Pediatric Weight Management

PWM: Major Recommendations (2007)

Major Recommendations

Recommendations By Topic

Below you will find a list of Childhood Overweight Treatment Recommendations organized by Topic. To see the Recommendation Summary, click on the Recommendation title. Also view the Executive Summary of Recommendations or print the guideline material in PDF format.

Resources Available with Each Recommendation

In addition to the recommendation statement and strength rating you will find on each recommendation page:

- a brief narrative summary of the evidence analyzed to reach the recommendation
- a statement of justification, or reason, for the strength of the recommendation
- information on the evidence supporting the recommendations and background narrative (available in the Supporting Evidence section toward the bottom of each recommendation page)
- a reference list at the end of each recommendation page that includes all the sources used in the evidence analysis for the particular recommendation (each reference is hyperlinked to a summary of the article analyzed in the evidence analysis)

Guideline Update

In 2015, the Academy published the 2015 Pediatric Weight Management Guideline. This **Summary of Changes** provides an overview of revisions to the 2007 Guideline.

Pediatric Weight Management (PWM) 2007 Major Recommendations

Overview

PWM: Comprehensive Multicomponent Weight Management Program for Treating Childhood Obesity

PWM: Obesity in Children Ages 2-5

Assessment

PWM: Assessing Foods and Pediatric Obesity

PWM: Assessing Child and Family Diet Behaviors in Pediatric Obesity

PWM: Assessing Physical Activity and Sedentary Behaviors

PWM: Determination of Total Energy Expenditure

PWM: Assessing Family Climate Factors

Intervention

Nutrition Prescription

PWM: Nutrition Prescription in the Treatment of Pediatric Obesity

Energy Restriction

PWM: Energy Restricted Diets

Altered Macronutrient Diets

PWM: Reduced Glycemic Load Diet

PWM: Very Low Carbohydrate Diet

PWM: Using Protein Sparing Modified Fast Diets for Pediatric Weight Loss

PWM: Very Low Fat Diet (<20% Daily Energy Intake from Fat)

Nutrition Education

PWM: Nutrition Education in the Treatment of Pediatric Obesity

Nutrition Counseling

PWM: Nutrition Counseling and Behavior Therapy Strategies in the Treatment of Obesity in Children and Adolescents

PWM: Family Participation in Treating Pediatric Obesity in Children and Adolescents

PWM: Nutrition Counseling: Setting Weight Goals with Patient and Family

Coordination of Nutrition Care

PWM: Coordination of Care in Pediatric Weight Management

Physical Activity and Inactivity

PWM: Decreasing Sedentary Behaviors in Children and Adolescents

PWM: Physical Activity in the Treatment of Childhood and Adolescent Obesity

Adjunct Therapies

PWM: Adjunct Therapies: Use of Weight Loss Medications in Treating Obesity in Adolescents

PWM: Adjunct Therapies: Weight Loss Surgery and Adolescent Obesity

Treatment Format Options

PWM: Treatment Format Options: Group Versus Individual Intervention

Monitoring and Evaluation

PWM: Optimal Length of Weight Management Therapy in Children and Adolescents

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Comprehensive, Multicomponent Weight Management Program for Treating Childhood Obesity

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

PWM: Multicomponent Program

Interventions to reduce pediatric obesity should be multi-component and include diet, physical activity, nutrition counseling and parent or caregiver participation. A large body of strong research indicates that clinically supervised, multi-component weight-management programs are more successful than single component programs for short-term and longer-term (more than one year) improvement in child and adolescent obesity.

Rating: Strong
Imperative

- Risks/Harms of Implementing This Recommendation

Within each component area, particular risks exist that must be monitored by the appropriate professionals:

- Nutrition interventions should be monitored by a registered dietitian to ensure adequate nutrition and growth and to prevent micronutrient deficiencies (see Pediatric Weight Management (PWM) Energy Restricted Diets)
- Intense physical activity, in some overweight and obese individuals, may contribute to disability or death. Thus, consultation with a physician prior to beginning an exercise program should be recommended (see Pediatric Weight Management (PWM) Physical Activity in the Treatment of Childhood and Adolescent Obesity).
- Adequate screening for eating disorders, depression and family risk factors is critical (see Pediatric Weight Management (PWM) Assessing Family Climate Factors and Pediatric Weight Management (PWM) Assessing Child and Family Diet Behaviors in Pediatric Obesity)
- Program success is conditioned by the above factors.

- Conditions of Application

Clinically supervised multi-component weight management programs require the participation of professional staff with expertise in distinct areas: Behavioral interventions, dietary interventions and physical activity interventions. Adequate screening processes are also needed to address and assess the above factors.

Organizational barriers may limit options for multi-component programs, including lack of space for physical activity and trained staff to conduct components of the intervention program.

Adequate screening for eating disorders, depression and family risk factors are necessary. Program success may be limited by the above factors.

- Potential Costs Associated with Application

Costs to Program or Organization

Multi-component weight-management programs may require substantial organizational infrastructure to implement well. Organizational costs are associated with:

- Access to qualified professional staff to determine and supervise interventions
- Access to adequate clinical space and instruments for treatment.

Costs to Patient and Family

Costs of MNT sessions and reimbursement vary. The absence of health insurance coverage for weight management could limit program access.

Additionally, parent commitment to program participation is required.

- Recommendation Narrative

Multi-Component Program

Research on multi-component weight-management programs indicate strong support for:

- Including a **nutrition component** that includes an individualized diet prescription that promotes an energy deficit
- Including a **physical activity component**
- Including a **behavioral intervention component.**

For evidence analysis on the above topics, see the Supporting Evidence section below.

Additionally, when the focus is on children (ages six to 12), research indicates that weight management in children without parents is not effective. See, Is counseling children (ages 6 to 12) for weight loss in the absence of their parents effective? (Evidence: Grade III). Direct parent participation in weight-management programs appears to be less critical for adolescents (see Is counseling of adolescents for weight loss in the absence of their parents effective?) (Evidence: Grade II).

Weight Loss vs. Weight Stabilization

Because of growth occurring within children and adolescents, the goal of pediatric weight management programs may be weight stabilization rather than weight loss. Research indicates that weight stabilization in children and adolescents may be associated with improvements in BMI and other measures of adiposity.

Goals for weight status should be individualized for the child. While weight loss may be appropriate in some cases, weight stabilization in growing children and adolescents may be more appropriate.

- Recommendation Strength Rationale

Research comparing the inclusion of each of the three program components (dietary, physical activity and behavioral interventions) consistently show improved outcomes in both short-term and longer-term improvement in child and adolescent adiposity.

- Minority Opinions

None.

- Supporting Evidence

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

In children ages 6-12, what is the effectiveness of using balanced macronutrient, low calorie (900-1200 kcal per day) dietary interventions for treating childhood obesity?

In children ages 6-12, what is the effectiveness of using balanced macronutrient, reduced calorie (>1200 kcal-DRI per day) dietary interventions for treating childhood obesity?

In adolescents, what balanced macronutrient dietary interventions are effective in treating obesity?

What is the effectiveness of using a program to increase physical activity as a part of an intervention program to treat childhood obesity?

What is the effectiveness of using a program to decrease sedentary behaviors as a part of an intervention program to treat childhood obesity?

What is the effectiveness of using behavioral counseling as part of a multicomponent pediatric weight management program to treat childhood obesity?

What is the effectiveness of family-based counseling including parent training or modeling as part of a multicomponent pediatric weight management program to treat obesity in children (ages 6-12)?

What is the effectiveness of family-based counseling including parent training or modeling as part of a multicomponent pediatric weight management program to treat obesity in adolescents (ages 13-18)?

- References
- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

Links to supporting recommendations and evidence are located in Recommendation Narrative.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Recommendations Summary

Pediatric Weight Management (PWM) Obesity in Children Ages Two to Five

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

PWM: Children Two to Five Years Old

Weight maintenance is generally recommended in overweight children two to five years old, within a multi-component weight-management intervention with active participation of a parent or caregiver. Weight loss may be recommended when the child has serious medical complications. Research was not identified on the efficacy and safety of weight-loss interventions among children ages two to five years old. The practitioner should refer to the Expert Committee Recommendations (*Pediatrics* Dec 2007, Vol 120 / Issue Supp4) for weight goals (Table 8) for children two to five years old.

Rating: Consensus
Imperative

PWM: Children Two to Five Years Old, Interventions

The practitioner should refer to the Expert Committee Recommendations for interventions (Table 8) with children two to five years old.

Rating: Consensus
Imperative

- Risks/Harms of Implementing This Recommendation
  - A negative energy balance during this period of rapid growth and development may have detrimental effects
  - Nutrition interventions should be monitored by a registered dietitian to ensure adequate nutrition and growth and to prevent micro-nutrient deficiencies (see Pediatric Weight Management (PWM) Energy Restricted Diets).
- Conditions of Application

  Strategies for increasing physical activity among preschool children need not be highly structured. Regular outdoor play and decreased television viewing have been shown to be beneficial among some subpopulations of preschool children. The recent Expert Committee report recommends no television for children less than two years old. (Sarah E. Barlow and the Expert Committee. Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report. *Pediatrics,* 2007; 120; S164-S192. P.S182).

  Medical monitoring of growth and development is critical in the treatment of this age group, since a negative energy balance, during this period of rapid growth and development, may have detrimental effects.

  Adequate screening of family risk factors is critical for this age group: See Pediatric Weight Management (PWM) Assessing Child and Family Diet Behaviors in Pediatric Obesity and Pediatric Weight Management (PWM) Assessing Family Climate Factors.
- Potential Costs Associated with Application

  None.
- Recommendation Narrative

  Research was not identified on the efficacy and safety of weight-loss interventions among children ages two to five.

  The ADA Pediatric Weight Management Work Group refers the reader to the Expert Committee Recommendations regarding weight goals and approaches to weight management within this age group (Sarah E. Barlow and and the Expert Committee. Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report. *Pediatrics,* 2007; 120; S164-S192).
- Recommendation Strength Rationale

  The rating of "consensus" was based on the lack of direct research on this age group and because the ADA Work Group drew on the consensus recommendations in Sarah E. Barlow and the Expert Committee. Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report. *Pediatrics,* 2007; 120; S164-S192).
- Minority Opinions

  None.

- Supporting Evidence

  The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

  - References
  - References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

    Sarah E. Barlow and and the Expert Committee. Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report. *Pediatrics,* 2007; 120; S164-S192.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Assessing Foods and Pediatric Overweight

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

  PWM: Foods Associated with an Increased Risk of Overweight

  Dietary factors that may be associated with an **increase in the risk of overweight** and should be included in Nutrition Assessment are: increased total dietary fat intake and increased calorically sweetened beverages. ADA Evidence Analysis has shown that these factors are positively associated with childhood overweight.

  Rating: Strong
  Imperative

  PWM: Foods Associated with an Decreased Risk of Overweight

  Dietary factors that may be associated with a **decrease in the risk of overweight** and should be included in Nutrition Assessment are: increased fruit and vegetable intake. ADA Evidence Analysis has shown that these factors may be negatively associated with childhood overweight

  Rating: Strong
  Imperative

  PWM: Assessment - Total Energy Intake and 100% Fruit Juice

  Dietitians should be aware of the research on the following dietary factors when carrying out their Nutrition Assessment: reported total energy intake and 100% fruit juice intake. ADA Evidence Analysis has found that these factors may or may not be related to pediatric overweight, but the research is still unclear on the relationship.

  Rating: Fair
  Imperative

  PWM: Assessment - Dairy and Calcium

  Dietitians should be aware of the observational research that indicates an inadequate intake of dairy and calcium may be related to an increase in the risk of pediatric overweight. Consideration should be given to including dairy and calcium intake as part of the nutrition assessment.

  Rating: Fair
  Imperative

  - Risks/Harms of Implementing This Recommendation

    None

  - Conditions of Application

    The above topics were selected for evidence analysis. However:

    - The practitioner should not limit their assessment to these factors
    - Modification of these factors should be considered when developing the nutrition prescription
    - Evidence analysis on other factors is currently underway and will be added to the guideline as they are finished

  - Potential Costs Associated with Application

None

- Recommendation Narrative

  Evidence analysis was carried out on several foods associated with pediatric overweight.

  All factors are based only on observational (association) research and do not include research on interventions.

  The following foods and nutrients were associated with an **increased risk** of pediatric overweight:

  - increased total dietary fat intake (Grade II)
  - calorically sweetened beverages (Grade II)
  - inadequate intake of dairy and calcium (both Grade III)

  The following foods and nutrients were associated with a **decreased risk** of pediatric overweight:

  - increased fruit and vegetable intake (Grade II)

  The following foods and nutrients **may not be related to pediatric overweight**. A relationship may or may not, in fact, exist, but research has not been able to determine this definitively.

  - reported total energy intake (Grade II)
  - 100% fruit juice intake (Grade II)

- Recommendation Strength Rationale

  No direct research was analyzed regarding the benefits of knowledge-based assessment and intervention practices. However, the work group felt strongly that knowledge of relevant scientific research is indispensible for responsible dietetic practice.

  With the exception of the evidence on dairy and calcium, all grades for the food and nutrient associations with childhood overweight were a Grade II. Additionally, while there is no risk to the patient/client with respect to the practitioner's knowledge of these factors, the dietitian's ignorance of this research could result in substantial risk to the patient/client.

- Minority Opinions

  None

- Supporting Evidence

  The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

  Is intake of calcium related to adiposity in children?

  Is intake of dairy related to adiposity in children?

  Is intake of 100% fruit juice related to adiposity in children?

  Is intake of fruits and vegetables related to adiposity in children?

  Is intake of calorically-sweetened beverages related to adiposity in children?

  Is intake of dietary fat associated with adiposity in youth?

  Is total energy (caloric) intake associated with higher risk or prevalence of overweight among children?

  In children, does using beverages with non-nutritive sweeteners (saccharin, aspartame, acesulfame-K, sucralose, neotame) in a calorie-restricted or ad libitum diet affect energy balance?

- References

  Carruth BR, Skinner JD. The role of dietary calcium and other nutrient in moderating body fat in preschool children. *International Journal of Obesity* 2001; 25: 559-566.

  Fisher JO, Mitchell DC, Smiciklas-Wright H, Mannino ML, Birch LL. Meeting calcium recommendations during middle childhood reflects mother-daughter beverage choices and predicts bone mineral status. *Am J Clin Nutr*. 2004 Apr; 79(4): 698-706.

  Ortega RM, Requejo AM, Andres P, Lopez-Sobaler AM, Redondo R, Gonzalez-Fernandez M. Relationship between diet composition and body mass index in a group of Spanish adolescents. *Br J Nutr.* 1995;74:765-73.

  Phillips SM, Bandini LG, Cyr H, Colclough-Douglas S, Naumova E, Must A. Dairy food consumption and body weight and fatness studied longitudinally over the adolescent period. *Int J Obes Relat Metab Disord*. 2003 Sep; 27(9): 1,106-1,113.

  Rockett HR, Berkey CS, Field AE, Colditz GA. Cross-sectional measurement of nutrient intake among adolescents in 1996. *Prev Med* 2001; 33:27-37.

  Skinner JD, Bounds W, Carruth BR, Ziegler P. Longitudinal calcium intake is negatively related to children's body fat indexes. *J Am Diet Assoc.* 2003 Dec; 103(12): 1,626-1,631.

  Tanasescu M, Ferris AM, Himmelgreen DA, Rodriguez N, Pérez-Escamilla R. Biobehavioral factors are associated with obesity in Puerto Rican children. *J Nutr* 2000;130:1734-42.

Ariza AJ, Chen EH, Binns HJ, Christoffel KK. Risk factors for overweight in five- to six-year-old Hispanic-American children: A pilot study. *J Urban Health* 2004;81:150-161.

Berkey CS, Rockett HRH, Field AE, Gillman MW, Colditz GA. Sugar-added beverages and adolescent weight change. *Obes Res.* 2004;12:778-788.

Black RE, Williams SM, Jones IE, Goulding A. Children who avoid drinking cow milk have low dietary calcium intakes and poor bone health. *Am J Clin Nutr* 2002;76:675-80.

Boutelle K, Neumark-Sztainer D, Story M, Resnick M. Weight control behaviors among obese, overweight, and nonoverweight adolescents. *J Pediatr Pscychol* 2002;27:531-40.

Forshee RA, Storey ML. Total beverage consumption and beverage choices among children and adolescents. *Int J Food Sci Nutr* 2003;54:297-307.

Gillis LJ, Bar-Or O. Food away from home, sugar-sweetened drink consumption and juvenile obesity. *J Am Coll Nutr*. 2003 Dec;22(6):539-45.

Newby PK, Peterson KE, Berkey CS, Leppert J, Willett WC, Colditz GA. Beverage consumption is not associated with changes in weight and body mass index among low-income preschool children in North Dakota. *J Am Diet Assoc*. 2004; 104: 1,086-1,094.

Nicklas TA, Yang SJ, Baranowski T, Zakeri I, Berenson G. Eating patterns and obesity in children. The Bogalusa Heart Study. *Am J Prev Med*. 2003 Jul;25(1):9-16.

Rodríguez-Artalejo F, García EL, Gorgojo L, Garcés C, Royo MA, Martín Moreno JM, Benavente M, Macías A, De Oya M; On behalf of the investigators of the Four Provinces Study. Consumption of bakery products, sweetened soft drinks and yogurt among children aged 6-7 years: association with nutrient intake and overall diet quality. *Br J Nutr* 2003;89:419-29.

Sugimori H, Yoshida K, Izuno T, Miyakawa M, Suka M, Sekine M, Yamagami T, Kagamimori S. Analysis of factors that influence body mass index from ages 3 to 6 years: A study based on the Toyama cohort study. *Pediatr Int.* 2004 Jun;46(3):302-10.

Alexy U, Sichert-Hellert W, Kersting M, Manz F, Schoch G. Fruit juice consumption and the prevalence of obesity and short stature in German preschool children: results of the DONALD study. *Journal of Pediatric Gastroenterology & Nutrition* 1999; 29: 343-249.

Brewis A. Biocultural aspects of obesity in young Mexican schoolchildren. *Am J Hum Biol*. 2003 May-Jun;15(3):446-60.

Dennison BA, Rockwell HL, Baker SL. Excess fruit juice consumption by preschool-aged children is associated with short stature and obesity. *Pediatrics,* 1997; 99: 15-22.

Dennison BA, Rockwell HL, Nichols MJ, Jenkins P. Children's growth parameters vary by type of fruit juice consumption. *Journal of the American College of Nutrition.* 1999; 18: 346-352.

Kloeblen-Tarver AS. Fruit juice consumption not related to growth among preschool-aged children enrolled in the WIC program. *J Am Diet Assoc,* 2001;101:996.

Melgar-Quinonez HR, Kaiser LL. Relationship of child-feeding practices to overweight in low-income Mexican-American preschool-aged children. *J Am Diet Assoc.* 2004 Jul;104(7):1110-9.

Riddick H, Kramer-LeBlanc C, Bowman SA, Davis C. Is fruit juice dangerous for children? U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. *Nutrition Insights*, March 1997.

Skinner JD, Carruth BR. A longitudinal study of children's juice intake and growth: the juice controversy revisited. *Journal of American Dietetic Association,* 2001; 101: 432-437.

Skinner JD, Carruth BR, et al. Fruit juice intake is not related to children's growth. *Pediatrics,* 1999; 103:58-64.

Bandini LG, Vu D, Must A, Cyr H, Goldberg A, Dietz WH. Comparison of high-calorie, low-nutrient-dense food consumption among obese and non-obese adolescents. *Obes Res* 1999;7:438-43.

Boutelle K, Neumark-Sztainer D, Story M, Resnick M. Weight control behaviors among obese, overweight, and nonoverweight adolescents. *J Pediatr Pscychol* 2002;27:531-40.

Hanley AJG, Harris SB, Gittelsohn J, Wolever TMS, Saksvig B, Zinman B. Overweight among children and adolescents in a Native Canadian community: prevalence and associated factors. *Am J Clin Nutr,* 2000; 71: 693-700.

