0%, and 62.9%, respectively. For PCPs treating adults, knowledge of guidelines for overweight, obesity, physical activity, and fruit and vegetables intake was 81.4%, 81.3%, 70.9%, and 63.5%, respectively. Generally, younger, female physicians were more likely to exhibit correct knowledge. Knowledge of weight-related guidelines was associated with assessment of body mass index (BMI) and use of BMI-for-age growth charts.

Conclusion—Knowledge of energy balance guidelines among PCPs treating children is low, among PCPs treating adults it appeared high for overweight and obesity-related clinical guidelines

Correspondence: Nicolaas P. Pronk, Ph.D., Vice President and Health Science Officer, HealthPartners, 8170 33rd Avenue South Bloomington, MN 55425, Phone: 952-967-6729, Fax: 952-967-6729, nico.p.pronk@healthpartners.com.

Disclaimer: The findings and conclusions of this report are those of the authors and do not necessarily represent the official position of the National Institutes of Health or the Centers for Disease Control and Prevention.

Conflict of Interest Statement: The authors of this paper declare there are no conflicts of interest.

and moderate for physical activity and diet, and was mostly unrelated to clinical practices among all PCPs.

Keywords

Energy balance; primary care; guidelines; physical activity; nutrition; body mass index; knowledge

Introduction

Obesity represents a significant public health concern. Possible solutions include the role of primary care physicians (PCPs) in promoting healthy diet, physical activity, and weight status among their patients. Patients regard their PCP as an important source of information related to nutrition [Tillotsen 2006], physical activity [Calfas et al, 1996], and weight [Galuska 1999]. Recent data from the *National Survey of Energy Balance Related Care among Primary Care Physicians* (EB-PCP), suggest that PCPs do not consistently assess, counsel, and follow-up with patients on their diet, physical activity and weight control (energy balance) practices, whether they treat children [Huang et al, 2011] or adults [Smith et al, 2011]. Knowledge deficits represent an important barrier to provision of weight-related care [Vetter et al, 2008]. The purpose of this study is to assess PCPs' knowledge of physical activity-, diet-, and weight-related guidelines and their association with sociodemographic characteristics and energy balance-related clinical care practices.

Methods

Data Source

Between March and September, 2008, 3,145 participants in the EB-PCP, a nationally representative survey of actively practicing PCPs in the U.S. received a questionnaire and 2,027 surveys were returned. The subject sample was obtained from the American Medical Association's Physician Masterfile [AMA, 2010]. We excluded 251 surveys due to missing data for a final of 1,776 surveys (1,060 PCPs treating adults and 716 treating children) across four specialties (Internal Medicine (n=342), Obstetrics and Gynecology (OB/GYN, n=379), Family Practice (n=666), and Pediatrics (n=389). More details on sampling methodology are described elsewhere [Smith et al, 2011; Huang et al, 2011].

Survey Instruments and Study Variables

Two EB-PCP versions, one for PCPs treating children (ages 2–17 years) and one for PCPs treating adults (≥18 years), were used. (See: National Cancer Institute website http://www.outcomes.cancer.gov/surveys/energy/phys_pract_q_child.pdf and http://www.outcomes.cancer.gov/surveys/energy/phys_pract_q_adult.pdf). Since the EB-PCP was fielded prior to the 2008 guidelines [USDHHS, 2008], correct responses for physical activity included 30 minutes of moderate intensity physical activity on most days of the week for adults [Pate et al, 1995] and 60 minutes for children [Corbin and Pangrazi, 2004]. Fruit and vegetables intake linked to daily caloric intake [USDHHS, 2005] and daily intake of ≥5 fruits and vegetables [Pivonka et al, 2011] were both considered correct.

For PCPs treating adults, analyzed responses related to 1) overweight and obesity (BMI criteria), 2) number of servings of fruit and vegetables per day, 3) number of moderate intensity physical activity days per week (most days of the week), 4) all guidelines simultaneously correct. The same applied to PCPs treating children, except only healthy BMI percentile responses were considered.

Sociodemographic characteristics, including age, race, ethnicity, sex, and patient population treated were obtained from the EB-PCP. Specialty and census region were obtained from the AMA [AMA, 2010].