Lin BH, Huang CL, French SA. Factors associated with women's and children's body mass indices by income status. *Int J Obes Relat Metab Disord*. 2004 Apr;28(4):536-42.

Lin BH, Morrison RM. Higher fruit consumption linked with lower body mass index. *Food Review*, 2002;25:28-32.

Neumark-Sztainer D, Story M et al, Correlates of inadequate fruit and vegetable consumption among adolescents. *Preventive Med*. 1996; 497-505.

Newby PK, Peterson KE, Berkey CS, Leppert J, Willett WC, Colditz GA. Dietary composition and weight change among low-income preschool children. *Arch Pediatr Adolesc Med.* August 2003; 157 (8): 759-64.

Ortega RM, Requejo AM, Andres P, Lopez-Sobaler AM, Redondo R, Gonzalez-Fernandez M. Relationship between diet composition and body mass index in a group of Spanish adolescents. *Br J Nutr.* 1995;74:765-73.

Wang Y, Ge K, Popkin BM. Why do some overweight children remain overweight, whereas others do not? *Public Health Nutr.* 2003 Sep;6(6):549-58.

Giammattei J, Blix G, Marshah HH, Wollitzer AO, Pettitt DJ. Television watching and soft drink consumption: associations with obesity in 11- to 13-year old schoolchildren. *Arch Pediatr Adolesc Med* 2003;157:882-886.

James J, Thomas P, Cavan D, Kerr D. Preventing childhood obesity by reducing consumption of carbonated drinks: cluster randomised controlled trial. *BMJ.* 2004 May 22;328(7450):1237. Epub 2004 Apr 23.

Ludwig DS, Peterson KE, Gortmaker SL. Relation between consumption of sugar-sweetened drinks and childhood obesity. *Lancet* 2001;357:505-8.

Mrdjenovic G, Levitsky DA. Nutritional and energetic consequences of sweetened drink consumption in 6- to 13-year-old children. *J Pediatr* 2003;142:604-10.

Rockett HR, Berkey CS, Field AE, Colditz GA. Cross-sectional measurement of nutrient intake among adolescents in 1996. *Prev Med* 2001; 33:27-37.

Troiano RP, Briefel RR, Carroll MD, Bialostosky K. Energy and fat intakes of children and adolescents in the United States: data from the National Health and Nutrition Examination Surveys. *Am J Clin Nutr* 2000; 72 (suppl): 1343S-53S.

Alexy U, Sichert-Hellert W, Kersting M, Manz F, Schoch G. Fruit juice consumption and the prevalence of obesity and short stature in German preschool children: results of the DONALD study. *Journal of Pediatric Gastroenterology & Nutrition* 1999; 29: 343-249.

Atkin Lisa-Marie, Davies PS. Diet composition and body composition in preschool children. *Am J Clin Nut* 2000; 72: 15-21.

Bao W, Nicklas TA, Srinivasan SR, Berenson GS. Body composition and energy and nutritional intake in children. *Journal of Advancement in Medicine* 1996; 9: 101-112.

Berkey CS, Rockett HRH, Field AE, Gillman MW, Frazier AL, Camargo CA, Colditz GA. Activity, dietary intake, and weight changes in a longitudinal study of preadolescent and adolescent boys and girls. *Pediatrics* 2000; 105: 1-9.

Boulton TJC & Magarey AM. Effects of differences in dietary fat on growth, energy and nutrient intake from infancy to eight years of age. *Acta Paediatrica* 1995; 84: 146-50. *Adelaide Nutrition Study.*

Davies PSW. Diet composition and body mass index in pre-school children. *European Journal of Clinical Nutrition* 1997; 51: 443-448.

Eck LH, Klesges RC, et al. Children at familial risk for obesity: an examination of dietary intake, physical activity and weight status. *International Journal of Obesity* 1992: 16: 71-78.

Fisher JO and Birch LL. Fat preferences and fat consumption of 3- to 5- y-old children are related to parental adiposity. *J Am Diet Assoc.* 1995; 95: 759-764.

Francis CC, Bope AA, MaWhinney, Czaijka-Marins D, Alford BB. Body composition, dietary intake, and energy expenditure in nonobese, prepubertal children of obese and nonobese biological mothers. *Journal of the American Dietetic Association* 1999; 99: 58-66.

Francis LA, Lee Y, Birch LL. Parental weight status and girls' television viewing, snacking, and body mass indexes. *Obes Res* 2003;11:143-51.

Garaulet M, Martinez A, Victoria F, Perez-Llamas F, Ortega RM, Zamora S. Differences in dietary intake and activity level between normal-weight and overweight or obese adolescents. *JPGN* 2000; 30: 253-258.

Gazzaniga JM & Burns TL. Relationship between diet composition and body fatness, with adjustment for resting energy expenditure and physical activity, in preadolescent children. *Am J Clin Nutr* 1993; 58: 21-8.

Gillis LJ, Kennedy LC, Gills AM, Bar-Or O. Relationship between juvenile obesity, dietary energy and fat intake and physical activity. *International Journal of Obesity* 2002; 26: 458-463.

Guillaume M, Lapidus L, Lambert A. Obesity and nutrition in children. The Belgian Luxembourg Child Study IV. *European Journal of Clinical Nutrition* 1998; 52: 323-328.

Hanley AJG, Harris SB, Gittelsohn J, Wolever TMS, Saksvig B, Zinman B. Overweight among children and adolescents in a Native Canadian community: prevalence and associated factors. *Am J Clin Nutr,* 2000; 71: 693-700.

Klesges RC, Klesges LM, Eck LH, Shelton ML. A longitudinal analysis of accelerated weight gain in preschool children. *Pediatrics* 1995; 95: 126-130.

Koivisto U, Fellenius J, Sjoden. Relations between parental mealtime practices and children's food intake. *Appetite* 1994; 22: 245-258.

Lee Y, Mitchell DC, Smickiklas-Wright H, Birch LL. Diet quality, nutrient intake, weight status, and feeding environments of girls meeting or exceeding recommendations for total dietary fat of the American Academy of Pediatrics. *Pediatrics* 2001; 107: e95.

Lluch A, Herbeth B, Mejean L, Siest G. Dietary intakes, eating style and overweight in the Stanislas Family Study. Int J Obes Relat Metab Disord. 2000; 24(11): 1493-1499.

Maffeis C, Pinelli L, Schutz Y. Fat intake and adiposity in 8 to 11-y-old obese children. *Int J Obes Relat Metab Disord* 1996; 20: 170-174.

Maffeis C, Provera S, Filippi L, Sidoti G, Schena S, Pinelli L, Tatò L. Distribution of food intake as a risk factor for childhood obesity. *Int J Obes* 2000;24:75-80.

Maffeis C, Talamini G, Tato L. Influence of diet, physical activity and parents' obesity on children's adiposity: A four-year longitudinal study. *Int J Obes.* 1998; 22: 758-764.

Magarey AM, Daniels LA, Boulton TJC, Cockington RA. Does fat intake predict adiposity in healthy children and adolescents aged 2-15 y? A longitudinal analysis. *Eur J Clin Nutr* 2001; 55: 471-481.

Manos TM, Gutin B, Rhodes T, Spandorfer PR, Jackson LW, Litaker MS. Energy expenditure and intake in obese and non-obese African American girls. *Ann N Y Acad Sci* 1993; 699: 275-277.

McGloin AF, Livingstone MBE, Greene LC, Webb SE, Gibson JMA, Jebb SA, Cole TJ, Coward WA, Wright A, Prentice AM. Energy and fat intake in obese and lean children at varying risk of obesity. *International Journal of Obesity.* 2002; 26: 200-207.

Muecke L, Simons-Morton B, Wei Huang I, Parcel G. Is childhood obesity associated with high-fat foods and low physical activity? *J Sch Health* 1992; 19-23.

Nguyen VT, Larson DE, Johnson RK, Goran M. Fat intake and adiposity in children of lean and obese parents. *Am J Clin Nutr* 1996; 63: 507-13.

Obarzanek E, Schreiber GB, et al. Energy intake and physical activity in relation to indexes of body fat: National heart, lung, and blood institute growth and health study. *American Journal of Clinical Nutrition* 1994; 60: 15-22.

Ricketts CD. Fat preferences, dietary intake and body composition in children. *Eur J Clin Nutr* 1997; 51: 778-781.

Robertson SM, Cullen KW, Baranowski J, Baranowski T, Hu S, de Moor C. Factors related to adiposity among children aged 3 to 7 years. *J Am Diet Assoc* 1999; 99: 938-943.

Rocandio AM, Ansotegui L, Arroyo M. Comparison of dietary intake among overweight and non-overweight school children. *International Journal of Obesity* 2001; 25: 1,651-1,655.

Rolland-Cachera MF, Deheeger M, Akrout M, Bellisle F. Influence of macronutrients on adiposity development: a follow up study of nutrition and growth from 10 months to 8 years of age. Int *J Obes Relat Metab Disord* 1995; 19: 573-578.

Scaglioni S, Agostoni C, De Notaris R, Radaelli G, Radice N, Valenti M, Giovannini M, Riva E. Early macronutrient intake and overweight at five years of age. *Int J Obes.* 2000; 24: 777-781.

Shea S, Basch CE, Stein AD, Contento IR, Irigoyen M, Zybert P. Is there a relationship between dietary fat and stature or growth in children three to five years of age? *Pediatrics.* 1993; 92: 579-586. *Columbia University Study of Childhood Activity and Nutrition.*

Stewart KJ, Seemans C, McFarland LD, Weinhofer JJ, Brown CS. Dietary fat and cholesterol intake in young children compared with recommended levels.*J Cardiopulmonary Rehabil* 1999; 19: 112-117.

Storey ML, Forshee RA, Weaver AR, Sansalone WR. Demographic and lifestyle factors associated with body mass index among children and adolescents. *Int J Food Sci Nutr* 2003; 54: 491-503.

Troiano RP, Briefel RR, Carroll MD, Bialostosky K. Energy and fat intakes of children and adolescents in the United States: data from the National Health and Nutrition Examination Surveys. *Am J Clin Nutr* 2000; 72 (suppl): 1343S-53S.

Tucker LA, Seljaas GT, Hager R. Body fat percentage of children varies according to their diet composition. *J Am Diet Assoc* 1997; 97: 981-6.

Wardle J, Guthrie C, Sanderson S, Birch L, Plomin R. Food and activity preferences in children of lean and obese parents. *Int J Obes* 2001; 25: 971-7.

Albertson AM, Anderson GH, Crockett SJ, Goebel MT. Ready-to-eat cereal consumption: its relationship with BMI and nutrient intake of children aged 4 to 12 years. *J Am Diet Assoc.* 2003 Dec;103(12):1613-9.

Arluk SL, Branch JD, Swain DP, Dowling EA. Childhood obesity's relationship to time spent in sedentary behavior. *Military Medicine* 2003; 168: 583-586.

Deheeger M, Akrout M, Bellisle F, Rossignol C, Rolland-Cachera MF. Individual patterns of food intake development in children: A 10 months to 8 years of age follow-up study of nutrition and growth. *Physiol Behav.* 1996; 59: 403-407.

Johnson-Down L, O'Loughlin J, Koski KG, Gray-Donald K. High prevalence of obesity in low income and multiethnic schoolchildren: a diet and physical activity assessment. *J Nutr* 1997; 127: 2,310-2,315.

Kelley C, Krummel D, Gonzales EN, Neal WA, Fitch CW. Dietary intake of children at high risk for cardiovascular disease. *J Am Diet Assoc.* 2004 Feb;104(2):222-5.

McGloin AF, Livingstone MBE, Greene LC, Webb SE, Gibson JMA, Jebb SA, Cole TJ, Coward WA, Wright A, Prentice AM. Energy and fat intake in obese and lean children at varying risk of obesity. *International Journal of Obesity.* 2002; 26: 200-207.

Robertson SM, Cullen KW, Baranowski J, Baranowski T, Hu S, de Moor C. Factors related to adiposity among children aged 3 to 7 years. *J Am Diet Assoc* 1999; 99: 938-943.

- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

None

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Assessing Child and Family Diet Behaviors in Pediatric Obesity

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

PWM: Family Diet Behaviors - Increased Risk of Obesity

Child and family diet behavior factors that may be associated with an **increase in the risk** of pediatric obesity and should be included in Nutrition Assessment are: Parental restriction of highly-palatable foods, consumption of food away from home, increased portion size of meals and breakfast-skipping. ADA Evidence Analysis has shown that these factors are positively associated with childhood overweight or obesity.

Rating: Fair
Imperative

PWM: Family Diet Behaviors - Relationship Unclear

Dietitians should be aware of the research on the following child and family diet behavior factors when carrying out their Nutrition Assessment: Parental encouragement or pressure to eat, parental control over child's dietary intake, meal frequency, snacking frequency or snack food intake and using food as a reward. ADA Evidence Analysis has found that these factors **may not be related** to pediatric overweight or obesity or that the research i**s still unclear on the relationship.**

Rating: Fair
Imperative

- Risks/Harms of Implementing This Recommendation

  None.

- Conditions of Application

  The above topics were selected for evidence analysis. However:

  - The practitioner should not limit their assessment to these factors
  - Modification of these factors should be considered when developing the nutrition prescription
  - Evidence analysis on other factors is currently underway and will be added to the guideline as they are finished.

- Potential Costs Associated with Application

  None.

- Recommendation Narrative

  - Evidence analysis was carried out on several child and family diet behaviors associated with pediatric obesity
  - All factors are based only on observational (association) research and do not include research on interventions
  - The following child and family diet behaviors were associated with an **increased risk** of pediatric obesity:
    - Parental restriction of highly palatable foods (Grade II)
    - Consumption of food away from home (Grade III)
    - Increased portion size of meals (Grade III)
    - Breakfast-skipping (Grade III).
  - The following child and family diet behaviors **may not be related** to pediatric obesity. A relationship may or may not, in fact, exist, but research has not been able to determine this definitively.
    - Parental encouragement or pressure to eat (Grade II)
    - Parental control over child's dietary intake (Grade II)
    - Meal frequency (Grade III)
    - Snacking frequency or snack food intake (Grade III)
    - Using food as a reward (Grade III).

- Recommendation Strength Rationale

  No direct research was analyzed regarding the benefits of knowledge-based assessment and intervention practices. However, the work group felt strongly that knowledge of relevant scientific research is indispensable for responsible dietetic practice.

  The majority of grades for the associations between child and family diet behaviors and pediatric obesity were a Grade III. However, while there is no risk to the patient or client, with respect to the practitioner's knowledge of these factors, the dietitian's ignorance of this research could result in substantial risk to the patient or client.

- Minority Opinions

  None.

- Supporting Evidence

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Is eating out related to adiposity in children?

Is portion size related to adiposity in children?

Is breakfast skipping related to adiposity in children?

Is eating frequency related to adiposity in children?

Is snacking related to adiposity in children?

Is parental encouragement/pressure to eat associated with higher risk or prevalence of overweight among children?

Is parental restriction of highly palatable foods associated with higher risk or prevalence of overweight among children?

Is parental control over child dietary intake associated with higher risk or prevalence of overweight among children?

Is using food as a reward (Instrumental feeding) & emotional feeding associated with higher risk or prevalence of overweight among children?

- References

Birch LL, Fisher JO, Davison KK. Learning to overeat: maternal use of restrictive feeding practices promotes girls' eating in the absence of hunger. *Am J Clin Nutr*. 2003 Aug;78(2):215-20.

Francis LA, Hofer SM, Birch LL. Predictors of maternal and child characteristics. *Appetite* 2001; 37: 231-243.

Koivisto U, Fellenius J, Sjoden. Relations between parental mealtime practices and children's food intake. *Appetite* 1994; 22: 245-258.

Lee Y, Mitchell DC, Smickiklas-Wright H, Birch LL. Diet quality, nutrient intake, weight status, and feeding environments of girls meeting or exceeding recommendations for total dietary fat of the American Academy of Pediatrics. *Pediatrics* 2001; 107: e95.

Melgar-Quinonez HR, Kaiser LL. Relationship of child-feeding practices to overweight in low-income Mexican-American preschool-aged children. *J Am Diet Assoc*. 2004 Jul;104(7):1110-9.

Robinson TN, Kiernan M, Matheson DM, Haydel KF. Is parental control over children's eating associated with childhood obesity? Results from a population-based sample of third graders. *Ob Res* 2001; 9: 306-312.

Spruijt-Metz D, Lindquist CH, et.al. Relation between mothers' child-feeding practices and children's adiposity. *Am J Clin Nutr*. 2002;75:581-586.

Wardle J, Sanderson WS, Guthrie CA, Rapoport L, Plomin R. Parental feeding style and the intergenerational transmission of obesity risk. *Obes Res* 2002; 10: 453-462. *Twins Early Development Study*.

Birch LL, Fisher JO. Mothers' child-feeding practices influence daughters' eating and weight. *Am J Clin Nutr*. 2000; 71: 1054-1061.

Davison KK, Birch LL. Weight status, parent reaction, and self-concept in five-year-old girls. *Pediatrics* 2001; 107: 46-53.

Fisher JO, Birch LL. Restricting access to palatable foods affects children's behavioral response, food selection and intake. *Am J Clin Nutr* 1999; 69: 1,264-1,272.

Fisher JO, Birch LL. Restricting access to foods and children's eating. *Appetite* 1999; 32: 405-419.

Fisher JO, Birch LL. Eating in the absence of hunger and overweight in girls from 5 to 7 y of age. *Am J Clin Nutr*. 2002 Jul;76(1):226-31.

Agras WS, Hammer LD, McNicholas F, Kraemer HC. Risk factors for childhood overweight: a prospective study from birth to 9.5 years. *J Pediatr*. 2004 Jul;145(1):20-5.

Baughcum AE, Powers SW, Johnson SB, Chamberlin LA, Deeks CM, Jain A, Whitaker RC. Maternal feeding practices and beliefs and their relationships to overweight in early childhood. *J Dev Behav Pediatr* 2001; 22: 391-408.

Johnson SL, Birch LL. Parents' and children's adiposity and eating style. *Pediatrics* 1994; 94: 653-661.

Koivisto U, Fellenius J, Sjoden. Relations between parental mealtime practices and children's food intake. *Appetite* 1994; 22: 245-258.

Robinson TN, Kiernan M, Matheson DM, Haydel KF. Is parental control over children's eating associated with childhood obesity? Results from a population-based sample of third graders. *Ob Res* 2001; 9: 306-312.

Saelens BE, Ernst MM, Epstein LH. Maternal child feeding practices and obesity: a discordant sibling analysis. *Int J Eat Disord* 2000; 27:459-463.

Sherman JB, Alexander MA, Dean AH, Kim M. Obesity in Mexican-American and Anglo children. *Prog Cardiovasc Nurs*. 1995 Winter;10(1):27-34.

Ebbeling CB, Sinclair KB, Pereira MA, Garcia-Lago E, Feldman HA, Ludwig DS. Compensation for energy intake from fast food among overweight and lean adolescents. *JAMA*. 2004 Jun 16;291(23):2828-33.

French SA, Story M, Neumark-Sztainer D, Fulkerson JA, Hannan P. Fast food restaurant use among adolescents: associations with nutrient intake, food choices and behavioral and psychosocial variables. *International Journal of*

Obesity. 2001:1823-1833.

Gillis LJ, Bar-Or O. Food away from home, sugar-sweetened drink consumption and juvenile obesity. *J Am Coll Nutr*. 2003 Dec;22(6):539-45.

Kelishadi R, Pour MH, Sarraf-Zadegan N, Sadry GH, Ansari R, Alikhassy H, Bashardoust N. Obesity and associated modifiable environmental factors in Iranian adolescents: Isfahan Healthy Heart Program - Heart Health Promotion from Childhood. *Pediatr Int*. 2003 Aug;45(4):435-42.

Lin BH, Huang CL, French SA. Factors associated with women's and children's body mass indices by income status. *Int J Obes Relat Metab Disord*. 2004 Apr;28(4):536-42.

Mikkila V, Lahti-Koski M, Pietinen P, Virtanen SM, Rimpela M. Associates of obesity and weight dissatisfaction among Finnish adolescents. *Publ Health Nutr* 2002;6:49-56.

Nicklas TA, Morales M, Linares A, Yang SJ, Baranowski T, De Moor C, Berenson G. Children's meal patterns have changed over a 21-year period: the Bogalusa Heart Study. *J Am Diet Assoc*. 2004; 104(5): 753-61

Pastore DR, Fisher M, Friedman SB. Abnormalities in weight status, eating attitudes, and eating behaviors among urban high school students: correlations with self-esteem and anxiety. *J Adolesc Health* 1996;18:312-9.

Sugimori H, Yoshida K, Izuno T, Miyakawa M, Suka M, Sekine M, Yamagami T, Kagamimori S. Analysis of factors that influence body mass index from ages 3 to 6 years: A study based on the Toyama cohort study. *Pediatr Int.* 2004 Jun;46(3):302-10.

Thompson OM, Ballew C, Resnicow K, Must A, Bandini LG, Cyr H, Dietz WH. Food purchased away from home as a predictor of change in BMI z-score among girls. *Int J Obes Relat Metab Disord*. 2004 Feb;28(2):282-9.

McConahy KL, Smiciklas-Wright H, Birch LL, Mitchell DC, Picciano MF. Food portions are positively related to energy intake and body weight in early childhood. *J Pediatr* 2002;140:340-347.

Berkey CS, Rockett HR, Gillman MW, Field AE, Colditz GA. Longitudinal study of skipping breakfast and weight change in adolescents. *Int J Obes Relat Metab Disord*. 2003 Oct; 27(10): 1,258-1,266.

Boutelle K, Neumark-Sztainer D, Story M, Resnick M. Weight control behaviors among obese, overweight, and nonoverweight adolescents. *J Pediatr Pscychol* 2002;27:531-40.

Dwyer JT, Evans M, Stone EJ, Feldman HA, Lytel L, Hoelscher D, Johnson C, Zive M, Yang M. CATCH Cooperative Research Group. Adolescents' eating patterns influence their nutrient intakes. *J Am Diet Assoc* 2001;101:798-802.

Lin BH, Huang CL, French SA. Factors associated with women's and children's body mass indices by income status. *Int J Obes Relat Metab Disord*. 2004 Apr;28(4):536-42.

Nicklas TA, Yang SJ, Baranowski T, Zakeri I, Berenson G. Eating patterns and obesity in children. The Bogalusa Heart Study. *Am J Prev Med*. 2003 Jul;25(1):9-16.

O'Dea JA, Caputi P. Association between socioeconomic status, weight, age and gender, and the body image and weight control practices of 6- to 19-year-old children and adolescents. *Health Educ Res* 2001;16:521-32.

Ortega RM, Requejo AM, López-Sobaler AM, Quintas ME, Andrés P, Redondo MR, Navia B, López-Bonilla MD, Rivas T. Difference in the breakfast habits of overweight/obese and normal weight schoolchildren. *Int J Vitam Nutr Res* 1998; 68:125-32.

Sampson AE, Dixit S, Meyers AF, Houser R Jr. The nutritional impact of breakfast consumption on the diets of inner-city African-American elementary school children. *J Natl Med Assoc* 1995;87:195-202.

Sekine M, Yamagami T, Hamanishi S, Handa K, Saito T, Nanri S, Kawaminami K, Tokui N, Yoshida K, Kagamimori S. Parental obesity, lifestyle factors and obesity in preschool children: results of the Toyama Birth Cohort study. *J Epidemiol* 2002;12:33-9.

Summerbell CD, Moody RC, Shanks J, Stock MJ, Geissler C. Relationship between feeding pattern and body mass index in 220 free-living people in four age groups. *European Journal of Clinical Nutrition* 1996;50:513-519.

Wolfe WS, Campbell CC, Frongillo EA, Haas JD, Melnik TA. Overweight schoolchildren in New York State: Prevalence and characteristics. *Am J Pub Health* 1994;84:807-813.

Crawley H, Summerbell C. Feeding frequency and BMI among teenagers aged 16-17 years. *Int J Obes,* 1997;21:159-161.

Bandini LG, Vu D, Must A, Cyr H, Goldberg A, Dietz WH. Comparison of high-calorie, low-nutrient-dense food consumption among obese and non-obese adolescents. *Obes Res* 1999;7:438-43.

Brewis A. Biocultural aspects of obesity in young Mexican schoolchildren. *Am J Hum Biol*. 2003 May-Jun;15(3):446-60.

Francis LA, Lee Y, Birch LL. Parental weight status and girls' television viewing, snacking, and body mass indexes. *Obes Res* 2003;11:143-51.

Locard E, Mamelle N, Billette A, Miginiac M, Munoz F, Rey S. Risk factors of obesity in a fiver year old population. Parental versus environmental factors. *Int J Obes* 1992;16:721-9.

Maffeis C, Provera S, Filippi L, Sidoti G, Schena S, Pinelli L, Tatò L. Distribution of food intake as a risk factor for childhood obesity. *Int J Obes* 2000;24:75-80.

Phillips SM, Bandini LG, Naumova EN, Cyr H, Colclough S, Dietz WH, Must A. Energy-dense snack food intake in adolescence: longitudinal relationship to weight and fatness. Obes Res. 2004;12:461-472.

Rockett HR, Berkey CS, Field AE, Colditz GA. Cross-sectional measurement of nutrient intake among adolescents in 1996. *Prev Med* 2001; 33:27-37.

Takahashi E, Yoshida K, Sugimori H, Miyakawa M, Izuno T, Yamagami T, Kagamimori S. Influence factors on the development of obesity in 3-year-old children based on the Toyama Study. *Prev Med* 1999;28:203-6.

Tanasescu M, Ferris AM, Himmelgreen DA, Rodriguez N, Pérez-Escamilla R. Biobehavioral factors are associated with obesity in Puerto Rican children. *J Nutr* 2000;130:1734-42.

Wardle J, Sanderson WS, Guthrie CA, Rapoport L, Plomin R. Parental feeding style and the intergenerational transmission of obesity risk. *Obes Res* 2002; 10: 453-462. *Twins Early Development Study*.

- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

  None.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Assessing Physical Activity and Sedentary Behaviors

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

  PWM: Sedentary Behaviors that Increase the Risk of Pediatric Overweight and Obesity

  Sedentary behaviors that may be associated with an *increase* in the risk of pediatric overweight and pediatric obesity and that should be included in Nutrition Assessment are: Excessive television viewing and excessive use of video games. ADA Evidence Analysis has shown that these factors are positively associated with childhood overweight and obesity.

  Rating: Fair
  Imperative

  PWM: Physical Activity Behaviors that Decrease the Risk of Pediatric Overweight and Obesity

  Physical activity behaviors that may be associated with a *decrease* in the risk of pediatric overweight and pediatric obesity and that should be included in Nutrition Assessment are: Regular physical activity and sports participation. ADA Evidence Analysis has shown that these factors may be negatively associated with childhood overweight and obesity.

  Rating: Fair
  Imperative

  - Risks/Harms of Implementing This Recommendation

    None.

  - Conditions of Application

    The above topics were selected for evidence analysis. However:

    - The practitioner should not limit their assessment to these factors
    - Modification of these factors should be considered when developing the nutrition prescription
    - Evidence analysis on other factors is currently underway and will be added to the guideline as they are finished.

  - Potential Costs Associated with Application

    None.

  - Recommendation Narrative

    - Evidence analysis was carried out on several physical activity and sedentary behavior factors associated with pediatric overweight and obesity
    - All factors are based only on observational (association) research and do not include research on interventions
    - The following physical activity and sedentary behavior factors were associated with an increased risk of pediatric overweight and obesity:
      - Excessive television viewing (Grade II)
      - Excessive use of video games (Grade III).
    - The following physical activity and sedentary behavior factors were associated with a decreased risk of pediatric overweight and obesity:
      - Regular physical activity (Grade II)
      - Sports participation (Grade III).

- Recommendation Strength Rationale

  No direct research was analyzed regarding the benefits of knowledge-based assessment and intervention practices. However, the work group felt strongly that knowledge of relevant scientific research is indispensable for responsible dietetic practice.

  The grades for the physical activity and sedentary behavior factors associated with childhood overweight and obesity were evenly split between Grade II and Grade III. However, while there is no risk to the patient or client, with respect to the practitioner's knowledge of these factors, the dietitian's ignorance of this research could result in substantial risk to the patient or client.

- Minority Opinions

  None.

- Supporting Evidence

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Is frequent television viewing associated with a higher risk or prevalence of overweight among youth?

Is frequent use of video games associated with a higher risk or prevalence of overweight among youth?

Is physical activity associated with a lower risk or prevalence of overweight among youth?

Does participation in sports or exercise programs reduce the risk or prevalence of overweight among youth?

- References

Andersen RE, Crespo CJ, Bartlet SJ, Cheskin LJ, Pratt M. Relationship of physical activity and television watching with body weight and level of fatness among children. *Journal of the American Medical Association.* 1998; 279: 938-942.

Ariza AJ, Chen EH, Binns HJ, Christoffel KK. Risk factors for overweight in five- to six-year-old Hispanic-American children: A pilot study. *J Urban Health* 2004;81:150-161.

Berkey CS, Rockett HRH, Field AE, Gillman MW, Frazier AL, Camargo CA, Colditz GA. Activity, dietary intake, and weight changes in a longitudinal study of preadolescent and adolescent boys and girls. *Pediatrics* 2000; 105: 1-9.

Berkey CS, Rockett HRH, Gillman MW, Colditz GA, 2003. One-year change in activity and in inactivity among 10 to 15 year old boys and girls: Relationship to change in body mass index. *Pediatrics.* 111 (4): 836-843.

Bogaert N, Steinbeck KS, Baur LA, Brock K, Bermingham MA. Food, activity and family--environmental vs biochemical predictors of weight gain in children. *Eur J Clin Nutr*. 2003 Oct;57(10):1242-9.

Brewis A. Biocultural aspects of obesity in young Mexican schoolchildren. *Am J Hum Biol*. 2003 May-Jun;15(3):446-60.

Crespo CJ, Smit E, Troiano RP, Bartlett SJ, Macera CA, Andersen RE. Television watching, energy intake, and obesity in US children. *Arch Pediatric Adolescent Medicine* 2001;155:360-65.

Crooks DL. Food consumption, activity, and overweight among elementary school children in an Appalachian Kentucky community. *American Journal of Physical Anthropology* 2000;112: 159-170

Dennison BA, Erb TA, Jenkins PL Television viewing and television in bedroom associated with overweight risk among low income preschool children. *Pediatrics*. 2002;109:1028-35.

Dietz WH, Gortmaker SL. Do we fatten our children at the television set? Obesity and television viewing in children and adolescents. *Pediatrics* 1985;75:807-812

Dowda, M., Ainsworth, B.E., Addy, C.L., Saunders, R. Riner, W. Environmental influences, physical activity, and weight status in 8 to 16 year-olds. *Archives of Pediatric and Adolescent Medicine* 2001; 155:711-717.

DuRant R, Baranowski T, Johnson M, Thompson W. The relationship among television watching, physical activity, and body composition of young children. *Pediatrics*. 1994;94:449-455.

Dwyer JT, Stone EJ, Yang M, Feldman H, Webber LS, Must A, Perry CL, Nader PR, Parcel GS. Predictors of overweight and overfatness in a multiethnic pediatric population *American Journal of Clinical Nutrition* 1998;67:602-610

Eisenmann, J.C., Bartee, R.T., Wang, M.Q. Physical activity, TV viewing and weight in U.S. youth: 1999 Youth Risk Behavior Survey. *Obesity Research* 2002; 10(5): 379-385

Felton, G.M., Dowda, M., Ward, D.S., Dishman, R.K., Trost, S.G., Saunders, R., & Pate, R.R. (2002). Differences in physical activity between black and white girls living in rural and urban areas. *Journal of School Health*, 72 (6), 250-255

Fontvieille AM, Kriska A, Ravussin E. Decreased physical activity in Pima Indian compared with Caucasian children. *International Journal of Obesity* 1993;17: 445-452.

Francis LA, Lee Y, Birch LL. Parental weight status and girls' television viewing, snacking, and body mass indexes. *Obes Res* 2003;11:143-51.

Giammattei J, Blix G, Marshah HH, Wollitzer AO, Pettitt DJ. Television watching and soft drink consumption: associations with obesity in 11- to 13-year old schoolchildren. *Arch Pediatr Adolesc Med* 2003;157:882-886.

Gordon-Larsen P, Adair LS, Popkin BM. Ethnic differences in physical activity and inactivity patterns and overweight status *Obesity Research* 2002; 10: 141-149.

Gordon-Larsen P. Obesity-related knowledge, attitudes, and behaviors in obese and non-obese urban Philadelphia female adolescents. *Obesity Research* 2001;9(2):112-18

Gray A., & Smith, C. (2003). Fitness, dietary intake, and body mass index in urban native American youth. *Journal of American Dietetic Association*, 103(9), 1187-1191.

Guillaume M, Lapidus L, Bjorntorp P, Lambert A. Physical activity, obesity and cardiovascular risk factors in children. The Belgian Luxembourg child study II. *Obesity Research* 1997; 5: 549-556.

Hanley AJG, Harris SB, Gittelsohn J, Wolever TMS, Saksvig B, Zinman B. Overweight among children and adolescents in a Native Canadian community: prevalence and associated factors. *Am J Clin Nutr*, 2000; 71: 693-700.

Hernandez B, Gortmaker SL, Colditz GA, Peterson KE, Laird LM, Parra-Cabrera S. Association of obesity with physical activity, television programs and other forms of video viewing among children in Mexico City. *International Journal of Obesity and Related Metabolic Disorders* 1999;23:845-854.

Horn OK, Paradis G, Potvin L, Macaulay AC, Desrosiers S. Correlates and predictors of adiposity among Mohawk children. *Preventive Medicine* 2001; 33: 274-281.

Janz KF, Levy SM, Burns TL, Torner JC, Willing MC, Warren JJ Fatness, physical activity, and television viewing in children during the adiposity rebound period: The Iowa bone development study. *Preventative Medicine* 2002;35:563-71

Katzmarzyk, P., Malina, R.M., Song, T.M., Bouchard, C. Television viewing, physical activity, and health related fitness of youth in the Quebec family study. *Journal of Adolescent Health* 1998; 23:318-325.

Kelishadi R, Pour MH, Sarraf-Zadegan N, Sadry GH, Ansari R, Alikhassy H, Bashardoust N. Obesity and associated modifiable environmental factors in Iranian adolescents: Isfahan Healthy Heart Program - Heart Health Promotion from Childhood. *Pediatr Int*. 2003 Aug;45(4):435-42.

Kimm SYS, Obarzanek E, Barton BA, Aston CE, Similo SL, Morrison JA, Sabry ZA, Schreiber GB, McMahon RP, 1996. Race, socioeconomic status, and obesity in 9- to 10- year old girls: The NHLBI growth and health study. Annual Epidemiology, 6 (4), 266-275.

Lin BH, Huang CL, French SA. Factors associated with women's and children's body mass indices by income status. *Int J Obes Relat Metab Disord*. 2004 Apr;28(4):536-42.

Locard E, Mamelle N, Billette A, Miginiac M, Munoz F, Rey S. Risk factors of obesity in a fiver year old population. Parental versus environmental factors. *Int J Obes* 1992;16:721-9.

Lowry, R., Wechsler, H., Galuska, A., Fulton, J.E., & Kann, L. Television viewing and its associations with overweight, sedentary lifestyle, and insufficient consumption of fruits and vegetables among US high school students: differences by race, ethnicity, and gender. *J Sch Health* 2002;72(10):413-421.

Maffeis C, Talamini G, Tato L. Influence of diet, physical activity and parents' obesity on children's adiposity: a four-year longitudinal study. *International Journal of Obesity and Related Metabolic Disorders* 1998;22: 758-764.

Maffeis C, Talamini G, Tato L. Influence of diet, physical activity and parents' obesity on children's adiposity: A four-year longitudinal study. *Int J Obes*. 1998; 22: 758-764.

McMurray RG, Harrell JS, Deng S, Bradley CB, Cox LM, Bangdiwala SI. The influence of physical activity, socioeconomic status, and ethnicity on the weight status of adolescents. *Obesity Research* 2000;8(2):130-39.

Muller MJ, Koertzinger I, Mast M, Langnase K, Grund A. Physical activity and diet in 5 and 7 years old children. Nutrition Society. 1999;2(3a):443-44.

Muller, MJ, Grund, A, Krause, H, Siewers, M, Bosy-Westphal, A, & Rieckert, H. Determinants of fat mass in prepubertal children. *Br J Nutr* 2002;88:545-554.

Neutzling, M.B., Taddei, J.A.A.C., & Gigante, D.P. Risk factors of obesity among Brazilian adolescents: a case-control study. *Public Health Nutr*. 2003 Dec;6(8):743-9.

Obarzanek E, Schreiber GB, et al. Energy intake and physical activity in relation to indexes of body fat: National heart, lung, and blood institute growth and health study. *American Journal of Clinical Nutrition* 1994; 60: 15-22.

O'Loughlin J, Gray-Donald K, Paradis G, Meshefedjian G One- and two-year predictors of excess weight gain among elementary schoolchildren in multiethnic, low-income, inner city neighborhoods. *American Journal of Epidemiology* 2000; 152: 739-746

Proctor MH, Moore LL, Gao D, Cupples LA, Bradlee ML, Hood MY, Ellison RC. Television viewing and change in body fat from preschool to early adolescence: The Framingham children's study. *International Journal of Obesity*. 2003; 27: 827-833.

Robinson TN, Hammer LD, Killen JD, Kraemer HC, Wilson DM, Hayward C, Taylor CB, 1993. Does television viewing increase obesity and reduce physical activity? Cross-sectional and longitudinal analyses among adolescent girls. Pediatrics, 91(2), 273-280.

Skinner JD, Bounds W, Carruth BR, Morris M, Ziegler P. Predictors of children's body mass index: A longitudinal study of diet and growth in children aged two to eight years. *Int J Obes Relat Metab Disord*. 2004 Apr; 28(4): 476-482.

Stettler, N., Signer, T.M., Suter, P.M. (2004). Electronic games and environmental factors associated with childhood obesity in Switzerland. *Obesity Research*, 12 (6), 896-903.

Storey ML, Forshee RA, Weaver AR, Sansalone WR. Demographic and lifestyle factors associated with body mass

index among children and adolescents. *Int J Food Sci Nutr* 2003; 54: 491-503.

Strauss RS, Knight J. Influence of the home environment on the development of obesity in children. *Pediatrics*. 1999 Jun;103(6):e85.

Sugimori H, Yoshida K, Izuno T, Miyakawa M, Suka M, Sekine M, Yamagami T, Kagamimori S. Analysis of factors that influence body mass index from ages 3 to 6 years: A study based on the Toyama cohort study. *Pediatr Int.* 2004 Jun;46(3):302-10.

Tanasescu M, Ferris AM, Himmelgreen DA, Rodriguez N, Pérez-Escamilla R. Biobehavioral factors are associated with obesity in Puerto Rican children. *J Nutr* 2000;130:1734-42.

Toyran M, Ozmert E, Yardakok K. Television viewing and its effect on physical health of school age children. *The Turkish Journal of Pediatrics* 2002; 44: 194-203.

Wake M, Hesketh K, Waters E. Television, computer use and body mass index in Australian primary school children. *Journal of Paediatric Child Health* 2003;39:130-34

Wardle J, Guthrie C, Sanderson S, Birch L, Plomin R. Food and activity preferences in children of lean and obese parents. *Int J Obes* 2001; 25: 971-7.

Dowda, M., Ainsworth, B.E., Addy, C.L., Saunders, R. Riner, W. Environmental influences, physical activity, and weight status in 8 to 16 year-olds. *Archives of Pediatric and Adolescent Medicine* 2001; 155:711-717.

Guillaume M, Lapidus L, Bjorntorp P, Lambert A. Physical activity, obesity and cardiovascular risk factors in children. The Belgian Luxembourg child study II. *Obesity Research* 1997; 5: 549-556.