PCP energy balance-related clinical practices considered patients with an unhealthy diet, insufficient activity, or overweight status. PCPs were asked how often they: 1) provide general counseling; 2) provide specific guidance on diet, physical activity, or weight control; 3) refer to further evaluation or management; 4) systematically track/follow patients over time; and 5) assess BMI in adults or BMI, weight-for-age, stature-for-age, or BMI-for-age in children.

Data Analysis

Sample weights compensated for differential selection probabilities, including oversampling of family practice physicians, non-response, and under-coverage of the target population. For variance estimation, we generated replicate weights using the Jackknife replication method [Wolter, 1985] and used SAS-callable SUDAAN (version 10.0 [Research Triangle Institute, 2008] for analyses. Chi-square tests were conducted to test differences between PCP knowledge and characteristics.

Binary logistic regression analyses were used to examine the relationships between PCP sociodemographic variables and knowledge. Analyses were stratified by patient population (child vs. adult). To examine associations between PCPs' knowledge and clinical practices, we used multivariate ordinal logistical regression models and computed the likelihood of each care practice as the predicted probabilities from the corresponding logistic regression model. Covariates included in the final models were PCPs' specialty, age, sex, race/ethnicity, and region. All alpha values were set at .05.

Results

The EB-PCP response rate was 64.5%. For PCPs treating children, knowledge of guidelines for healthy BMI percentile, physical activity, fruit and vegetables, and all guidelines simultaneously was 36.5%, 27.0%, 62.9%, and 10.6%, respectively. For PCPs treating adults, knowledge of guidelines for overweight, obesity, physical activity, fruit and vegetables, and all guidelines simultaneously was 81.4%, 81.3%, 70.9%, 63.5%, and 40.6%, respectively. [Data shown in Appendix A]

Table 1 shows, among PCPs treating children, compared to other family practice physicians, pediatricians were more likely to report correct knowledge about healthy BMI percentile, fruit and vegetables intake, physical activity, and simultaneously meeting all guidelines. Female PCPs were more likely than male PCPs to report correct knowledge for healthy BMI percentile guidelines and physical activity guidelines.

Among PCPs treating adults (Table 1), compared to PCPs under 40 years old, older PCPs (≥50 years), were less likely to report correct knowledge about weight-related guidelines, fruit and vegetables intake, and all guidelines simultaneously. Compared to males, female PCPs reported higher levels of knowledge in relation to all guidelines.

Table 2 (multivariate analyses), indicates that among PCPs treating children with knowledge of healthy BMI percentile guidelines, fruit and vegetables intake, and all guidelines simultaneously, likelihood to assess BMI was higher. Knowledge of physical activity guidelines increased the likelihood to refer patients for further evaluation and management and to systematically track patients over time.

Among PCPs treating adults (Table 2), knowledge of overweight guidelines was associated with an increased likelihood to provide general counseling, guidance on diet, and assess BMI. A higher likelihood to assess BMI was associated with knowledge of obesity guidelines and all guidelines simultaneously. Knowledge of fruit and vegetables intake, as well as all guidelines simultaneously, was associated with a lower likelihood to provide guidance for weight control practices and the systematic tracking and follow-up of patients over time.

Discussion

Weight-related clinical guidelines were first published over a decade ago [NIH 1998] and obesity is widely recognized as a clinical concern. However, physical activity guidance has not focused on PCPs and diet and physical activity-related guidelines have, until recently, not been supported by strong evidence of clinical effectiveness [Lin et al, 2010].

Knowledge of weight-related guidelines did correlate with more assessment of BMI and use of BMI-for-age growth charts. Clinical use of electronic medical records makes this practice simple and efficient. Pediatric HEDIS measures that call for measurement of BMI and physical activity and nutrition counseling are important to improve clinical care for weight-related concerns [NCQA 2009].

Study Limitations and Strengths

Limitations include the self-reported nature of the data and since fielding the EB-PCP, new guidelines have emerged thereby limiting applicability of findings. Finally, obesity represents a complex problem with causal factors that go far beyond the variables reported here.

Strengths include the nationally representative data, an almost 70% response rate, and baseline knowledge levels prior to new guideline releases provide opportunity to measure progress over time across PCP specialties.