Horn OK, Paradis G, Potvin L, Macaulay AC, Desrosiers S. Correlates and predictors of adiposity among Mohawk children. *Preventive Medicine* 2001; 33: 274-281.

Levin S, Lowry R, Brown DR, Dietz, WH. Physical activity and body mass index among US adolescents. *Archives of Pediatric and Adolescent Medicine*. 2003; 157: 816-820.

O'Loughlin J, Gray-Donald K, Paradis G, Meshefedjian G One- and two-year predictors of excess weight gain among elementary schoolchildren in multiethnic, low-income, inner city neighborhoods. *American Journal of Epidemiology* 2000; 152: 739-746

Salbe, AD., Weyer, C., Harper, I., Lindsay, RS., Ravussin, E., & Tataranni, A. Assessing risk factors for obesity between childhood and adolescence: II. Energy metabolism and physical activity. *Pediatrics* 2002;110:307-314.

- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

None.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Recommendations Summary

Pediatric Weight Management (PWM) Determination of Total Energy Expenditure

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

PWM: Option for Determining Energy Expenditure

If possible, RMR should be measured (e.g., indirect calorimetry). If RMR cannot be measured, then the equations for estimating total energy expenditure in overweight youth provided in the *2005 US Institutes of Medicine "Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (Macronutrients),* " may be used. Estimated energy needs should be based on Total Energy Expenditure (TEE--see below for TEE calculation).

Rating: Consensus
Conditional

PWM: Types of Energy Expenditure Indices

Total Energy Expenditure (TEE) is the sum of BEE (which includes a small component associated with arousal, as compared to sleeping), thermic effect of food, physical activity, thermoregulation, and the energy expended in depositing new tissues and in producing milk.

Basal energy expenditure (BEE) is determined by extrapolating BMR to 24 hours, expressed as kcal/24 h.

Basal metabolic rate (BMR) corresponds to the situation in which food and physical activity have minimal influence on metabolism. The BMR reflects the energy needed to sustain the metabolic activities of cells and tissues, plus the energy needed to maintain blood circulation, respiration, and gastrointestinal and renal processing (i.e., the basal cost of living).

PWM: Calculations for Total Energy Expenditure

TEE in Overweight Boys Ages 3 Through 18 Years in a Weight Maintenance Program

TEE = 114 – (50.9 × age [y]) + PA × (19.5 × weight [kg] + 1161.4 × height [m])

Where PA is the physical activity coefficient:

- PA = 1.00 if PAL is estimated to be = 1.0 < 1.4 (sedentary)
- PA = 1.12 if PAL is estimated to be = 1.4 < 1.6 (low active)
- PA = 1.24 if PAL is estimated to be = 1.6 < 1.9 (active)
- PA = 1.45 if PAL is estimated to be = 1.9 < 2.5 (very active)

TEE in Overweight Girls Ages 3 Through 18 Years in a Weight Maintenance Program

TEE = 389 – (41.2 × age [y]) + PA × (15.0 × weight [kg] + 701.6 × height [m])

Where PA is the physical activity coefficient:

- PA = 1.00 if PAL is estimated to be = 1.0 < 1.4 (sedentary)
- PA = 1.18 if PAL is estimated to be = 1.4 < 1.6 (low active)
- PA = 1.35 if PAL is estimated to be = 1.6 < 1.9 (active)
- PA = 1.60 if PAL is estimated to be = 1.9 < 2.5 (very active)

Evidence analysis not completed on pediatric population; not a recommendation.

- Risks/Harms of Implementing This Recommendation

  None

- Conditions of Application

  Use of the *2005 US Institutes of Medicine "Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (Macronutrients)* is suggested. However, the practitioner's clinical judgement should be used to determine the appropriate method of energy expenditure estimation.

- Potential Costs Associated with Application

  Measuring energy expenditure requires specialized equipment which may be cost prohibitive for some programs.

  If costs of the measurement of energy expenditure is passed along to families in the program, costs could be prohibitive to lower income families.

- Recommendation Narrative

  No evidence analysis was completed for this question at this stage.

- Recommendation Strength Rationale

  Consensus rating is based on the lack of evidence analysis carried out for pediatric weight management.

- Minority Opinions

  None

- Supporting Evidence

  The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

  - References
  - References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

  2005 US Institutes of Medicine "Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (Macronutrients)

  The reader who is interested in the details of the IOM Report's methods for creating the equations may find them at http://www.nap.edu/catalog/10490.html (especially chapter 5 and Appendix I).

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Assessing Family Climate Factors

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the

hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

PWM: Family Climate - Increased Risk of Overweight or Obesity

Family climate factors that may be associated with an **increase** in the risk of pediatric obesity and should be included in Nutrition Assessment are: Parental dietary disinhibition and restraint, negative aspects of family functioning (such as lack of parental support or over-possessiveness) and parental concern about child's weight status. ADA Evidence Analysis has shown that these factors are positively associated with childhood overweight or obesity.

Rating: Fair
Imperative

PWM: Family Climate - Decreased Risk of Overweight or Obesity

Family climate factors that may be associated with a **decrease** in the risk of pediatric obesity and should be included in Nutrition Assessment are: Positive aspects of family functioning (such as family cohesion, expressiveness, democratic style, parental support and cognitive stimulation at home). ADA Evidence Analysis has shown that these factors may be negatively associated with childhood overweight or obesity.

Rating: Fair
Imperative

PWM: Family Climate - Relationship Unclear

Dietitians should be aware of the research on the following family climate factor when carrying out their Nutrition Assessment: Household food insecurity. ADA Evidence Analysis has found that this factor **may not be related** to pediatric overweight or obesity or that the research **is still unclear on the relationship.**

Rating: Fair
Imperative

- Risks/Harms of Implementing This Recommendation

  None.

- Conditions of Application

  The above topics were selected for evidence analysis. However:

  - The practitioner should not limit her assessment to these factors
  - Modification of these factors should be considered when developing the nutrition prescription
  - Evidence analysis on other factors is currently underway and will be added to the guideline as they are finished.

- Potential Costs Associated with Application

  None.

- Recommendation Narrative

  - Evidence analysis was carried out on several family climate factors associated with pediatric overweight or obesity
  - All factors are based only on observational (association) research and do not include research on interventions
  - The following family climate factors were associated with an **increased risk** of pediatric overweight or obesity:
    - Parental dietary disinhibition and restraint (Grade III)
    - Negative aspects of family functioning such as lack of parental support or over-possessiveness (Grade III)
    - Parental concern about child's weight status (Grade II).
  - The following family climate factors were associated with a **decreased risk** of pediatric overweight or obesity:
    - Positive aspects of family functioning such as family cohesion, expressiveness, democratic style, parental support and cognitive stimulation at home (Grade III).
  - The following family climate factors **may not be related** to pediatric overweight or obesity. A relationship may or may not, in fact, exist, but research has not been able to determine this definitively.
    - Household food insecurity (Grade II).

- Recommendation Strength Rationale

  No direct research was analyzed regarding the benefits of knowledge-based assessment and intervention practices. However, the work group felt strongly that knowledge of relevant scientific research is indispensable for responsible dietetic practice.

  The majority of grades for the family climate factors associated with childhood overweight or obesity were a Grade III. However, while there is no risk to the patient or client with respect to the practitioner's knowledge of these factors, the dietitian's ignorance of this research could result in substantial risk to the patient or client.

- Minority Opinions

None.

- Supporting Evidence

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Are parental attitudes towards their own dietary intakes (Dietary restraint & disinhibition) associated with higher risk or prevalence of overweight among children?

Is family functioning associated with higher risk or prevalence of overweight among children?

Is parental concern about or criticism of their child's weight status associated with higher risk or prevalence of overweight among children?

What is the relationship between household food insecurity and childhood overweight?

- References

Cutting TM, Fisher JO, Grimm-Thomas K, Birch LL. Like mother, like daughter: Familial patterns of overweight are mediated by mothers' dietary disinhibition. *Am J Clin Nutr* 1999; 69: 608-613.

Davison KK, Birch LL. Obesigenic families: Parents' physical activity and dietary intake patterns predict girls' risk of overweight. *Int'l J Obes.* 2002; 26: 1,186-1,193.

Fisher JO, Birch LL. Restricting access to palatable foods affects children's behavioral response, food selection and intake. *Am J Clin Nutr* 1999; 69: 1,264-1,272.

Hood MY, Moore LL, Sundarajan-Ramamurti A, Singer M, Cupples LA, Ellison RC. Parental eating attitudes and the development of obesity in children. The Framingham Children's Study. *Int J Obes* 2000; 24: 1,319-1,325.

Johnson SL, Birch LL. Parents' and children's adiposity and eating style. *Pediatrics* 1994; 94: 653-661.

Alaimo K, Olson CM, Frongillo EA Jr. Low family income and food insufficiency in relation to overweight in US children. *Arch Pediatr Adolesc Med* 2001; 155:1161-1167.

Casey PH, Szeto K, Lensing S, Bogle M, Weber J. Children in food insufficient, low-income families: Prevalence, health, and nutrition status. *Arch Pediatr Adolesc Med* 2001;155:508-14.

Cutts DB, Pheley AM, Geppert JS. Hunger in Midwestern inner-city young children. *Arch Pediatr Adolesc Med* 1998;152:489-93.

Kaiser LL, Melgar-Quiñonez HR, Lamp CL, Johns MC, Sutherlin JM, Harwood JO. Food security and nutritional outcomes of preschool-age Mexican-American children. *J Am Diet Assoc* 2002; 102: 924-929.

Matheson DM, Varady J, Varady A, Killen JD. Household food security and nutritional status of Hispanic children in the fifth grade. *Am J Clin Nutr* 2002;76:210-7.

Melgar-Quinonez HR, Kaiser LL. Relationship of child-feeding practices to overweight in low-income Mexican-American preschool-aged children. *J Am Diet Assoc.* 2004 Jul;104(7):1110-9.

Tanasescu M, Ferris AM, Himmelgreen DA, Rodriguez N, Pérez-Escamilla R. Biobehavioral factors are associated with obesity in Puerto Rican children. *J Nutr* 2000;130:1734-42.

Lissau I, Breum L, Sorensen TIA. Maternal attitude to sweet eating habits and risk of overweight in offspring: a ten-year prospective population study. *Int J Obes* 1993; 17: 125-129.

Lissau I, Sorensen TIA. Parental neglect during childhood and increased risk of obesity in young adulthood. *Lancet* 1994; 343: 324-328.

Mendelson BK, White DR, Schliecker E. Adolescents' weight, sex and family functioning. *Int J Eat Disord* 1995; 17: 73-79.

Strauss RS, Knight J. Influence of the home environment on the development of obesity in children. *Pediatrics*. 1999 Jun;103(6):e85.

Trombini E, Baldaro B, Bertaccini R, Mattei C, Montebarocci O, Rossi N. Maternal attitudes and attachment styles in mothers of obese children. *Percept Mot Skills.* 2003 Oct;97(2):613-20.

Valtolina GG, Marta E. Family relations and psychosocial risk in families with an obese adolescent. *Psychological Reports* 1998; 83: 251-260.

Agras WS, Hammer LD, McNicholas F, Kraemer HC. Risk factors for childhood overweight: a prospective study from birth to 9.5 years. *J Pe*diatr. 2004 Jul;145(1):20-5.

Birch LL, Fisher JO, Davison KK. Learning to overeat: maternal use of restrictive feeding practices promotes girls' eating in the absence of hunger. *Am J Clin Nutr*. 2003 Aug;78(2):215-20.

Brewis A. Biocultural aspects of obesity in young Mexican schoolchildren. *Am J Hum Biol*. 2003 May-Jun;15(3):446-60.

Davison KK, Birch LL. Weight status, parent reaction, and self-concept in five-year-old girls. *Pediatrics* 2001; 107: 46-53.

Davison KK, Birch LL. Processes linking weight status and self-concept among girls from ages 5 to 7 years. *Developmental Psychology*. 2002; 38: 735-748.

Kelishadi R, Pour MH, Sarraf-Zadegan N, Sadry GH, Ansari R, Alikhassy H, Bashardoust N. Obesity and associated

modifiable environmental factors in Iranian adolescents: Isfahan Healthy Heart Program - Heart Health Promotion from Childhood. *Pediatr Int*. 2003 Aug;45(4):435-42.

Spruijt-Metz D, Lindquist CH, et.al. Relation between mothers' child-feeding practices and children's adiposity. *Am J Clin Nutr*. 2002;75:581-586.

- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

None.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Nutrition Prescription in the Treatment of Pediatric Obesity

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

PWM: Nutrition Prescription

A nutrition prescription should be formulated as part of the dietary intervention in a multi-component pediatric weight-management program. The exact specification of nutrients and energy is often translated into a specific eating plan. Nutrition interventions are selected based on the nutrition prescription. Research shows that when an individualized nutrition prescription is included, improvements in weight status in children and adolescents are consistent. When an individualized nutrition prescription is not included, results are less consistent.

Rating: Strong
Imperative

- Risks/Harms of Implementing This Recommendation

None.

- Conditions of Application

The patient's or client's individualized recommended dietary intake of energy and selected foods or nutrients should be based on current reference standards and dietary guidelines and the patient's or client's health condition and nutrition diagnosis.

Before starting a prescribed diet plan that will be hypocaloric, the child or adolescent should have a complete medical exam performed by a qualified medical provider, who should also approve of the child or adolescent being placed on this individualized diet.

To be able to provide a prescribed diet plan, the registered dietitian needs to have accurate measurements of height and weight. The registered dietitian should be familiar with ways of estimating energy needs of children and adolescents who suffer from pediatric overweight or pediatric obesity. Whenever possible, direct measurement of energy requirements should be obtained through indirect calorimetry, although this technique may not be readily available to most dietitians (see Determining Energy Needs in Overweight Children and Adolescents).

The prescribed diet plan should be discussed with the child as well as his or her caregivers, and the family's habits as well as any cultural or religious restrictions should be taken into account when prescribing dietary changes.

Close follow-up of the child or adolescent is essential when prescribing an individualized diet plan, with scheduled visits with the registered dietitian to discuss progress and measure weight. Depending on the child's or adolescent's progress, changes should be made to the prescribed diet plan.

- Potential Costs Associated with Application

Designing, providing and following-up on a prescribed diet plan will require additional time from the registered dietitian, thus adding to the cost of the program. This additional time and costs may stress the budget of existing programs.

If program costs are passed on directly to patients, this may limit access for patients and their families who do not have health insurance coverage.

Absence of health insurance coverage for weight management could limit program access.

- Recommendation Narrative

The majority of research identified on multi-component weight-management programs for children and adolescents appeared to include individualized dietary recommendations (that is, dietary recommendations which were based on differences in sex, age, weight, etc.).

- When both a decrease as well as stabilization in weight status are taken together as positive outcomes, the large majority of the 39 studies analyzed indicates that a prescribed diet plan is associated with positive outcomes in children ages six to 12. Research on adiposity outcomes one year or more from post-treatment indicate that the use of a prescribed a diet plan is associated with longer-term improvement in adiposity outcomes (Grade I).
- All seven studies (13 treatment arms) of outcomes with adolescents indicate that the use of a prescribed diet plan is associated with positive longer-term outcomes, with the majority of treatment arms demonstrating a longer-term (more than one year) decrease in adiposity (Grade I).

- Recommendation Strength Rationale

  The evidence for positive outcomes was much stronger when a prescribed diet plan was used (Grade I for both children and adolescents). In contrast, the evidence of the effectiveness of diet interventions that did not include prescribed diet plans (but only nutrition education) was weak (Grade III for children and Grade II for adolescents).

- Minority Opinions

  None.

- Supporting Evidence

  The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

  What is the effectiveness of using a prescribed dietary plan as part of an intervention program for child (ages 6-12) obesity?

  What is the effectiveness of using a prescribed dietary plan as part of an intervention program for adolescent (ages 13-18) obesity?

- References

Epstein LH, Gordy CC, Raynor HA, Beddome M, Kilanowski CK, Paluch R. Increasing fruit and vegetable intake and decreasing fat and sugar intake in families at risk for childhood obesity. *Obes Res*. 2001 Mar;9(3):171-8.

Epstein LH, Paluch RA, Gordy CC, Dorn J. Decreasing sedentary behaviors in treating pediatric obesity. *Arch Pediatr Adolesc Med* 2000; 154 (3):220-6.

Epstein LH, Paluch RA, Gordy CC, Saelens BE, Ernst MM. Problem solving in the treatment of childhood obesity. *J Consult Clin Psychol* 2000;68:717-21.

Epstein LH, Paluch RA, and Raynor HA. Sex Differences in Obese Children and Siblings in Family-based Obesity Treatment. *Obesity Research* 2001;9:746-753

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year follow-up of behavioral, family-based treatment for obese children. *JAMA* 1990; 264: 2519-2523.

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year outcomes of behavioral family-based treatment for childhood obesity. *Health Psychology*. 1994, 13:373-383.

Epstein LH, Valoski AM, Vara LS, McCurley J, Wisniewski L, Kalarchian MA, Klein KR, Shrager LR. Effects of decreasing sedentary behavior and increasing activity on weight change in obese children. *Health Psychol* 1995;14:109-15.

Epstein LH, Wing RR, Koeske R, and Valoski A. Effect of parent weight on weight loss in obese children. *Journal of Consulting and Clinical Psychology*. 54(3): 400-401, 1986.

Epstein LH, Wing RR, Koeske R, Valoski A. Effects of diet plus exercise on weight change in parents and children. *Journal of Consulting and Clinical Psychology* 1984; 52:429-437.

Epstein LH, Wing RR, Koeske R, Valoski A. A Comparison of Lifestyle Exercise, Aerobic Exercise, and Calisthenics on Weight Loss in Obese Children. *Behavior Therapy* 1985;16;345-56.

Epstein LH, Wing RR, Penner BC, Kress MJ. Effect of diet and controlled exercise on weight loss in obese children. *J Pediatr* 1985;107:358-61.

Figueroa-Colon R, von Almen TK, Franklin FA, Schuftan C, Suskind RM. Comparison of two hypocaloric diets in obese children. Am J Dis Child. 1993 Feb;147(2):160-6.

Flodmark CE, Ohlsson T, Ryden O, Sveger T. Prevention of progression to severe obesity in a group of obese schoolchildren treated with family therapy. *Pediatrics* 1993; 91: 880-84.

Golan M, Weizman A, Apter A, Fainaru M. Parents as the exclusive agents of change in the treatment of childhood obesity. Am J Clin Nutr 1998;67:1130-1135.

Goldfield GS, Epstein LH, Kilanowski CK, Paluch RA, Kogut-Bossler B. Cost-effectiveness of group and mixed family-based treatment for childhood obesity. *Int J Obes Relat Metab Disord*. 2001 Dec;25(12):1843-9.

Graves T, Meyers AW, Clark L. An evaluation of parental problem-solving training in the behavioral treatment of childhood obesity. *Journal of Consulting and Clinical Psychology* 1988; 56:246-250.

Levine, M., Ringham, R., Kalarchian, M., Wisniewski, L., and Marcus, M. Is family-based behavioral weight control appropriate for severe pediatric obesity? *Int J Eat Disord*. 2001 Nov;30(3):318-28.

Nuutinen O, and Knip M. Long-term weight control in obese children: persistence of treatment outcome and metabolic changes. *International Journal of Obesity* 1992;16:279-287.

Nuutinen O. Long-term effects of dietary counseling on nutrient intake and weight loss in obese children. *Eur J Clin Nutr*. 1991 Jun;45(6):287-97.

Sothern, M., Loftin, M., Udall, J., Suskind R., Ewing, T., Tang, S., & Blecker, U. Safety, feasibility and efficacy of a resistance training program in preadolescent obese children. *American Journal of the Medical Sciences*, 2000; 319: 370-375.

Young P, West S, Ortiz K, Carlson J. A pilot study to determine the feasibility of the low glycemic diet as a treatment for overweight children in primary care practice. Ambulatory Pediatrics 2004;4:28-33.

Brown R, Sothern M, Suskind R, Udall J, Blecker U. Racial differences in the lipid profiles of obese children and adolescents before and after significant weight loss. *Clinical Pediatrics* 2000; 39: 427-431.

Chen W, Chen SC, Hsu HS, Lee C. Counseling clinic for pediatric weight reduction: program formulation and follow-up. *J Formos Med Assoc* 1997; 96 59-62.

Ebbeling CB, Leidig MM, Sinclair KB, Hangen JP, and Ludwig DS. A Reduced–Glycemic Load Diet in the Treatment of Adolescent Obesity. *Arch Pediatr Adolesc Med* 2003;157:773-779.

Eliakim A, Friedland O, Kowen G, Wolach B, Nemet D. Parental obesity and higher pre-intervention BMI reduce the likelihood of a multidisciplinary childhood obesity program to succeed--a clinical observation. *J Pediatr Endocrinol Metab*. 2004 Aug;17(8):1055-61.

Eliakim A, Kaven G, Berger I, Friedland O, Wolach B, Nemet D. The effect of a combined intervention on body mass index and fitness in obese children and adolescents-a clinical experience. *Eur J Pediatr*. 2002; 161:449-454

Golan M, Crow S. Targeting parents exclusively in the treatment of childhood obesity: long-term results. *Obes Res* 2004;12:357-361.

Maffiuletti NA, De Col A, Agosti F, Ottolini S, Moro D, Genchi M, Massarini M, Lafortuna CL, Sartorio A. Effect of a 3-week body mass reduction program on body composition, muscle function and motor performance in pubertal obese boys and girls. *J Endocrinol Invest*. 2004 Oct;27(9):813-20.

Nuutinen O. Long-term effects of dietary counseling on nutrient intake and weight loss in obese children. *Eur J Clin Nutr*. 1991 Jun;45(6):287-97.

Rocchini AP, Katch V, Anderson J, Hinderliter J, Becque D, Martin M, Marks C. Blood Pressure in Obese Adolescents: Effect of Weight Loss. *Pediatrics* 1988;82:16-23.

Rolland-Cachera MF, Thibault H, Souberbielle JC, Soulie D, Carbonel P, Deheeger M, Roinsol D, Longueville E, Bellisle F, Serog P. Massive obesity in adolescents: dietary interventions and behaviours associated with weight regain at 2 y follow-up. *Int J Obes Relat Metab Disord*. 2004 Apr;28(4):514-9.

Saelens B, Sallis J, Wilfley D, Patrick K, Cella J, and Buchta R. Behavioral Weight Control for Overweight Adolescents Initiated in Primary Care. *Obesity Research* 2002;10:22-32

Schwingshandl J, Sudi K, et al. Effect of an individualized training programme during weight reduction on body composition: a randomized trial. *Arch Dis Child* 1999; 81:426-8.

Sondike SB, Copperman N, Jacobson MS. Effects of a low-carbohydrate diet on weight loss and cardiovascular risk factor in overweight adolescents. *J Pediatr* 2003; 142: 253-8.

Sothern, M., Hunter, S., Suskind R., Brown, R., Udall, J. and Blecker, U. Motivating the obese child to move: the role of structured exercise in pediatric weight management. *Southern Medical Journal* 1999; 92: 577-584.

Sothern, M., Despinasse, B., Brown, R., Suskind, R., Udall, J. and Blecker, U. Lipid profiles of obese children and adolescents before and after significant weight loss: differences according to sex. *Southern Medical Journal* 2000; 93: 278-282.

Sothern, M., Schumacher, H., von Almen, T., Carlisle, L., & Udall, J. Committed to Kids: an integrated, four level team approach to weight management in adolescents. *Journal of the American Dietetic Association* 2002;102:S81-S85.

Sothern, M., Udall, J. Suskind, R., Vargas, A., & Blecker, U. Weight loss and growth velocity in obese children after very low calorie diet, exercise and behavior modification. *Acta Paediatrica*, 2000; 89(9): 1036-43.

Spieth L, Harnish J, Lenders C, Raezer L, Pereira M, Hangen SJ, Ludwig D. A Low-Glycemic Index Diet in the Treatment of Pediatric Obesity *Arch Pediatr Adolesc Med* 2000;154:947-951

Wadden, T., Stunkard, A., Rich, L., Rubin, C., Sweidel, G, McKinney, S. Obesity in black adolescent girls: a controlled clinical trial of treatment by diet, behavior modification, and parental support. *Pediatrics*. 1990, 85(3): 345-352.

- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

International Dietetics & Nutrition Terminology (IDNT) Reference Manual: Standardized Language for the Nutrition Care Process 2007. American Dietetic Association.

Everyone: For information about how to purchase the book, *International Dietetics & Nutrition Terminology (IDNT) Reference Manual: Standardized Language for the Nutrition Care Process* (pictured above), click here to go to the EAL Resources section.

ADA Members only: Click here for the link to the Research page on the ADA website **members** page where you can find 12 presentations about the Nutrition Care Process.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Energy Restricted Diets

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

PWM: Energy Restricted Diets - Children Six to 12 Years Old

If energy-restriction is appropriate, based on the registered dietitian's professional judgment, then a **balanced macro-nutrient diet** that contains no fewer than 900kcal per day is recommended to improve weight status within a multi-component pediatric weight management program in **children ages six to 12,** who are medically monitored. Research indicates that balanced macro-nutrient diets at 900kcal to 1, 200kcal per day are associated with both short-term and longer-term (more than one year) improved weight status and body composition among six- to 12-year-old children.

Rating: Strong
Conditional

PWM: Energy Restricted Diets - Adolescents

If energy-restriction is appropriate, based on the registered dietitian's professional judgment, then a balanced macro-nutrient diet that contains no fewer than 1, 200kcal per day is recommended to improve weight status within a multi-component pediatric weight-management program in **adolescents** (ages 13 to 18), who are medically monitored. Research indicates that energy-restricted balanced macro-nutrient diets no lower than 1, 200kcal per day are associated with both short-term and longer-term (more than one year) improved weight status and body composition among 13- to 18-year-old adolescents.

Rating: Strong
Conditional

Note: A balanced macro-nutrient diet for children is defined by the DRI in terms of the following percentage of daily energy intake: Carbohydrates (45% to 65%), protein (10% to 35%), fat (20% to 35%).

- Risks/Harms of Implementing This Recommendation

  Children and adolescents on energy-restricted diets should be monitored for adequate micro-nutrient intake as well as adequate growth and development.

- Conditions of Application

  Patient, family and caregiver goals should be considered in determining treatment goals.

- Potential Costs Associated with Application

  - Longer-term (more than one year) participation in a weight-management program may be necessary to sustain improvement in weight status and body composition. However, longer-term participation increases costs both for the program and to the patient.
  - If organizational and program costs are passed on to participants, this could limit program access. Additionally, parent commitment to program participation is required.
  - The absence of health insurance coverage for weight management could limit program access.

- Recommendation Narrative

  While balanced macro-nutrient, reduced-calorie diets (over 1, 200kcal to the recommended kcal-per-day level, per DRI) were inconsistent in their results (Grade III) in children (ages six to 12), using a balanced macro-nutrient, low-calorie diet (900kcal to 1, 200kcal per day), as part of a multi-component weight-management program, showed consistent reduction in adiposity measures, both short-term and longer-term (Grade I).

  In adolescents, if stabilization of weight is taken as the minimum measure of effectiveness, then eight of the nine treatment arms examined indicate that a balanced macro-nutrient, calorie-deficit diet (more than 1, 200kcal to recommended kcal-per-day level, per DRI) is effective in the short-term for treatment of adolescent obesity (Grade I). However, in all cases where follow-up occurred, adolescents had gained some if not all of their weight back.

  In 2007, an Expert Committee (appointed by the American Medical Association, in collaboration with the Health Resources and Service Administration and the Centers for Disease Control and Prevention) produced a report on the Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity (Sarah E. Barlow and and the Expert Committee. Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report. Pediatrics 2007;120;S164-S192).

  The ADA Evidence Analysis Work Group on Pediatric Weight Management (focused on the treatment of childhood obesity) completed the evidence analysis on a series of childhood obesity topics (ADA Pediatric Weight

Management Evidence Analysis Project) and released their Evidence-Based Pediatric Weight Management Nutrition Practice Guideline in Summer 2007. The Work Group determined, at the time of the ADA guidelines were created, that recommendations of the Expert Committee would be used to supplement the ADA Pediatric Weight Management Guideline, as there were a few topical areas where there was insufficient research to make strong evidence-based recommendations.

In cases where there was a paucity of research, the ADA Work Group followed the Expert Committee's recommendations. In only one case did the Expert Committee's recommendation differ from the ADA Work Group's recommendation. This is with regard to energy intake recommendations for treatment of pediatric obesity within a medically-supervised, multi-component pediatric weight-management program.

Different Energy Intake Recommendations

Even though the ADA Work Group and the Expert Committee examined the same body of research, the Expert Committee decided to exclude a body of research by Epstein, et al. This influenced their recommendation for energy intake in treating obesity in children (ages six to 12). The Expert Committee treated this body of research separately from the research used to formulate their major recommendation and did not include the results of this research as part of their final recommendation. In the Expert Committee's words:

> "Because the research by Epstein et al focused primarily on white, middle-class, intact families with younger children (6–12 years of age), it is...unclear how well results may be generalized beyond this population." (p.261).

The ADA Work Group also treated the Epstein et al research separately (using the Traffic Light Diet). However, the ADA Work Group determined that challenges to generalizability for this research were no more serious than much of the other research on this topic. Thus, the ADA Work Group included the research on the Traffic Light Diet as part of the basis for formulating its recommendation for energy intake in children (ages six to 12 years).

Comparison of the Two Groups' Recommendations

- *ADA*
  - PWM: Energy-restricted diets; children six to 12 years old
    - If energy restriction is appropriate, based on the registered dietitian's professional judgment, then a balanced macro-nutrient diet that contains no fewer than 900kcal per day is recommended to improve weight status within a multi-component pediatric weight-management program in children ages six to 12 who are medically monitored
    - Research indicates that balanced macro-nutrient diets at 900kcal to 1, 200kcal per day are associated with both short-term and longer-term (over one year) improved weight status and body composition among six- to 12-year-old children
    - *Grade:* Strong
    - Conditional.
- *Expert Committee*
  - Although the outcomes are mixed, evidence does suggest that, in both the short term and the long term, a reduced-energy diet [less energy than required to maintain weight, but not less than 1, 200kcal (5, 040kJ per day)] may be an effective part of a multi-component weight-management program in children six to 12 years of age. (Spear BA, Barlow SE, Ervin C, Ludwig DS, Saelens BE, Schetzina KE, Taveras EM. Recommendations for treatment of child and adolescent overweight and obesity. *Pediatrics.* 2007, Dec; 120 Suppl 4: S254-288. p.260).

- Recommendation Strength Rationale

  - The evidence for short- and longer-term (more than one year) improvement in adiposity status for children (ages six to 12) was given a Grade I, according to ADA evidence standards
  - The evidence for short-term (under one year) improvement in adiposity status for adolescents (ages 13 to 18) was given a Grade I, according to ADA evidence standards.

- Minority Opinions

  None.

- Supporting Evidence

  The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

  In children ages 6-12, what is the effectiveness of using balanced macronutrient, low calorie (900-1200 kcal per day) dietary interventions for treating childhood obesity?

  In children ages 6-12, what is the effectiveness of using balanced macronutrient, reduced calorie (>1200 kcal-DRI per day) dietary interventions for treating childhood obesity?

  In adolescents, what balanced macronutrient dietary interventions are effective in treating obesity?

  - References

    Chen W, Chen SC, Hsu HS, Lee C. Counseling clinic for pediatric weight reduction: program formulation and follow-up. *J Formos Med Assoc* 1997; 96 59-62.

    Ebbeling CB, Leidig MM, Sinclair KB, Hangen JP, and Ludwig DS. A Reduced–Glycemic Load Diet in the Treatment of Adolescent Obesity. *Arch Pediatr Adolesc Med* 2003;157:773-779.

    Eliakim A, Friedland O, Kowen G, Wolach B, Nemet D. Parental obesity and higher pre-intervention BMI reduce the likelihood of a multidisciplinary childhood obesity program to succeed--a clinical observation. *J Pediatr Endocrinol Metab*. 2004 Aug;17(8):1055-61.

    Eliakim A, Kaven G, Berger I, Friedland O, Wolach B, Nemet D. The effect of a combined intervention on body mass index and fitness in obese children and adolescents-a clinical experience. *Eur J Pediatr*. 2002; 161:449-454

Epstein LH, Gordy CC, Raynor HA, Beddome M, Kilanowski CK, Paluch R. Increasing fruit and vegetable intake and decreasing fat and sugar intake in families at risk for childhood obesity. *Obes Res*. 2001 Mar;9(3):171-8.

Epstein LH, Paluch RA, Gordy CC, Dorn J. Decreasing sedentary behaviors in treating pediatric obesity. *Arch Pediatr Adolesc Med* 2000; 154 (3):220-6.

Epstein LH, Paluch RA, Gordy CC, Saelens BE, Ernst MM. Problem solving in the treatment of childhood obesity. *J Consult Clin Psychol* 2000;68:717-21.

Epstein LH, Paluch RA, and Raynor HA. Sex Differences in Obese Children and Siblings in Family-based Obesity Treatment. *Obesity Research* 2001;9:746-753

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year follow-up of behavioral, family-based treatment for obese children. *JAMA* 1990; 264: 2519-2523.

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year outcomes of behavioral family-based treatment for childhood obesity. *Health Psychology*. 1994, 13:373-383.

Epstein LH, Valoski AM, Vara LS, McCurley J, Wisniewski L, Kalarchian MA, Klein KR, Shrager LR. Effects of decreasing sedentary behavior and increasing activity on weight change in obese children. *Health Psychol* 1995;14:109-15.

Epstein LH, Wing RR, Koeske R, and Valoski A. Effect of parent weight on weight loss in obese children. *Journal of Consulting and Clinical Psychology*. 54(3): 400-401, 1986.

Epstein LH, Wing RR, Koeske R, Valoski A. Effects of diet plus exercise on weight change in parents and children. *Journal of Consulting and Clinical Psychology* 1984; 52:429-437.

Epstein LH, Wing RR, Koeske R, Valoski A. A Comparison of Lifestyle Exercise, Aerobic Exercise, and Calisthenics on Weight Loss in Obese Children. *Behavior Therapy* 1985;16;345-56.

Epstein LH, Wing RR, Penner BC, Kress MJ. Effect of diet and controlled exercise on weight loss in obese children. *J Pediatr* 1985;107:358-61.

Epstein, L, Valoski A, Kalarchian M, et al. Do children lose and maintain weight easier than adults: a comparison of child and parent weight changes from six months to ten years. *Obes Res* 1995; 3:411-417.

Figueroa-Colon R, von Almen TK, Franklin FA, Schuftan C, Suskind RM. Comparison of two hypocaloric diets in obese children. Am J Dis Child. 1993 Feb;147(2):160-6.

Flodmark CE, Ohlsson T, Ryden O, Sveger T. Prevention of progression to severe obesity in a group of obese schoolchildren treated with family therapy. *Pediatrics* 1993; 91: 880-84.

Golan M, Crow S. Targeting parents exclusively in the treatment of childhood obesity: long-term results. *Obes Res* 2004;12:357-361.

Golan M, Weizman A, Apter A, Fainaru M. Parents as the exclusive agents of change in the treatment of childhood obesity. Am J Clin Nutr 1998;67:1130-1135.

Goldfield GS, Epstein LH, Kilanowski CK, Paluch RA, Kogut-Bossler B. Cost-effectiveness of group and mixed family-based treatment for childhood obesity. *Int J Obes Relat Metab Disord*. 2001 Dec;25(12):1843-9.

Graves T, Meyers AW, Clark L. An evaluation of parental problem-solving training in the behavioral treatment of childhood obesity. *Journal of Consulting and Clinical Psychology* 1988; 56:246-250.

Levine, M., Ringham, R., Kalarchian, M., Wisniewski, L., and Marcus, M. Is family-based behavioral weight control appropriate for severe pediatric obesity? *Int J Eat Disord*. 2001 Nov;30(3):318-28.

Maffiuletti NA, De Col A, Agosti F, Ottolini S, Moro D, Genchi M, Massarini M, Lafortuna CL, Sartorio A. Effect of a 3-week body mass reduction program on body composition, muscle function and motor performance in pubertal obese boys and girls. *J Endocrinol Invest*. 2004 Oct;27(9):813-20.

Nuutinen O. Long-term effects of dietary counseling on nutrient intake and weight loss in obese children. *Eur J Clin Nutr*. 1991 Jun;45(6):287-97.

Rolland-Cachera MF, Thibault H, Souberbielle JC, Soulie D, Carbonel P, Deheeger M, Roinsol D, Longueville E, Bellisle F, Serog P. Massive obesity in adolescents: dietary interventions and behaviours associated with weight regain at 2 y follow-up. *Int J Obes Relat Metab Disord*. 2004 Apr;28(4):514-9.

Maffiuletti NA, De Col A, Agosti F, Ottolini S, Moro D, Genchi M, Massarini M, Lafortuna CL, Sartorio A. Effect of a 3-week body mass reduction program on body composition, muscle function and motor performance in pubertal obese boys and girls. *J Endocrinol Invest*. 2004 Oct;27(9):813-20.

Rolland-Cachera MF, Thibault H, Souberbielle JC, Soulie D, Carbonel P, Deheeger M, Roinsol D, Longueville E, Bellisle F, Serog P. Massive obesity in adolescents: dietary interventions and behaviours associated with weight regain at 2 y follow-up. *Int J Obes Relat Metab Disord*. 2004 Apr;28(4):514-9.

Saelens B, Sallis J, Wilfley D, Patrick K, Cella J, and Buchta R. Behavioral Weight Control for Overweight Adolescents Initiated in Primary Care. *Obesity Research* 2002;10:22-32

Sondike SB, Copperman N, Jacobson MS. Effects of a low-carbohydrate diet on weight loss and cardiovascular risk factor in overweight adolescents. *J Pediatr* 2003; 142: 253-8.

Wadden, T., Stunkard, A., Rich, L., Rubin, C., Sweidel, G, McKinney, S. Obesity in black adolescent girls: a controlled clinical trial of treatment by diet, behavior modification, and parental support. *Pediatrics*. 1990, 85(3): 345-352.

- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

Institute of Medicine, Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (available at http://www.iom.edu/CMS/3788/4576/4340.aspx).

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Reduced Glycemic Load Diet

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

PWM: Reduced Glycemic Load Diet - Children Six to 12 Years

If an ad libitum, reduced glycemic load diet is selected for use in **children (ages six to 12)**, then this diet could be used to produce modest short-term improvement in weight status. Limited research shows that an ad libitum reduced glycemic load diet results in short-term improvement in weight status in this age group.

Rating: Weak
Conditional

PWM: Reduced Glycemic Load Diet - Adolescents

If an ad libitum reduced glycemic load diet is selected for use in **adolescents (ages 13 to 18)**, then this diet could be used to produce modest short-term and longer-term improvement in weight status and body composition. Limited research shows that an ad libitum reduced glycemic load diet results in short-term improvement in weight status and body composition in this age group. One study shows weight status improvement at one year.

Rating: Fair
Conditional

- Risks/Harms of Implementing This Recommendation

  None.

- Conditions of Application

  Parents or caregivers of obese children need to participate in the counseling process.

- Potential Costs Associated with Application

  - The use of specialized commercial food products to implement this diet could be an additional cost
  - If organizational and program costs are passed on to participants, this could limit program access. Additionally, parent commitment to program participation is required.
  - The absence of health insurance coverage for weight management could limit program access.

- Recommendation Narrative

  Three studies were identified that met inclusion criteria for treatment of childhood obesity using a low glycemic load diet. In all three studies (Ebbeling CB, Leidig MM et al, 2003; Spieth L, Harnish J et al, 2000; Young, West et al, 2004), results showed an improvement in anthropometric outcomes measured by BMI. However, only Ebbeling et al showed long-term improvement, in one-year follow-up data, of anthropometric outcomes.