Conclusions

Energy balance guidelines knowledge among PCPs treating children is low, whereas among PCPs treating adults it is relatively high for weight-related guidelines but moderate for physical activity and fruit and vegetables intake. Knowledge of all guidelines simultaneously is low for all PCPs. Knowledge appears largely unrelated to clinical care. Addressing gaps in knowledge is important; however, it is unlikely that knowledge improvement alone will be sufficient to generate improvements in clinical care.

Acknowledgments

Data collection for this survey was supported by the National Cancer Institute's Contract No. N02-PC-61301. We would like to thank the members of the Department of Health and Human Services' survey development team and outside consultants:

National Cancer Institute: Ashley Wilder Smith, Steven Clauser, Rachel Ballard-Barbash, Carrie Klabunde, Susan M. Krebs-Smith, Laurel Borowski, Emily Dowling, Gordon Willis, Richard Troiano, Audie Atienza, Tanya Agurs-Collins, Bill Davis

Eunice Kennedy Shriver **National Institute of Child Health and Human Development**: Terry Huang, Caroline Signore

National Institute of Diabetes and Digestive and Kidney Diseases: Mary Horlick, Myrlene Staten, Susan Yanovski

National Institutes of Health Office of Behavioral and Social Sciences Research: Deborah Olster

Centers for Disease Control and Prevention: Deborah Galuska, Laura Kettel Khan, Beth Tohill

National Heart, Lung, and Blood Institute: Barbara Wells, Karen Donato

Agency for Healthcare Research and Quality: Iris Mabry-Hernandez

Outside Consultants: Nico Pronk, Robert Kushner, Erica Frank, Jim Reschovsky, Gregory Pawlson

References

[Accessed January 15, 2010] American Medical Association Physician Data Resources: AMA Physician Masterfile. 2006. www.ama-assn.org/ama/pub/about-ama/physician-data-resources/physician-masterfile.sthml

Calfas KJ, Long BJ, Sallis JF, Wooten WJ, Pratt M, Patrick K. A controlled trial of physician counseling to promote the adoption of physical activity. Prev Med. 1996; 25:225–233. [PubMed: 8780999]

Corbin, CB.; Pangrazi, RP. Physical activity for children: A statement of guidelines for children ages 5–12. Reston, VA: National Association for Sports and Physical Education;

Galuska DA, Will JC, Serdula MK, Ford ES. Are health care professionals advising obese patients to lose weight? JAMA. 1999; 282:1576–1578. [PubMed: 10546698]

Huang T, Borowski LA, Liu B, Galuska DA, Ballard-Barbash R, Yanowski SZ, Olster DH, Atienza AA, Smith AW. Pediatricians' and family physicians' weight-related care of children in the U. S. Am J Prev Med. 2011; 41(1):24–32. [PubMed: 21665060]

Lin JS, O'Connor E, Whitlock EP, Beil TL. Behavioral counseling to promote physical activity and a healthful diet to prevent cardiovascular disease in adults: A systematic review for the U.S. Preventive Services Task Force. Ann Intern Med. 2010; 153(11):736–50. [PubMed: 21135297]

National Committee for Quality Assurance. State of health care quality report. Washington, DC: NCQA; 2009.

NIH and National Health Lung Blood Institute. NIH Publication No 98-4083. Vol. 1998. Rockville MD: DHHS, Public Health Service; 1998. Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults—The Evidence Report. Available at: http://www.nhlbi.nih.gov/guidelines/obesity/ob_gdlns.pdf

Pate RR, Pratt M, Blair SN, Haskell WL, Macera CA, Bouchard C, Buchner D, Ettinger W, Heath GW, et al. Physical activity and public health. A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. JAMA. 1995; 273:402–407. [PubMed: 7823386]

Pivonka E, Seymour J, McKenna J, Baxter SD, Williams S. Development of the behaviorally focused fruits & veggies-more matters public health initiative. J Am Diet Assoc. 2011; 111(10):1570–7. [PubMed: 21963025]

Research Triangle Institute. SUDAAN Language Manual, Release 10.0. Research Triangle Park, NC: Research Triangle Institute; 2008.