  In the analysis of six studies (Ludwig DS, Majzoob et al, 1999; Ball SD, Keller KR et al, 2003; Ebbeling CB, Leidig MM et al, 2003; Warren, Henry et al, 2003; Young, West et al, 2004; Spieth L, Harnish J et al, 2000), which prescribed an ad libitum low glycemic diet or meal to their subjects, all studies that reported the actual intake showed a reduction in caloric intake (compared to either baseline calorie intake or higher glycemic load diet).

  Thus, it is likely that one of the reasons low glycemic diets may bring about weight loss is simply that this type of diet brings about a reduced caloric intake. In the Ebbeling et al study, both groups, the low-fat hypocaloric diet and the ad libitum low glycemic diet, demonstrated a reduction in energy intake from baseline to follow-up. However, the low glycemic diet group was able to demonstrate long-term weight loss, while the low-fat hypocaloric group regained the lost weight.

- Recommendation Strength Rationale

  1. Both conclusion statements are given Grade III
  2. All studies had small numbers of participants (seven to 64 participants). Only one study (Ebbeling CB, Leidig MM et al, 2003) included a follow-up at one year. Of the three intervention studies, two were given a neutral rating and one a positive rating. However, the results of these studies were consistent supporting

the recommendations.

- Minority Opinions

  None.

- Supporting Evidence

  The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

  Are low-glycemic diets effective in treating obesity in children (age 6-12) and adolescents?

  Do low-glycemic meals increase satiety in children and adolescents compared to higher glycemic meals?

  - References

    Ebbeling CB, Leidig MM, Sinclair KB, Hangen JP, and Ludwig DS. A Reduced–Glycemic Load Diet in the Treatment of Adolescent Obesity. *Arch Pediatr Adolesc Med* 2003;157:773-779.

    Spieth L, Harnish J, Lenders C, Raezer L, Pereira M, Hangen SJ, Ludwig D. A Low-Glycemic Index Diet in the Treatment of Pediatric Obesity *Arch Pediatr Adolesc Med* 2000;154:947-951

    Young P, West S, Ortiz K, Carlson J. A pilot study to determine the feasibility of the low glycemic diet as a treatment for overweight children in primary care practice. Ambulatory Pediatrics 2004;4:28-33.

    Ball SD, Keller KR, Moyer-Mileur LJ, Ding Y-W, Donaldson D, Jackson WD. Prolongation of satiety after low versus moderately high glycemic index meals in obese adolescents. *Pediatrics* 2003;111:488-494.

    Ludwig DS, Majzoub JA, Al-Zahrani A, Dallal GE, Blanco I, Roberts SB. High glycemic index foods, overeating, and obesity. Pediatrics 1999;103:e26

    Warren JM, Henry JK, Simonite Y. Low glycemic index breakfasts and reduced food intake in preadolescent children. *Pediatrics* 2003;112:e414-e418.

  - References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

    None.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Very Low Carbohydrate Diet

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

  PWM: Very Low Carbohydrate Diet - Adolescents

  If a low-carbohydrate diet is selected for use in adolescents, then it is recommended for short-term (up to 12 weeks) use. The use of an ad libitum very-low-carbohydrate diet, which is defined as a diet containing 20g to 60g of carbohydrates to treat obese adolescents has shown short-term improvement in weight status. However, due to the lack of evidence, it is not recommended for long-term treatment of pediatric obesity.

  Rating: Weak
  Conditional

  - Risks/Harms of Implementing This Recommendation

    - Electrolyte imbalance, especially hypokalemia, can be a side-effect of the diet, especially when an adolescent is in a state of ketoacidosis
    - Electrolytes should be monitored and potassium should be supplemented through dietary supplements when this diet is implemented
    - Constipation may occur secondary to inadequate fiber and fluid intakes
    - A daily multi-vitamin supplement containing 100% of the DRI should be prescribed with the diet to ensure adequate vitamin and mineral intake especially since fruit, vegetable and dairy consumption may be limited.

  - Conditions of Application

    - Adolescents with a positive family history of premature atherosclerosis or an LDL-cholesterol level above 130 should not be prescribed this diet

- The very-low-carbohydrate diet has not been studied in children under the age of 12 years and therefore should not be used in this population
- The very-low-carbohydrate diet should not be used in obese pregnant adolescents. Prior to implementing a protein-sparing modified fast diet, screen for pregnancy and provide anticipatory guidance to avoid pregnancy while on this diet.

- Potential Costs Associated with Application

  None.

- Recommendation Narrative

  There is only a single study, Sondike SB, Copperman N et al, 2003, that reports that adolescents on ad libitum, low-carbohydrate diets lose weight and improve BMI in the short term. Even though this study received a positive rating, there is too little research to be able to determine whether calorie unrestricted low-carbohydrate diets would be effective longer term (one year or more).

- Recommendation Strength Rationale

  Only one study with a positive rating available.

- Minority Opinions

  None.

- Supporting Evidence

  The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

  What is the evidence to support using an ad libitum, low carbohydrate diet as a way of treating obesity in adolescents?

  What is the evidence to support using an ad libitum, low carbohydrate diet as a way of treating obesity in children (ages 6-12)?

  - References

    Sondike SB, Copperman N, Jacobson MS. Effects of a low-carbohydrate diet on weight loss and cardiovascular risk factor in overweight adolescents. *J Pediatr* 2003; 142: 253-8.

  - References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

    None.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Using Protein Sparing Modified Fast Diets for Pediatric Weight Loss

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

  PWM: Protein Sparing Modified Fast Diets: Short-term Treatment

  If children and adolescents are >120% of ideal body weight, have serious medical complications and would benefit from rapid weight loss, then a Protein Sparing Modified Fast Diet (PSMF) could be utilized in a short-term intervention (typically 10 weeks) under the supervision of a multidisciplinary team of healthcare providers who specialize in pediatric obesity. Research shows that short term use of a PSMF brings about short term and longer term improvement in weight status and body composition when part of a medically supervised, multicomponent program.

  Rating: Weak
  Conditional

  PWM: Protein Sparing Modified Fast Diets: Long-term Treatment

  The Protein Sparing Modified Fast Diet is not recommended for long-term weight management for obesity in children or adolescents. There are few well designed studies to support the use of this intervention for longer than 10 weeks.

Rating: Weak
Imperative

- Risks/Harms of Implementing This Recommendation

  - Electrolyte imbalance, especially hypokalemia, can be a side effect of the PSMF,
  - Electrolytes should be monitored and potassium should be supplemented through dietary supplements when this diet is implemented,
  - A daily multivitamin supplements containing 100% of the DRI should be prescribed with the diet to ensure adequate vitamin and mineral intake especially since fruit, vegetable and dairy consumption may be limited,
  - Adequate fluid intake should be encouraged to prevent dehydration.

- Conditions of Application

  Parents/caregivers of obese children and adolescents need to participate in the counseling process.

  The Protein Sparing Modified Fast Diet should not be used in obese pregnant adolescents. Prior to implementing PSMF, screen for pregnancy and provide anticipatory guidance to avoid pregnancy while on this diet.

  PSMF stage of intervention should be followed by a less restrictive diet intervention.

- Potential Costs Associated with Application

  Additional medical and laboratory monitoring may incur increased healthcare costs.

- Recommendation Narrative

  The purpose of using a PSMF diet is to bring about rapid weight loss in obese children during the initial phase of treatment (10-20 weeks) while minimizing the negative effects of a very low calorie diet. Even though studies utilizing the PSMF diet showed significant short term weight loss (Figueroa-Colon, von Almen, et al 1993 Brown R, Sothern M et al 2000, Brown R, Sothern M et al 2000, Sothern and Hunter 1999, Sothern, M., Loftin, M. et al 2000, Sothern, M., Loftin, M. et al 2000) it is unclear if the weight loss can be solely attributed to the macronutrient content of the diet or a result of a hypocaloric intake. Only one study, Figueroa-Colon, von Almen, et al 1993, compared the PSMF to a hypocaloric balanced macronutrient diet. However, the PSMF intervention arm still consumed a mean of 200 kcal/day less than the hypocaloric balanced nutrient control group.

  Long-term treatment outcomes (>=1 year) for PSMF studies show that subjects initially treated were able to maintain some weight loss at one year. However, the data is limited to 4 studies with neutral ratings and a majority of the data was from the same treatment program. The one study (Figueroa-Colon, von Almen, et al 1993) that compared the PSMF diet with a hypocaloric balanced macronutrient diet showed some weight regain at one year compared to their post-treatment weight but, the children remained below their pre-treatment weight. Only 2 studies provided data on short term growth velocity but long-term effects on growth have not been studied. Data of hunger and satiety implications of the PSMF is very limited.

- Recommendation Strength Rationale

  Conclusion Statements are Grade III and V

  - One received a positive rating, three received a neutral rating, and one received a negative rating,
  - All studies present results from the same treatment program (thus, no variation across settings),
  - Only one of the studies compared the use of a protein sparing modified fast diet with a control diet (balanced macronutrient diet)--and this study had subjects on the PSMF diet on a lower energy intake than the control group,
  - Four of the studies report outcomes at one year (or greater) post treatment,
  - Only two studies report on growth velocity,
  - Only one study provided information on self reported hunger "side effects" of PSMF versus balanced macronutrient diet.

- Minority Opinions

  None.

- Supporting Evidence

  The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

  Does short term (no more than 20 weeks) use of protein sparing modified fast diets compromise fat free body mass in obese children?

  Do protein sparing modified fast diets bring about greater weight loss in children than macronutrient balanced diets of the same level of energy intake?

  Are children on protein sparing modified fast diets less hungry than children on balanced macronutrient diets at the same level of energy intake?

  Do protein sparing modified fast diets preserve fat free body mass in children better than balanced macronutrient diets at the same level of energy intake?

  What evidence is there that short-term use of protein sparing modified fast diets for childhood weight loss may compromise the growth velocity of children?

- References

  Brown R, Sothern M, Suskind R, Udall J, Blecker U. Racial differences in the lipid profiles of obese children and adolescents before and after significant weight loss. *Clinical Pediatrics* 2000; 39: 427-431.

  Figueroa-Colon R, von Almen TK, Franklin FA, Schuftan C, Suskind RM. Comparison of two hypocaloric diets in obese children. Am J Dis Child. 1993 Feb;147(2):160-6.

  Sothern, M., Hunter, S., Suskind R., Brown, R., Udall, J. and Blecker, U. Motivating the obese child to move: the role of structured exercise in pediatric weight management. *Southern Medical Journal* 1999; 92: 577-584.

  Sothern, M., Despinasse, B., Brown, R., Suskind, R., Udall, J. and Blecker, U. Lipid profiles of obese children and adolescents before and after significant weight loss: differences according to sex. *Southern Medical Journal* 2000; 93: 278-282.

  Sothern, M., Loftin, M., Udall, J., Suskind R., Ewing, T., Tang, S., & Blecker, U. Safety, feasibility and efficacy of a resistance training program in preadolescent obese children. *American Journal of the Medical Sciences*, 2000; 319: 370-375.

  Sothern, M., Schumacher, H., von Almen, T., Carlisle, L., & Udall, J. Committed to Kids: an integrated, four level team approach to weight management in adolescents. *Journal of the American Dietetic Association* 2002;102:S81-S85.

  Sothern, M., Udall, J. Suskind, R., Vargas, A., & Blecker, U. Weight loss and growth velocity in obese children after very low calorie diet, exercise and behavior modification. *Acta Paediatrica*, 2000; 89(9): 1036-43.

- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

  None.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Very Low Fat Diet (Less than 20% Daily Energy Intake from Fat)

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

  PWM: Very Low Fat Diet

  Use of a very-low-fat diet (less than 20% of total daily energy) is not recommended for use in pediatric weight management. The efficacy of a very-low-fat diet, defined as less than 20% of total daily energy intake from fat in the treatment of pediatric obesity, has not been studied.

  Rating: Insufficient Evidence
  Imperative

  - Risks/Harms of Implementing This Recommendation

    None.

  - Conditions of Application

    None.

  - Potential Costs Associated with Application

    None.

  - Recommendation Narrative

    There are no studies in the pediatric population that used a very-low-fat diet, as defined above, as the dietary intervention for the treatment of pediatric obesity. Some trials used a modified-fat hypocaloric diet, based on the NCEP Step I Diet recommendations (Ebbeling CB, Leidig MM et al, 2003 and Spieth L, Harnish J et al, 2000) as the control dietary intervention, but the percentage of total calories from fat exceeded 20%.

  - Recommendation Strength Rationale

    Conclusion statement was a Grade V.

    There was no evidence focusing specifically on the use of a very-low-fat diet for the treatment of pediatric obesity

and so there is no evidence to support using very-low-fat diets for treatment of pediatric obesity.

- Minority Opinions

  None.

- Supporting Evidence

  The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

  What is the evidence to support using a low fat diet (<20% of total daily energy intake) as a means to treat pediatric obesity?

  - References

    Ebbeling CB, Leidig MM, Sinclair KB, Hangen JP, and Ludwig DS. A Reduced–Glycemic Load Diet in the Treatment of Adolescent Obesity. *Arch Pediatr Adolesc Med* 2003;157:773-779.

    Spieth L, Harnish J, Lenders C, Raezer L, Pereira M, Hangen SJ, Ludwig D. A Low-Glycemic Index Diet in the Treatment of Pediatric Obesity *Arch Pediatr Adolesc Med* 2000;154:947-951

  - References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

    None.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Nutrition Education in the Treatment of Pediatric Obesity

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

  PWM: Tailor Nutrition Education to Nutrition Prescription

  In a multi-component program, if there is a Nutrition Diagnosis for food and nutrition-related knowledge deficit, then Nutrition Education should be tailored to the Nutrition Prescription. Research shows that if nutrition education is not tailored to nutrition prescription, improvement in weight status is not consistent.

  Rating: Fair
  Conditional

  - Risks/Harms of Implementing This Recommendation

    None.

  - Conditions of Application

    The patient or the patient's family will almost always need some form of Nutrition Education. It is imperative that patient education be tailored to the specific knowledge deficits identified in the Nutrition Assessment.

    According to the *Nutrition Diagnosis and Intervention: Standardized Language of the Nutrition Care Process:*

    > Nutrition Education is a formal process to instruct or train a patient/client in a skill or to impart knowledge to help the patients/clients voluntarily manage or modify food choices and eating behavior to maintain or improve health...In [some] cases the patient/client knows what to do but has been unable to make or sustain a behavioral change. (p.191).

    Thus, the dietitian must distinguish between the etiology or cause of the problem. If the patient or client or their family demonstrates adequate knowledge, but are still unable to make the behavioral changes, then nutrition education should be tailored to take advantage of existing knowledge to support the desired behavior change.

    Thus, it is critical for the nutrition education intervention be closely coordinated with the Nutrition Prescription.

  - Potential Costs Associated with Application

    Absence of health insurance coverage for weight management could limit program access.

- Recommendation Narrative

  Results from studies that include Nutrition Education without a prescribed diet plan are less consistent than results where nutrition education interventions were integrated with the Nutrition Prescription:

  - See the evidence questions in the Supporting Evidence section below
  - These findings are in contrast to the outcomes reported from studies that integrated nutrition education with an individualized nutrition prescription. See Pediatric Weight Management (PWM) Nutrition Prescription in the Treatment of Pediatric Obesity.

- Recommendation Strength Rationale

  A strong body of research indicates much more consistent results when Nutrition Education is tailored to an individualized Nutrition Prescription [Grade I for combined nutrition prescription and nutrition education, Grade III (children) and Grade II (adolescents) for nutrition education alone.]

- Minority Opinions

  None.

- Supporting Evidence

  The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

  What is the effectiveness of using nutrition education without a prescribed diet plan as the dietary component of a multicomponent pediatric weight management program in children (ages 6-12)?

  What is the effectiveness of using nutrition education without a prescribed diet plan as the dietary component of a multicomponent pediatric weight management program in adolescents (ages 13-18)?

  - References

    Brownell KD, Kelman JH, Stunkard AJ. Treatment of obese children with and without their mothers: changes in weight and blood pressure. Pediatrics 1983; 71: 515-23.

    Coates TJ, Killen JD, Slinkard LA. Parent participation in a treatment program for overweight adolescents. *Int J Eat Disord* 1982; 1: 37-48.

    de Mello ED, Luft VC, Meyer F. Individual outpatient care versus group education programs. Which leads to greater change in dietary and physical activity habits for obese children? *J Pediatr* (Rio J). 2004 Nov-Dec;80(6):468-74.

    Golan M, Weizman A, Apter A, Fainaru M. Parents as the exclusive agents of change in the treatment of childhood obesity. Am J Clin Nutr 1998;67:1130-1135.

    Gutin B, Barbeau P, Owens S, Lemmon C, Bauman M, Allison J, Kang H, Litaker M. Effects of exercise intensity on cardiovascular fitness, total body composition, and visceral adiposity of obese adolescents *Am J Clin Nutr* 2002;75:818-26.

    Israel AC, Guile CA, Baker JE. An evaluation of enhanced self-regulation training in the treatment of childhood obesity. *J Pediatr Psychol* 1994; 19:737-49.

    Kirschenbaum DS, Harris ES, Tomarken AJ. Effects of parental involvement in behavioral weight loss therapy for preadolescents. *Behavior Therapy* 1984;15:485-500.

    Mellin LM, Slinkard LA, Irwin CE. Adolescent obesity intervention: validation of the SHAPEDOWN program. *J Am Diet Assoc* 1987; 87:333-8.

    Resnicow K, Yaroch AL, Davis A, Wang DT, Carter S, Slaughter L, Coleman D, Baranowski T. GO GIRLS!: results from a nutrition and physical activity program for low-income, overweight African American adolescent females. *Health Education & Behavior* 2000;27:616-31.

  - References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

    International Dietetics & Nutrition Terminology (IDNT) Reference Manual: Standardized Language for the Nutrition Care Process 2007. American Dietetic Association.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Nutrition Counseling and Behavior Therapy Strategies in the Treatment of Obesity in Children and Adolescents

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

PWM: Nutrition Counseling

Nutrition counseling, delivered by an RD (which is inclusive of goal-setting, self-monitoring, stimulus control, problem-solving, contingency management, cognitive restructuring, use of incentives and rewards and social supports), should be a part of the behavior therapy component of a multi-component pediatric weight-management program.

Rating: Consensus
Imperative

PWM: Behavioral Therapy

Behavior therapy strategies should be included as part of a multi-component pediatric weight-management program. Research shows that when behavior therapy strategies are included within the context of a multi-disciplinary team, weight status and body composition improve.

Rating: Strong
Imperative

PWM: Family-Based Counseling

Family-based counseling that includes parent training or modeling should be included as part of a multi-component weight-management program that targets children ages six to 12 years. During the development of a multi-component treatment program for children ages 12 years and younger, the registered dietitian should advise the health-care team on the advantages of incorporating parent training or modeling as part of the treatment program. Research studies that including parent training or modeling as part of a multi-component weight-management program for children 12 years and younger showed positive changes in a child's weight status and adiposity.

Rating: Strong
Imperative

- Risks/Harms of Implementing This Recommendation

  None.

- Conditions of Application

  Additional training may be required for some dietitians to implement some behavior strategies.

  Adequate screening for eating disorders, depression and family risk factors (see the topics under Parent/Child Relationship or Emotional Climate) may fall outside the scope of expertise of individual dietitians and may require consultation with a behavioral therapy specialist member of the health-care team.

- Potential Costs Associated with Application

  Behavioral interventions targeting children may require resources that some programs do not have available. Program budgets may need to be increased in order to incorporate a behavioral component with a qualified professional.

  If program costs are passed directly to patients and families, this may limit access to the program for less affluent patients and their families.

  Absence of health insurance coverage for weight management could limit program access.

- Recommendation Narrative

  Recommendation: Nutritional Counseling by a Registered Dietitian

  Nutrition counseling is defined as "a supportive process, characterized by a collaborative counselor-patient/client relationship, to set priorities, establish goals, and create individualized action plans that acknowledge and foster responsibility for self-care to treat an existing condition and promote health."

  Recommendation: Behavioral Strategies

  Inclusion of behavioral therapy strategies was a well-developed and well-described part of the majority of the studies that show successful results. 50 of the studies reviewed contained a behavioral counseling component. Of these studies, eight compared a treatment group with a behavioral counseling component to a treatment group without behavioral training.

  Seven of the randomized controlled trials received a positive quality rating, while one (Golan, Weizman, et al 1998) received a neutral quality rating.

  The six studies that compared an intervention with a behavioral component to an intervention without a behavioral component all found that the treatment group that included a behavioral training intervention had greater improvement in adiposity than the comparison groups DISC, 1995; Flodmark CE, Ohlsson T et al, 1993; Graves T, Meyers AW et al, 1988; Saelens B, Sallis J et al, 2002; Obarzanek, Kimm et al, 2001; Golan, Weizman et al, 1998).

  In addition, intervention studies that included parent training or modeling showed positive changes in the child's weight status and adiposity for children 12 years old and younger. The results of studies in youth over 12 years of age were more limited or inconsistent, thus the evidence to recommend parent training or modeling in obese adolescents needs further investigation.

Recommendation: Family-Based Counseling

There is a strong association between the inclusion of family-based counseling as part of the childhood obesity treatment program and reductions in weight status or adiposity in children ages six to 12. See What is the effectiveness of family-based counseling as a part of an intervention program to treat obesity in children (ages 6-12)? (Grade I).

Inclusion of family counseling as part of a multi-component adolescent weight-management program may provide beneficial effects. However, definite conclusions are hampered by the fact that evidence is limited to a small number of older studies, studies of weak design and inconsistent results. See What is the effectiveness of family-based counseling as a part of an intervention program to treat obesity in adolescents (ages 13-18)? (Grade III).

- Recommendation Strength Rationale

Recommendation: Nutritional Counseling by a Registered Dietitian

Nutrition Counseling has been defined as an integral part of the Nutrition Care Process by the American Dietetic Association. Since the recommendation is policy-based, rather than research-based, the strength of the recommendation is consensus.

Recommendation: Behavioral Strategies

Strong – The six studies that compared an intervention with a behavioral component to an intervention without a behavioral component all found that the treatment group that included a behavioral training intervention had greater improvement in adiposity than the comparison groups. (Grade I)

The evidence for an association between improvement in adiposity and including a behavioral treatment component as part of a multicomponent pediatric weight management program was strong (Grade I).

Recommendation: Family-Based counseling

In relation to incorporating parent training or modeling with children 12 years and under, the bulk of the studies show that incorporating these to the intervention produces positive changes in the children's weight and adiposity. (Grade I)

- Minority Opinions

None.

- Supporting Evidence

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

What is the effectiveness of using behavioral counseling as part of a multicomponent pediatric weight management program to treat childhood obesity?

What is the effectiveness of family-based counseling including parent training or modeling as part of a multicomponent pediatric weight management program to treat obesity in children (ages 6-12)?

What is the effectiveness of family-based counseling including parent training or modeling as part of a multicomponent pediatric weight management program to treat obesity in adolescents (ages 13-18)?

- References

DISC. Efficacy and safety of lowering dietary intake of fat and cholesterol in children with elevated low-density lipoprotein cholesterol. The Dietary Intervention Study in Children (DISC). The Writing Group for the DISC Collaborative Research Group. *JAMA* 1995;273:1429-35.

Epstein LH, Paluch RA, Gordy CC, Saelens BE, Ernst MM. Problem solving in the treatment of childhood obesity. *J Consult Clin Psychol* 2000;68:717-21.

Flodmark CE, Ohlsson T, Ryden O, Sveger T. Prevention of progression to severe obesity in a group of obese schoolchildren treated with family therapy. *Pediatrics* 1993; 91: 880-84.

Golan M, Weizman A, Apter A, Fainaru M. Parents as the exclusive agents of change in the treatment of childhood obesity. Am J Clin Nutr 1998;67:1130-1135.

Graves T, Meyers AW, Clark L. An evaluation of parental problem-solving training in the behavioral treatment of childhood obesity. *Journal of Consulting and Clinical Psychology* 1988; 56:246-250.

Israel AC, Guile CA, Baker JE. An evaluation of enhanced self-regulation training in the treatment of childhood obesity. *J Pediatr Psychol* 1994; 19:737-49.

Obarzanek E, Kimm SY, Barton BA, Van Horn L L, Kwiterovich PO Jr, Simons-Morton DG, Hunsberger SA, Lasser NL, Robson AM, Franklin FA Jr, Lauer RM, Stevens VJ, Friedman LA, Dorgan JF, Greenlick MR; DISC Collaborative Research Group. Long-term safety and efficacy of a cholesterol-lowering diet in children with elevated low-density lipoprotein cholesterol: seven-year results of the Dietary Intervention Study in Children (DISC). Pediatrics. 2001 Feb;107(2):256-64.

Saelens B, Sallis J, Wilfley D, Patrick K, Cella J, and Buchta R. Behavioral Weight Control for Overweight Adolescents Initiated in Primary Care. *Obesity Research* 2002;10:22-32

Brown R, Sothern M, Suskind R, Udall J, Blecker U. Racial differences in the lipid profiles of obese children and adolescents before and after significant weight loss. *Clinical Pediatrics* 2000; 39: 427-431.

Brownell KD, Kelman JH, Stunkard AJ. Treatment of obese children with and without their mothers: changes in weight and blood pressure. Pediatrics 1983; 71: 515-23.

Chen W, Chen SC, Hsu HS, Lee C. Counseling clinic for pediatric weight reduction: program formulation and follow-up. *J Formos Med Assoc* 1997; 96 59-62.

Coates TJ, Killen JD, Slinkard LA. Parent participation in a treatment program for overweight adolescents. *Int J Eat Disord* 1982; 1: 37-48.

de Mello ED, Luft VC, Meyer F. Individual outpatient care versus group education programs. Which leads to greater change in dietary and physical activity habits for obese children? *J Pediatr* (Rio J). 2004 Nov-Dec;80(6):468-74.

Epstein LH, Paluch RA, Gordy CC, Dorn J. Decreasing sedentary behaviors in treating pediatric obesity. *Arch Pediatr Adolesc Med* 2000; 154 (3):220-6.

Epstein LH, Paluch RA, Gordy CC, Saelens BE, Ernst MM. Problem solving in the treatment of childhood obesity. *J Consult Clin Psychol* 2000;68:717-21.

Epstein LH, Paluch RA, and Raynor HA. Sex Differences in Obese Children and Siblings in Family-based Obesity Treatment. *Obesity Research* 2001;9:746-753

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year follow-up of behavioral, family-based treatment for obese children. *JAMA* 1990; 264: 2519-2523.

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year outcomes of behavioral family-based treatment for childhood obesity. *Health Psychology*. 1994, 13:373-383.

Epstein LH, Valoski AM, Vara LS, McCurley J, Wisniewski L, Kalarchian MA, Klein KR, Shrager LR. Effects of decreasing sedentary behavior and increasing activity on weight change in obese children. *Health Psychol* 1995;14:109-15.

Epstein LH, Wing RR, Koeske R, and Valoski A. Effect of parent weight on weight loss in obese children. *Journal of Consulting and Clinical Psychology*. 54(3): 400-401, 1986.

Epstein LH, Wing RR, Koeske R, Valoski A. Effects of diet plus exercise on weight change in parents and children. *Journal of Consulting and Clinical Psychology* 1984; 52:429-437.

Epstein LH, Wing RR, Koeske R, Valoski A. A Comparison of Lifestyle Exercise, Aerobic Exercise, and Calisthenics on Weight Loss in Obese Children. *Behavior Therapy* 1985;16;345-56.

Epstein LH, Wing RR, Penner BC, Kress MJ. Effect of diet and controlled exercise on weight loss in obese children. *J Pediatr* 1985;107:358-61.

Epstein, L, Valoski A, Kalarchian M, et al. Do children lose and maintain weight easier than adults: a comparison of child and parent weight changes from six months to ten years. *Obes Res* 1995; 3:411-417.

Flodmark CE, Ohlsson T, Ryden O, Sveger T. Prevention of progression to severe obesity in a group of obese schoolchildren treated with family therapy. *Pediatrics* 1993; 91: 880-84.

Golan M, Weizman A, Apter A, Fainaru M. Parents as the exclusive agents of change in the treatment of childhood obesity. Am J Clin Nutr 1998;67:1130-1135.

Israel AC, Guile CA, Baker JE. An evaluation of enhanced self-regulation training in the treatment of childhood obesity. *J Pediatr Psychol* 1994; 19:737-49.

Kirschenbaum DS, Harris ES, Tomarken AJ. Effects of parental involvement in behavioral weight loss therapy for preadolescents. *Behavior Therapy* 1984;15:485-500.

Levine, M., Ringham, R., Kalarchian, M., Wisniewski, L., and Marcus, M. Is family-based behavioral weight control appropriate for severe pediatric obesity? *Int J Eat D*isord. 2001 Nov;30(3):318-28.

Miraglia del Giudice E, Santoro N, Marotta A, Nobili B, Di Toro, Perrone L. Inadequate leptin level negatively affects body fat loss during a weight reduction programme for childhood obesity. *Acta Paediatr* 2002; 91: 132-135.

Sothern, M., Hunter, S., Suskind R., Brown, R., Udall, J. and Blecker, U. Motivating the obese child to move: the role of structured exercise in pediatric weight management. *Southern Medical Journal* 1999; 92: 577-584.

Sothern, M., Despinasse, B., Brown, R., Suskind, R., Udall, J. and Blecker, U. Lipid profiles of obese children and adolescents before and after significant weight loss: differences according to sex. *Southern Medical Journal* 2000; 93: 278-282.

Sothern, M., Loftin, M., Udall, J., Suskind R., Ewing, T., Tang, S., & Blecker, U. Safety, feasibility and efficacy of a resistance training program in preadolescent obese children. *American Journal of the Medical Sciences*, 2000; 319: 370-375.

Sothern, M., Schumacher, H., von Almen, T., Carlisle, L., & Udall, J. Committed to Kids: an integrated, four level team approach to weight management in adolescents. *Journal of the American Dietetic Association* 2002;102:S81-S85.

Sothern, M., Udall, J. Suskind, R., Vargas, A., & Blecker, U. Weight loss and growth velocity in obese children after very low calorie diet, exercise and behavior modification. *Acta Paediatrica*, 2000; 89(9): 1036-43.

Wadden, T., Stunkard, A., Rich, L., Rubin, C., Sweidel, G, McKinney, S. Obesity in black adolescent girls: a controlled clinical trial of treatment by diet, behavior modification, and parental support. *Pediatrics*. 1990, 85(3): 345-352.

- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

ADA. Nutrition Diagnosis and Intervention: Standardized Language for the Nutrition Care Process; 2007.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Family Participation in Treating Pediatric Obesity in Children and Adolescent Obesity Treatment

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

PWM: Family Participation - Children Six to 12 Years Old

Parent or caregiver should be included in multi-component pediatric weight-management programs as an agent of change when treating children ages six to 12. A strong body of research indicates that including parents and caregivers as agents of change in the treatment of their child's obesity is associated with both short-term and longer-term (more than one year) improvements in weight status. A more limited body of research indicates that treating six- to 12-year-old children without parental participation is not effective.

Rating: Strong
Imperative

PWM: Family Participation - Adolescents

Parent or caregiver may be included in multi-component pediatric weight-management programs when treating adolescents. A limited body of research indicates that programs with or without parent or caregiver participation may be effective for improvements in weight status and adiposity in adolescents.

Rating: Fair
Conditional

PWM: Family Participation - Treatment Format

If parent or caregiver participation is included in child and adolescent weight-management programs, health professionals should tailor the format (e.g., group vs. individual format, parent or caregiver with child vs. parent or caregiver and child separate, etc.) to meet individual, family and program needs. Research does not show a clear superiority of one format vs. another for parent or caregiver participation.

Rating: Consensus
Conditional

- Risks/Harms of Implementing This Recommendation

  None.

- Conditions of Application

  - Multi-component weight-management programs must have adequate staffing and appropriate training materials to educate parents so that they may support their child's weight management
  - Clinically supervised multi-component weight-management programs require the participation of professional staff with expertise in distinct areas: Behavioral interventions, dietary interventions and physical activity interventions. Adequate screening process are also needed to address and assess the above factors.
  - Organizational barriers may limit options for family participation in a multi-component program, including lack of space for physical activity and trained staff to conduct components of the intervention program
  - Adequate screening for eating disorders, depression and family risk factors are necessary. Program success may be limited by the above factors.

- Potential Costs Associated with Application

  - Organizational costs may be increased in order to incorporate a family counseling component
  - Because of the time commitment required of parents, program participation may be limited by parent schedules
  - If organizational and program costs are passed on to participants, this could limit program access
  - The absence of health insurance coverage for weight management could limit program access.

- Recommendation Narrative

  Recommendation: Children (Ages Six to 12 Years)

  A strong body of research (21 studies exclusively of children and 12 studies of mixed children and adolescent subjects) on programs that include a family counseling component as part of a multi-component treatment program for pediatric obesity indicates that family counseling is associated with improvements in child adiposity,

both post-treatment and in the longer term (more than one year). See What is the effectiveness of family-based counseling as a part of an intervention program to treat obesity in children (ages 6-12)? (Grade I).

The body of research that directly compares the inclusion of a family counseling component to a child-alone approach is more limited (only five studies). See Is counseling children (ages six to 12) for weight loss in the absence of their parents effective? (Grade III). This research is limited because:

- Treatment of younger children in the absence of their parents is not the norm, so it is not surprising that so few studies use a child-only approach for treating overweight in this population
- The studies are older (three studies are between 10 and 22 years old) and family counseling techniques have developed during the intervening period
- The more recent studies are of neutral quality.

Additionally, the research comparing different methods of family involvement is quite limited and does not afford us the ability to judge what method of family counseling is best.

In sum, while we can confidently assert that including family counseling as part of a multi-component child weight-management program is associated with improved adiposity outcomes, we can be much less confident that omitting family counseling will have negative consequences. Also, we cannot tell from the research which formats or methods for family counseling are most strongly associated with improvements in child adiposity.

Recommendation: Adolescents (13 to 18 years)

Unlike the research on children (ages six to 12), evidence is lacking for the superiority of programs that include family participation in multi-component weight-management programs. Research indicates that adolescents are likely to improve adiposity status both in the short term and the longer term (more than one year), when they are treated with or without family participation in a multi-component weight-management program.

While the research does indicate benefits in including family participation in adolescent weight management programs (see What is the effectiveness of family-based counseling as a part of an intervention program to treat obesity in adolescents (ages 13-18)? (Grade III), research also indicates that adolescents demonstrate improvements in adiposity when treated without parents (see Is counseling of adolescents for weight loss in the absence of their parents effective?) (Grade II). Thus, while including family members in the treatment of adolescent obesity may have added benefits over treatment without family members, the research is not clear on this point.

Research comparing different formats for including family participation in treating adolescent obesity is both limited and dated. So, we cannot conclude that one format for including parental participation is better than any other in the treatment of adolescent obesity. (See the evidence analysis under Effectiveness of Different Family Treatment Formats for Treating Pediatric Obesity)

Recommendation: Family-Based Counseling

There is a strong association between the inclusion of family-based counseling as part of the childhood obesity treatment program and reductions in weight status or adiposity in children ages six to 12. See What is the effectiveness of family-based counseling as a part of an intervention program to treat obesity in children (ages 6-12)? (Grade I).

Inclusion of family counseling as part of a multi-component adolescent weight-management program may provide beneficial effects. However, definite conclusions are hampered by the fact that evidence is limited to a small number of older studies, studies of weak design and inconsistent results. See What is the effectiveness of family-based counseling as a part of an intervention program to treat obesity in adolescents (ages 13-18)? (Grade III).

- Recommendation Strength Rationale

Recommendation - Children Ages Six to 12

The strength and consistency of the research on the association between the inclusion of family counseling as a part of a multicomponent child weight management program justifies a strong rating.

Recommendation - Adolescents

Research on adolescent weight-management programs indicates adiposity improvement with or without including family members in the treatment process.

Recommendation - Treatment Format

Research was inadequate to make any recommendations about the format or content of family participation.

- Minority Opinions

None.

- Supporting Evidence

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

Is counseling children (ages 6 to 12) for weight loss in the absence of their parents effective?

How does child-only treatment of obesity compare to interventions with both children (ages 6-12) and their parents (together)?

How does child-only treatment of obesity in children ages 6-12 compare to treating both child and parent in a mixed treatment format (sometimes together sometimes separate)?

How does treatment of childhood obesity in children ages 6-12 by interventions with parents and children together compare to interventions with parents and children separate?

How does child-only treatment of obesity compare to interventions with both children (ages 6-12) and their parents (separately)?

What is the effectiveness of family-based counseling as a part of an intervention program to treat obesity in children (ages 6-12)?

Is counseling of adolescents for weight loss in the absence of their parents effective?

How does adolescent-only treatment of obesity compare to interventions with both adolescents and their parents (together)?

How does adolescent-only treatment of obesity compare to interventions including both adolescent and parent in a mixed treatment format (sometimes together sometimes separate)?

How does treatment of adolescent obesity by interventions with parents and adolescents together compare to interventions with parents and adolescents separate?

How does adolescent-only treatment of obesity compare to interventions with both adolescents and their parents (separately)?

What is the effectiveness of family-based counseling as a part of an intervention program to treat obesity in adolescents (ages 13-18)?

- References

Brownell KD, Kelman JH, Stunkard AJ. Treatment of obese children with and without their mothers: changes in weight and blood pressure. Pediatrics 1983; 71: 515-23.

Coates TJ, Killen JD, Slinkard LA. Parent participation in a treatment program for overweight adolescents. *Int J Eat Disord* 1982; 1: 37-48.

Ebbeling CB, Leidig MM, Sinclair KB, Hangen JP, and Ludwig DS. A Reduced–Glycemic Load Diet in the Treatment of Adolescent Obesity. *Arch Pediatr Adolesc Med* 2003;157:773-779.

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year follow-up of behavioral, family-based treatment for obese children. *JAMA* 1990; 264: 2519-2523.

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year outcomes of behavioral family-based treatment for childhood obesity. *Health Psychology*. 1994, 13:373-383.

Flodmark CE, Ohlsson T, Ryden O, Sveger T. Prevention of progression to severe obesity in a group of obese schoolchildren treated with family therapy. *Pediatrics* 1993; 91: 880-84.

Golan M, Crow S. Targeting parents exclusively in the treatment of childhood obesity: long-term results. *Obes Res* 2004;12:357-361.

Golan M, Weizman A, Apter A, Fainaru M. Parents as the exclusive agents of change in the treatment of childhood obesity. Am J Clin Nutr 1998;67:1130-1135.

Kirschenbaum DS, Harris ES, Tomarken AJ. Effects of parental involvement in behavioral weight loss therapy for preadolescents. *Behavior Therapy* 1984;15:485-500.

Maffiuletti NA, De Col A, Agosti F, Ottolini S, Moro D, Genchi M, Massarini M, Lafortuna CL, Sartorio A. Effect of a 3-week body mass reduction program on body composition, muscle function and motor performance in pubertal obese boys and girls. *J Endocrinol Invest*. 2004 Oct;27(9):813-20.

Nuutinen O. Long-term effects of dietary counseling on nutrient intake and weight loss in obese children. *Eur J Clin Nutr*. 1991 Jun;45(6):287-97.

Rolland-Cachera MF, Thibault H, Souberbielle JC, Soulie D, Carbonel P, Deheeger M, Roinsol D, Longueville E, Bellisle F, Serog P. Massive obesity in adolescents: dietary interventions and behaviours associated with weight regain at 2 y follow-up. *Int J Obes Relat Metab Disord*. 2004 Apr;28(4):514-9.

Saelens B, Sallis J, Wilfley D, Patrick K, Cella J, and Buchta R. Behavioral Weight Control for Overweight Adolescents Initiated in Primary Care. *Obesity Research* 2002;10:22-32

Sondike SB, Copperman N, Jacobson MS. Effects of a low-carbohydrate diet on weight loss and cardiovascular risk factor in overweight adolescents. *J Pediatr* 2003; 142: 253-8.