Smith AW, Borowski LA, Liu B, Galuska DA, Signore C, Klabunde C, Huang TT, Krebs-Smith S, Frank E, et al. U.S Primary care physicians' diet-, physical activity-, and weight-related care of adult patients. Am J Prev Med. 2011; 41(1):33–42. [PubMed: 21665061]

Tillotson J. Who's the average Joe eater to believe? Nutr Today. 2006; 41(3):112–114.

USDHHS. U.S. Department of Health and Human Services and U.S. Department of Agriculture. Dietary Guidelines for Americans, 2005. 6. Washington, DC: U.S. Government Printing Office; Jan. 2005

USDHHS. Physical Activity Guidelines for Americans. Physical Activity Guidelines for Americans Report, 2008. Washington, DC: U.S. Department of Health and Human Services; 2008.

Vetter ML, Herring SJ, Sood M, Shah NR, Kalet AL. What do Resident physicians know about nutrition? An evaluation of attitudes, self-perceived proficiency and knowledge. J Am Coll Nutr. 2008; 27(2):287–298. [PubMed: 18689561]

Wolter, KM. Introduction to Variance Estimation. New York: Springer-Verlag; 1985.

Prev Med. Author manuscript; available in PMC 2013 July 01.

Table 1

Odds Ratios: Knowledge of Guidelines and Sociodemographic Variables among Physicians Treating Children and Adults in the 2008 U.S. EB-PCP Study

Physicians treating Children	Total	BMI Percentile: 5–85th Percentile	Diet: 5 Servings or Depends on calories	Physical Activity: 60 min	Know all guidelines
	n	O.R. (95% CI)	O.R. (95% CI)	O.R. (95% CI)	O.R. (95% CI)
Primary specialty					
Family Practice	327	Reference	Reference	Reference	Reference
Pediatrician	389	**4.88 (3.37 – 7.06)**	**1.48 (1.06 – 2.09)**	**1.70 (1.23 – 2.34)**	**3.19 (1.93 – 5.25)**
Age					
< 40	192	Reference	Reference	Reference	Reference
40–49	222	0.80 (0.54 – 1.19)	1.26 (0.83 – 1.91)	1.34 (0.79 – 2.28)	1.19 (0.62 – 2.27)
50–59	203	0.88 (0.59 – 1.33)	0.85 (0.54 – 1.31)	1.37 (0.89 – 2.11)	0.93 (0.48 – 1.80)
60–75	99	0.77 (0.48 – 1.24)	0.75 (0.45 – 1.26)	1.05 (0.59 – 1.87)	1.14 (0.56 – 2.30)
Gender					
Male	385	Reference	Reference	Reference	Reference
Female	331	**1.98 (1.45 – 2.70)**	1.35 (0.99 – 1.84)	**1.47 (1.05 – 2.07)**	1.35 (0.86 – 2.11)
Race/Ethnicity					
White/NH	528	Reference	Reference	Reference	Reference
Black/NH	30	1.46 (0.70 – 3.04)	1.01 (0.46 – 2.24)	0.46 (0.20 – 1.08)	0.98 (0.33 – 2.91)
Asian/NH	119	**2.07 (1.32 – 3.26)**	0.89 (0.57 – 1.39)	0.79 (0.49 – 1.27)	1.23 (0.67 – 2.27)
Hispanic	24	1.49 (0.59 – 3.76)	0.85 (0.37 – 1.95)	1.54 (0.65 – 3.64)	1.43 (0.36 – 5.71)
Other	15	0.84 (0.35 – 2.07)	0.80 (0.23 – 2.80)	0.75 (0.26 – 2.20)	**0.49 (0.26 – 0.92)**
Region					
Northeast	147	Reference	Reference	Reference	Reference
Midwest	175	0.77 (0.52 – 1.14)	0.59 (0.35 – 1.01)	0.83 (0.51 – 1.35)	**0.53 (0.29 – 0.95)**

Physicians treating Children	Total	BMI Percentile: 5–85th Percentile	Diet: 5 Servings or Depends on calories	Physical Activity: 60 min	Know all guidelines
	n	O.R. (95% CI)	O.R. (95% CI)	O.R. (95% CI)	O.R. (95% CI)
South	231	0.73 (0.48 – 1.11)	**0.51 (0.30 – 0.84)**	0.62 (0.36 – 1.05)	0.52 (0.27 – 1.01)
West	163	0.73 (0.47 – 1.13)	0.89 (0.49 – 1.60)	0.65 (0.40 – 1.07)	0.66 (0.35 – 1.25)

Physicians treating Adults	Total	BMI: Overweight	BMI: Obese	Diet: 5 Servings or depends on calories	Physical Activity: 30 min	Know all guidelines
	n	O.R. (95% CI)	O.R. (95% CI)	O.R. (95% CI)	O.R. (95% CI)	O.R. (95% CI)
Primary Specialty						
Internal Medicine	342	Reference	Reference	Reference	Reference	Reference
OB/GYN	379	0.79 (0.56 – 1.13)	0.85 (0.59 – 1.23)	0.80 (0.60 – 1.08)	1.06 (0.77 – 1.44)	0.83 (0.62 – 1.10)
Family Practice	339	1.31 (0.88 – 1.97)	1.37 (0.91 – 2.04)	1.15 (0.82 – 1.61)	1.33 (0.95 – 1.87)	1.11 (0.81 – 1.53)
Age						
< 40	213	Reference	Reference	Reference	Reference	Reference
40–49	314	0.87 (0.52 – 1.45)	0.90 (0.53 – 1.52)	**0.60 (0.40 – 0.91)**	0.94 (0.61 – 1.47)	0.73 (0.51 – 1.05)
50–59	338	**0.49 (0.30 – 0.82)**	**0.52 (0.33 – 0.83)**	**0.53 (0.36 – 0.79)**	0.73 (0.48 – 1.11)	**0.55 (0.39 – 0.77)**
60–75	195	**0.34 (0.19 – 0.58)**	**0.37 (0.22 – 0.65)**	**0.36 (0.23 – 0.55)**	0.67 (0.44 – 1.01)	**0.37 (0.24 – 0.56)**
Gender						
Male	663	Reference	Reference	Reference	Reference	Reference
Female	397	**1.67 (1.19 – 2.35)**	**1.45 (1.05 – 2.00)**	**1.51 (1.16 – 1.96)**	**1.80 (1.37 – 2.37)**	**1.80 (1.39 – 2.32)**
Race/Ethnicity						
White/NH	776	Reference	Reference	Reference	Reference	Reference
Black/NH	63	1.30 (0.57 – 2.99)	0.93 (0.42 – 2.06)	0.74 (0.41 – 1.34)	0.62 (0.33 – 1.17)	0.95 (0.52 – 1.73)
Asian/NH	159	0.72 (0.46 – 1.11)	0.89 (0.57 – 1.39)	0.97 (0.67 – 1.40)	0.89 (0.63 – 1.26)	0.90 (0.63 – 1.30)
Hispanic	42	0.77 (0.38 – 1.58)	0.97 (0.46 – 2.05)	**0.42 (0.22 – 0.78)**	1.77 (0.80 – 3.94)	0.76 (0.39 – 1.49)

Physicians treating Adults	Total	BMI: Overweight	BMI: Obese	Diet: 5 Servings or depends on calories	Physical Activity: 30 min	Know all guidelines
	n	O.R. (95% CI)	O.R. (95% CI)	O.R. (95% CI)	O.R. (95% CI)	O.R. (95% CI)
Other	20	0.63 (0.17 – 2.35)	1.05 (0.27 – 4.15)	**0.29 (0.11 – 0.76)**	**0.29 (0.11 – 0.81)**	0.37 (0.12 – 1.19)
Region						
Northeast	216	Reference	Reference	Reference	Reference	Reference
Midwest	255	1.09 (0.66 – 1.81)	1.55 (0.97 – 2.49)	1.13 (0.78 – 1.63)	1.07 (0.69 – 1.66)	1.03 (0.70 – 1.51)
South	365	0.93 (0.59 – 1.46)	1.40 (0.91 – 2.17)	0.95 (0.66 – 1.36)	1.12 (0.76 – 1.64)	0.98 (0.68 – 1.39)
West	224	1.21 (0.74 – 1.98)	1.32 (0.80 – 2.17)	1.13 (0.76 – 1.67)	1.17 (0.79 – 1.75)	1.22 (0.83 – 1.80)

Note: Bold associations are significant ($p<.05$); U.S. = United States; EB-PCP = National Survey of Energy Balance Related Care among Primary Care Physicians; OB/GYN = Obstetrics/Gynecology; NH = Non-Hispanic; O.R. = Odds Ratio; CI = Confidence Interval

Table 2

Knowledge of Guidelines and Related Clinical Practices among Physicians Treating Children and Adults in the 2008 U.S. EB-PCP Study

	Total	Provide general counseling	Provide guidance on diet	Provide guidance on physical activity	Provide guidance on weight control	Refer patients for further evaluation/ management	Systematically Track/follow patients over time	Assess BMI	Weight- for-age	Stature- for-age	BMI-for-age
	n (%)	O.R. (95% CI)	O.R. (95% CI)	O.R. (95% CI)	O.R. (95% CI)	O.R. (95% CI)	O.R. (95% CI)	O.R. (95% CI)	O.R. (95% CI)	O.R. (95% CI)	O.R. (95 % CI)
Physicians Treating Children											
BMI Percentile: 5–85th Percentile	30 6 (36.5)	1.15 (0.86 – 1.55)	1.32 (0.97 – 1.81)	1.06 (0.79 – 1.42)	1.12 (0.82 – 1.53)	1.28 (0.96 – 1.70)	0.97 (0.69 – 1.37)	**2.20 (1.46 – 3.31)**	1.24 (0.73 – 2.10)	1.06 (0.64 – 1.75)	**2.54 (1.82 – 3.55)**
Diet: 5 Servings or Depends on calories	46 4 (62.9)	1.18 (0.85 – 1.63)	1.22 (0.86 – 1.72)	1.07 (0.74 – 1.54)	0.80 (0.57 – 1.12)	1.29 (0.95 – 1.76)	1.01 (0.73 – 1.41)	**1.50 (1.03 – 2.19)**	1.28 (0.76 – 2.14)	1.04 (0.65 – 1.65)	1.31 (0.93 – 1.84)
Physical Activity: 60 min	20 6 (27.0)	1.24 (0.88 – 1.75)	1.05 (0.76 – 1.44)	1.24 (0.87 – 1.77)	1.26 (0.93 – 1.72)	**1.41 (1.01 – 1.97)**	**1.57 (1.12 – 2.18)**	1.11 (0.76 – 1.63)	0.99 (0.56 – 1.76)	1.22 (0.69 – 2.15)	1.13 (0.80 – 1.58)
Know all guidelines	90 (10.6)	1.13 (0.74 – 1.72)	0.85 (0.55 – 1.34)	0.98 (0.62 – 1.54)	0.87 (0.58 – 1.29)	1.50 (0.94 – 2.42)	1.37 (0.89 – 2.09)	**1.80 (1.04 – 3.13)**	1.43 (0.56 – 3.67)	1.32 (0.58 – 2.99)	**1.83 (1.16 – 2.90)**
Physicians Treating Adults											
BMI: Overweight	849 (81.4)	**1.77 (1.28 – 2.45)**	**1.46 (1.04 – 2.06)**	1.27 (0.86 – 1.86)	1.06 (0.78 – 1.44)	1.04 (0.71 – 1.52)	1.32 (0.98 – 1.76)	**2.66 (1.91 – 3.70)**	**NA**	**NA**	**NA**
BMI: Obese	849 (81.3)	1.34 (0.95 – 1.90)	0.96 (0.66 – 1.39)	1.00 (0.67 – 1.48)	0.99 (0.69 – 1.42)	0.77 (0.55 – 1.10)	1.20 (0.86 – 1.67)	**2.52 (1.77 – 3.60)**	**NA**	**NA**	**NA**
Diet: 5 Servings or Depends on calories	659 (63.5)	0.91 (0.69 – 1.21)	0.81 (0.61 – 1.07)	0.90 (0.68 – 1.21)	**0.75 (0.57 – 0.97)**	1.08 (0.87 – 1.36)	**0.64 (0.50 – 0.83)**	1.10 (0.86 – 1.40)	**NA**	**NA**	**NA**
Physical Activity: 30 min	744 (70.9)	1.09 (0.82 – 1.44)	0.98 (0.76 – 1.26)	0.97 (0.75 – 1.26)	0.98 (0.73 – 1.31)	0.94 (0.74 – 1.20)	1.03 (0.82 – 1.31)	1.25 (0.96 – 1.62)	**NA**	**NA**	**NA**
Know all guidelines	418 (40.6)	0.98 (0.74 – 1.29)	0.84 (0.63 – 1.12)	0.93 (0.71 – 1.21)	**0.77 (0.60 – 0.98)**	0.96 (0.77 – 1.21)	**0.74 (0.58 – 0.93)**	**1.28 (1.02 – 1.61)**	**NA**	**NA**	**NA**

Note: Bold associations are significant (*p<.05);* Models adjust for PCP specialty, age, sex, race, and region; U.S. = United States; EB-PCP = National Survey of Energy Balance Related Care among Primary Care Physicians; BMI = Body Mass Index; O.R. = Odds Ratio; CI = Confidence Interval

Appendix A

Sample Characteristics by Physicians Knowledge of Guidelines in the 2008 U.S. EB-PCP Study

		Guideline Knowledge								
		Total	Healthy Weight – Children		Physical Activity		Servings of Fruit and Vegetables		Know All Guidelines	
			5th – 85th Percentile		60 min/day (Child)		5 Servings or Depends on Calories			
			Correct	Chi-square	Correct	Chi-square	Correct	Chi- square	Yes	Chi-square
		n	%	p-value	%	p-value	%	p-value	%	p-value
Physicians Treating Child/Adolescent Patients		**716**	**36.5**		**27.0**		**62.9**		**10.6**	
Primary Specialty	Family/Practice	327	23.0	<.0001	23.0	0.00 15	59.5	0.02 44	6.4	<.00 01
	Pediatrics	389	59.3	-	33.6	-	68.5	-	17.8	-
Age	< 40	192	39.8	0.6633	23.3	0.46 59	63.3	0.11 33	10.1	0.88 46
	40–49	222	34.7	-	28.9	-	68.5	-	11.8	-
	50–59	203	36.9	-	29.3	-	59.3	-	9.5	-
	60–75	99	33.9	-	24.2	-	56.4	-	11.4	-
Gender	Male	385	29.7	<.0001	23.7	0.02 82	59.9	0.05 96	9.4	0.18 46
	Female	331	45.6	-	31.3	-	66.8	-	12.3	-
Race	White/NH	528	33.1	0.0265	28.0	0.20 18	63.5	0.96 67	10.3	0.84 55
	Black/NH	30	42.0	-	15.2	-	63.9	-	10.1	-
	Asian/NH	119	50.7	-	23.4	-	60.8	-	12.4	-
	Hispanic	24	42.4	-	37.4	-	59.7	-	14.1	-
	Other	15	29.5	-	22.6	-	58.3	-	5.3	-
Region	Northeast	147	42.2	0.3954	33.2	0.24 76	71.5	0.01 55	15.6	0.19 26
	Midwest	175	36.0	-	29.1	-	59.7	-	8.9	-
	South	231	34.8	-	23.5	-	55.9	-	8.8	-
	West	163	34.8	-	24.5	-	69.0	-	11. 0	-

		Guideline Knowledge									
		Total	Weight Guidelines				Physical Activity		Servings of Fruit and Vegetables		Know All Guidelines	
			Overweight		Obese		30 min/day (Adult)		5 Servings or Depends on Calories			
			Correct	Chi-square	Correct	Chi-square	Correct	Chi-square	Correct	Chi-square	Yes	Chi-square
		n	%	p-value	%	p-value	%	p-value	%	p-value	%	p-value
Physicians Treating Adults		**1060**	**81.4**		**81.3**		**70.9**		**63.5**		**40.6**	
Primary Specialty	Internal Medicine	342	80.4	0.02 99	79.8	0.02 92	68.0	0.19 79	63.2	0.07 63	40.4	0.14 77
	OB/GYN	379	76.5	-	77.1	-	69.2	-	57.9	-	35.9	-
	Family Practice	339	84.4	-	84.4	-	73.9	-	66.4	-	43.0	-
Age	< 40	213	87.9	0.00 02	87.2	0.00 02	74.7	0.09 05	75.0	0.00 01	51.7	<.00 01
	40–49	314	86.2	-	85.9	-	73.5	-	64.4	-	43.9	-
	50–59	338	78.1	-	78.1	-	68.3	-	61.6	-	36.9	-
	60–75	195	70.9	-	71.9	-	66.3	-	51.7	-	28.3	-
Gender	Male	663	78.7	0.00 23	79.3	0.01 93	66.6	<.00 01	60.1	0.00 18	35.5	<.00 01
	Female	397	86.1	-	84.8	-	78.3	-	69.5	-	49.7	-
Race	White/NH	776	82.3	0.37 49	81.6	0.99 07	72.0	0.03 48	65.4	0.01 61	41.7	0.22 14
	Black/NH	63	85.8	-	80.6	-	61.6	-	58.2	-	40.4	-
	Asian/NH	159	76.9	-	79.9	-	69.6	-	64.6	-	39.2	-
	Hispanic	42	78.2	-	81.2	-	82.0	-	44.0	-	35.3	-
	Other	20	74.7	-	82.3	-	43.0	-	35.3	-	21.1	-
Region	Northeast	216	80.9	0.62 99	76.8	0.32 25	69.0	0.88 15	62.7	0.55 72	39.6	0.58 06
	Midwest	255	82.2	-	83.7	-	70.4	-	65.5	-	40.3	-
	South	365	79.7	-	82.3	-	71.4	-	61.4	-	39.1	-
	West	224	83.7	-	81.3	-	72.4	-	65.4	-	44.5	-

Note: U.S. = United States; EB-PCP = National Survey of Energy Balance Related Care among Primary Care Physicians; OB/GYN = Obstetrics/Gynecology; NH = Non-Hispanic.

Appendix

EB-PCP Adult and Child survey questions and correct responses

	Adult Patients	Child Patients
BMI	**Question:** According to current guidelines, at what BMI level are adult patients (18 years or older) considered to be … Overweight **1** ≥ 20 kg/m^2 **2** **≥ 25 kg/m^2** **3** ≥ 30 kg/m^2 **4** ≥ 35 kg/m^2 **5** Don't Know Obese: **1** ≥ 20 kg/m^2 **2** ≥ 25 kg/m^2 **3** **≥ 30 kg/m^2** **4** ≥ 35 kg/m^2 **5** Don't Know	**Question:** According to current guidelines, in what BMI percentile range are children or adolescents 17 years) considered to have healthy weight? **1** 5th– 65th percentile **2** 5th– 75th percentile **3** **5th– 85th percentile** **4** 5th– 95th percentile **5** Other (Please specify): **6** Don't Know
Physical Activity	**Question:** According to current guidelines, for adults, 18 and older, how much moderate physical activity is recommended (on most days of the week) for general health and prevention of chronic diseases (Check one box): **1** 20 minutes **2** **30 minutes** **3** 40 minutes **4** 60 minutes **5** 90 minutes **6** Other (Please specify): **7** Don't Know	**Question:** According to current guidelines, for children/ adolescents, (2–17 years), how much moderate physical activity is recommended (on most days of the week) for general health and prevention of chronic diseases?(Check one box): **1** 20 minutes **2** 30 minutes **3** 40 minutes **4** **60 minutes** **5** 90 minutes **6** Other (Please specify): **7** Don't Know
Diet	**Question:** According to current guidelines, for adults, 18 and older, how many servings of fruits and vegetables should a person have in a day? **1** 3 servings **2** **5 servings** **3** **7 servings** **4** **It depends on daily calorie intake** **5** Other (Please specify): **6** Don't Know	**Question:** According to current guidelines, for children/ adolescents, ages 2–17, how many servings of fruits and vegetables should a person have in a day? **1** 3 servings **2** **5 servings** **3** **7 servings** **4** **It depends on daily calorie intake** **5** Other (Please specify): **6** Don't Know