Wadden, T., Stunkard, A., Rich, L., Rubin, C., Sweidel, G, McKinney, S. Obesity in black adolescent girls: a controlled clinical trial of treatment by diet, behavior modification, and parental support. *Pediatrics*. 1990, 85(3): 345-352.

Young P, West S, Ortiz K, Carlson J. A pilot study to determine the feasibility of the low glycemic diet as a treatment for overweight children in primary care practice. Ambulatory Pediatrics 2004;4:28-33.

- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

None.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Recommendations Summary

Pediatric Weight Management (PWM) Nutrition Counseling: Setting Weight Goals with Patient and Family

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

PWM: Weight Goals

Weight goals should be individualized for the child. Because of growth occurring within children and adolescents, the goal of pediatric weight-management programs may be weight stabilization rather than weight loss. Research indicates that weight stabilization in children and adolescents may be associated with improvements in BMI and other measures of adiposity.

Rating: Consensus
Imperative

- Risks/Harms of Implementing This Recommendation

None.

- Conditions of Application

None.

- Potential Costs Associated with Application

None.

- Recommendation Narrative

In analyzing the research, the ADA Pediatric Weight Management work group defined both stabilization of weight (no statistically significant change in weight from baseline), as well as decrease in weight or adiposity as a positive outcome.

Since there currently exists no universal research-based treatment goal for addressing pediatric obesity, the ADA Pediatric Weight Management work group maintains that weight goals should be individualized for the child and family. While weight loss may be appropriate in some cases, weight stabilization in growing children and adolescents may be more appropriate.

The work group suggests, as a reference, Sarah E. Barlow and and the Expert Committee. Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report. Pediatrics 2007;120;S164-S192(see especially, Table 8).

- Recommendation Strength Rationale

The "consensus" rating is appropriate since the current recommendations for pediatric weight management treatment goals are based on consensus documents and the ADA's policy that all nutrition care should be individualized to the particular needs of the patient and family.

- Minority Opinions

None.

- Supporting Evidence

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

- References
- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

Sarah E. Barlow and and the Expert Committee. Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report. Pediatrics 2007;120;S164-S192.

Nutrition Diagnosis and Intervention: Standardized Language for the Nutrition Care Process. 2007. Chicago: American Dietetic Association.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Coordination of Care in Pediatric Weight Management

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

PWM: Coordination of Care

The dietitian should collaborate with members of the health-care team (as available) in planning and implementing behavior, physical activity and adjunct therapy strategies. Effective multi-component pediatric weight management interventions benefit from the diverse expertise of different health-care professionals.

Rating: Consensus
Imperative

- Risks/Harms of Implementing This Recommendation

Within each component area, particular risks exist that must be monitored by the appropriate professionals:

- Dietary interventions should be monitored by a registered dietitian to ensure adequate nutrition and growth and to prevent micro-nutrient deficiencies (see Pediatric Weight Management (PWM) Energy Restricted Diets)
- Intense physical activity in some individuals with pediatric overweight or pediatric obesity may contribute to disability or death, thus approval from a primary health-care provider prior to beginning an exercise program should be obtained (see Pediatric Weight Management (PWM) Physical Activity in the Treatment of Childhood and Adolescent Obesity)
- Risks to program success are conditioned by: Adequate screening for eating disorders, depression, family risk factors, etc. (see the topics under Parent/Child Relationship or Emotional Climate).

- Conditions of Application

- Clinically-supervised multi-component weight-management programs require the participation of professional staff with expertise in distinct areas:
  - Behavioral interventions
  - Dietary interventions
  - Physical activity interventions
  - In some cases, pharmacological or surgical interventions.
- To provide a multi-component weight-management intervention, the RD may need to establish a practice network with other health-care professionals with complementary expertise
- Organizational barriers may limit options for multi-component programs, including lack of space for physical activity and trained staff to conduct components of the intervention program
- Adequate screening for eating disorders, depression and family risk factors is critical for success
- Program success is conditioned by the above factors.

- Potential Costs Associated with Application

Multi-component weight-management programs may require a substantial organizational infrastructure to be implemented well. Organizational costs are associated with:

- Access to qualified professional staff to determine and supervise interventions
- Access to adequate clinical space and instruments for treatment.

If organizational and program costs are passed on to participants, this could limit program access. Additionally, parent commitment to program participation is required.

Absence of health insurance coverage for weight management could limit program access.

- Recommendation Narrative

Multi-Component Program

Research on multi-component weight-management programs indicate strong support for:

- Including a **nutrition component** that includes an individualized diet prescription to promotes an energy deficit
- Including a **physical activity component**
- Including a **behavioral intervention component.**

To see the evidence analysis on the above pediatric weight management components, see the Supporting Evidence section below.

Additionally, when the focus is on children (ages six to 12), research indicates that weight management in children without parents is not effective. Direct parent participation in weight-management programs appears to be less critical for adolescents (see Pediatric Weight Management (PWM) Family Participation in Treating Pediatric Obesity in Children and Adolescents).

- Recommendation Strength Rationale

Research is strongly in support of the effectiveness of a multi-component pediatric weight-management program. None of the research analyzed indicated that interventions were carried out exclusively by a single health-care professional.

Research comparing the inclusion of each of the three program components (dietary, physical activity and behavioral interventions) consistently shows improved outcomes in both short-term and longer-term child and adolescent adiposity. ADA Evidence Category Grade I (six- to 12-year-olds) and Grade II (adolescents, 13 to 18 years old).

- Minority Opinions

None.

- Supporting Evidence

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

In children ages 6-12, what is the effectiveness of using balanced macronutrient, low calorie (900-1200 kcal per day) dietary interventions for treating childhood obesity?

In children ages 6-12, what is the effectiveness of using balanced macronutrient, reduced calorie (>1200 kcal-DRI per day) dietary interventions for treating childhood obesity?

In adolescents, what balanced macronutrient dietary interventions are effective in treating obesity?

What is the effectiveness of using a program to increase physical activity as a part of an intervention program to treat childhood obesity?

What is the effectiveness of using a program to decrease sedentary behaviors as a part of an intervention program to treat childhood obesity?

What is the effectiveness of using behavioral counseling as part of a multicomponent pediatric weight management program to treat childhood obesity?

What is the effectiveness of family-based counseling including parent training or modeling as part of a multicomponent pediatric weight management program to treat obesity in children (ages 6-12)?

What is the effectiveness of family-based counseling including parent training or modeling as part of a multicomponent pediatric weight management program to treat obesity in adolescents (ages 13-18)?

What is the effectiveness of using orlistat as part of a childhood obesity treatment program?

What is the effectiveness of family-based counseling as a part of an intervention program to treat obesity in children (ages 6-12)?

What is the effectiveness of family-based counseling as a part of an intervention program to treat obesity in adolescents (ages 13-18)?

- References

Chen W, Chen SC, Hsu HS, Lee C. Counseling clinic for pediatric weight reduction: program formulation and follow-up. *J Formos Med Assoc* 1997; 96 59-62.

Ebbeling CB, Leidig MM, Sinclair KB, Hangen JP, and Ludwig DS. A Reduced–Glycemic Load Diet in the Treatment of Adolescent Obesity. *Arch Pediatr Adolesc Med* 2003;157:773-779.

Eliakim A, Friedland O, Kowen G, Wolach B, Nemet D. Parental obesity and higher pre-intervention BMI reduce the likelihood of a multidisciplinary childhood obesity program to succeed--a clinical observation. *J Pediatr Endocrinol Metab*. 2004 Aug;17(8):1055-61.

Eliakim A, Kaven G, Berger I, Friedland O, Wolach B, Nemet D. The effect of a combined intervention on body mass index and fitness in obese children and adolescents-a clinical experience. *Eur J Pediatr*. 2002; 161:449-454

Epstein LH, Gordy CC, Raynor HA, Beddome M, Kilanowski CK, Paluch R. Increasing fruit and vegetable intake and decreasing fat and sugar intake in families at risk for childhood obesity. *Obes Res*. 2001 Mar;9(3):171-8.

Epstein LH, Paluch RA, Gordy CC, Dorn J. Decreasing sedentary behaviors in treating pediatric obesity. *Arch Pediatr Adolesc Med* 2000; 154 (3):220-6.

Epstein LH, Paluch RA, Gordy CC, Saelens BE, Ernst MM. Problem solving in the treatment of childhood obesity. *J Consult Clin Psychol* 2000;68:717-21.

Epstein LH, Paluch RA, and Raynor HA. Sex Differences in Obese Children and Siblings in Family-based Obesity Treatment. *Obesity Research* 2001;9:746-753

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year follow-up of behavioral, family-based treatment for obese children. *JAMA* 1990; 264: 2519-2523.

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year outcomes of behavioral family-based treatment for childhood obesity. *Health Psychology*. 1994, 13:373-383.

Epstein LH, Valoski AM, Vara LS, McCurley J, Wisniewski L, Kalarchian MA, Klein KR, Shrager LR. Effects of decreasing sedentary behavior and increasing activity on weight change in obese children. *Health Psychol* 1995;14:109-15.

Epstein LH, Wing RR, Koeske R, and Valoski A. Effect of parent weight on weight loss in obese children. *Journal of Consulting and Clinical Psychology*. 54(3): 400-401, 1986.

Epstein LH, Wing RR, Koeske R, Valoski A. Effects of diet plus exercise on weight change in parents and children. *Journal of Consulting and Clinical Psychology* 1984; 52:429-437.

Epstein LH, Wing RR, Koeske R, Valoski A. A Comparison of Lifestyle Exercise, Aerobic Exercise, and Calisthenics on Weight Loss in Obese Children. *Behavior Therapy* 1985;16;345-56.

Epstein LH, Wing RR, Penner BC, Kress MJ. Effect of diet and controlled exercise on weight loss in obese children. *J Pediatr* 1985;107:358-61.

Epstein, L, Valoski A, Kalarchian M, et al. Do children lose and maintain weight easier than adults: a comparison of child and parent weight changes from six months to ten years. *Obes Res* 1995; 3:411-417.

Figueroa-Colon R, von Almen TK, Franklin FA, Schuftan C, Suskind RM. Comparison of two hypocaloric diets in obese children. Am J Dis Child. 1993 Feb;147(2):160-6.

Flodmark CE, Ohlsson T, Ryden O, Sveger T. Prevention of progression to severe obesity in a group of obese schoolchildren treated with family therapy. *Pediatrics* 1993; 91: 880-84.

Golan M, Crow S. Targeting parents exclusively in the treatment of childhood obesity: long-term results. *Obes Res* 2004;12:357-361.

Golan M, Weizman A, Apter A, Fainaru M. Parents as the exclusive agents of change in the treatment of childhood obesity. Am J Clin Nutr 1998;67:1130-1135.

Goldfield GS, Epstein LH, Kilanowski CK, Paluch RA, Kogut-Bossler B. Cost-effectiveness of group and mixed family-based treatment for childhood obesity. *Int J Obes Relat Metab Disord*. 2001 Dec;25(12):1843-9.

Graves T, Meyers AW, Clark L. An evaluation of parental problem-solving training in the behavioral treatment of childhood obesity. *Journal of Consulting and Clinical Psychology* 1988; 56:246-250.

Levine, M., Ringham, R., Kalarchian, M., Wisniewski, L., and Marcus, M. Is family-based behavioral weight control appropriate for severe pediatric obesity? *Int J Eat Disord*. 2001 Nov;30(3):318-28.

Maffiuletti NA, De Col A, Agosti F, Ottolini S, Moro D, Genchi M, Massarini M, Lafortuna CL, Sartorio A. Effect of a 3-week body mass reduction program on body composition, muscle function and motor performance in pubertal obese boys and girls. *J Endocrinol Invest*. 2004 Oct;27(9):813-20.

Nuutinen O. Long-term effects of dietary counseling on nutrient intake and weight loss in obese children. *Eur J Clin Nutr*. 1991 Jun;45(6):287-97.

Rolland-Cachera MF, Thibault H, Souberbielle JC, Soulie D, Carbonel P, Deheeger M, Roinsol D, Longueville E, Bellisle F, Serog P. Massive obesity in adolescents: dietary interventions and behaviours associated with weight regain at 2 y follow-up. *Int J Obes Relat Metab Disord*. 2004 Apr;28(4):514-9.

Chen W, Chen SC, Hsu HS, Lee C. Counseling clinic for pediatric weight reduction: program formulation and follow-up. *J Formos Med Assoc* 1997; 96 59-62.

Ebbeling CB, Leidig MM, Sinclair KB, Hangen JP, and Ludwig DS. A Reduced–Glycemic Load Diet in the Treatment of Adolescent Obesity. *Arch Pediatr Adolesc Med* 2003;157:773-779.

Eliakim A, Friedland O, Kowen G, Wolach B, Nemet D. Parental obesity and higher pre-intervention BMI reduce the likelihood of a multidisciplinary childhood obesity program to succeed--a clinical observation. *J Pediatr Endocrinol Metab*. 2004 Aug;17(8):1055-61.

Eliakim A, Kaven G, Berger I, Friedland O, Wolach B, Nemet D. The effect of a combined intervention on body mass index and fitness in obese children and adolescents-a clinical experience. *Eur J Pediatr*. 2002; 161:449-454

Epstein LH, Gordy CC, Raynor HA, Beddome M, Kilanowski CK, Paluch R. Increasing fruit and vegetable intake and decreasing fat and sugar intake in families at risk for childhood obesity. *Obes Res*. 2001 Mar;9(3):171-8.

Epstein LH, Paluch RA, Gordy CC, Dorn J. Decreasing sedentary behaviors in treating pediatric obesity. *Arch Pediatr Adolesc Med* 2000; 154 (3):220-6.

Epstein LH, Paluch RA, Gordy CC, Saelens BE, Ernst MM. Problem solving in the treatment of childhood obesity. *J Consult Clin Psychol* 2000;68:717-21.

Epstein LH, Paluch RA, and Raynor HA. Sex Differences in Obese Children and Siblings in Family-based Obesity Treatment. *Obesity Research* 2001;9:746-753

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year follow-up of behavioral, family-based treatment for obese children. *JAMA* 1990; 264: 2519-2523.

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year outcomes of behavioral family-based treatment for childhood obesity. *Health Psychology*. 1994, 13:373-383.

Epstein LH, Valoski AM, Vara LS, McCurley J, Wisniewski L, Kalarchian MA, Klein KR, Shrager LR. Effects of decreasing sedentary behavior and increasing activity on weight change in obese children. *Health Psychol* 1995;14:109-15.

Epstein LH, Wing RR, Koeske R, and Valoski A. Effect of parent weight on weight loss in obese children. *Journal of Consulting and Clinical Psychology*. 54(3): 400-401, 1986.

Epstein LH, Wing RR, Koeske R, Valoski A. Effects of diet plus exercise on weight change in parents and children. *Journal of Consulting and Clinical Psychology* 1984; 52:429-437.

Epstein LH, Wing RR, Koeske R, Valoski A. A Comparison of Lifestyle Exercise, Aerobic Exercise, and Calisthenics on Weight Loss in Obese Children. *Behavior Therapy* 1985;16;345-56.

Epstein LH, Wing RR, Penner BC, Kress MJ. Effect of diet and controlled exercise on weight loss in obese children. *J Pediatr* 1985;107:358-61.

Epstein, L, Valoski A, Kalarchian M, et al. Do children lose and maintain weight easier than adults: a comparison of child and parent weight changes from six months to ten years. *Obes Res* 1995; 3:411-417.

Figueroa-Colon R, von Almen TK, Franklin FA, Schuftan C, Suskind RM. Comparison of two hypocaloric diets in obese children. Am J Dis Child. 1993 Feb;147(2):160-6.

Flodmark CE, Ohlsson T, Ryden O, Sveger T. Prevention of progression to severe obesity in a group of obese schoolchildren treated with family therapy. *Pediatrics* 1993; 91: 880-84.

Golan M, Crow S. Targeting parents exclusively in the treatment of childhood obesity: long-term results. *Obes Res* 2004;12:357-361.

Golan M, Weizman A, Apter A, Fainaru M. Parents as the exclusive agents of change in the treatment of childhood obesity. Am J Clin Nutr 1998;67:1130-1135.

Goldfield GS, Epstein LH, Kilanowski CK, Paluch RA, Kogut-Bossler B. Cost-effectiveness of group and mixed family-based treatment for childhood obesity. *Int J Obes Relat Metab Disord*. 2001 Dec;25(12):1843-9.

Graves T, Meyers AW, Clark L. An evaluation of parental problem-solving training in the behavioral treatment of childhood obesity. *Journal of Consulting and Clinical Psychology* 1988; 56:246-250.

Levine, M., Ringham, R., Kalarchian, M., Wisniewski, L., and Marcus, M. Is family-based behavioral weight control appropriate for severe pediatric obesity? *Int J Eat Disord*. 2001 Nov;30(3):318-28.

Maffiuletti NA, De Col A, Agosti F, Ottolini S, Moro D, Genchi M, Massarini M, Lafortuna CL, Sartorio A. Effect of a 3-week body mass reduction program on body composition, muscle function and motor performance in pubertal obese boys and girls. *J Endocrinol Invest*. 2004 Oct;27(9):813-20.

Nuutinen O. Long-term effects of dietary counseling on nutrient intake and weight loss in obese children. *Eur J Clin Nutr*. 1991 Jun;45(6):287-97.

Rolland-Cachera MF, Thibault H, Souberbielle JC, Soulie D, Carbonel P, Deheeger M, Roinsol D, Longueville E, Bellisle F, Serog P. Massive obesity in adolescents: dietary interventions and behaviours associated with weight regain at 2 y follow-up. *Int J Obes Relat Metab Disord*. 2004 Apr;28(4):514-9.

Ebbeling CB, Leidig MM, Sinclair KB, Hangen JP, and Ludwig DS. A Reduced–Glycemic Load Diet in the Treatment of Adolescent Obesity. *Arch Pediatr Adolesc Med* 2003;157:773-779.

Maffiuletti NA, De Col A, Agosti F, Ottolini S, Moro D, Genchi M, Massarini M, Lafortuna CL, Sartorio A. Effect of a 3-week body mass reduction program on body composition, muscle function and motor performance in pubertal obese boys and girls. *J Endocrinol Invest*. 2004 Oct;27(9):813-20.

Rolland-Cachera MF, Thibault H, Souberbielle JC, Soulie D, Carbonel P, Deheeger M, Roinsol D, Longueville E, Bellisle F, Serog P. Massive obesity in adolescents: dietary interventions and behaviours associated with weight regain at 2 y follow-up. *Int J Obes Relat Metab Disord*. 2004 Apr;28(4):514-9.

Saelens B, Sallis J, Wilfley D, Patrick K, Cella J, and Buchta R. Behavioral Weight Control for Overweight Adolescents Initiated in Primary Care. *Obesity Research* 2002;10:22-32

Sondike SB, Copperman N, Jacobson MS. Effects of a low-carbohydrate diet on weight loss and cardiovascular risk factor in overweight adolescents. *J Pediatr* 2003; 142: 253-8.

Wadden, T., Stunkard, A., Rich, L., Rubin, C., Sweidel, G, McKinney, S. Obesity in black adolescent girls: a controlled clinical trial of treatment by diet, behavior modification, and parental support. *Pediatrics*. 1990, 85(3): 345-352.

Becque MD, Katch V, Rocchini A, Marks C, and Moorehead C. Coronanry Risk Incidence of Obese Adolescents: Reduction by Exercise Plus Diet Intervention/ *Pediatrics* 1988;81;605-12.

Epstein LH, Paluch RA, Gordy CC, Dorn J. Decreasing sedentary behaviors in treating pediatric obesity. *Arch Pediatr Adolesc Med* 2000; 154 (3):220-6.

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year outcomes of behavioral family-based treatment for childhood obesity. *Health Psychology*. 1994, 13:373-383.

Epstein LH, Wing RR, Koeske R, Valoski A. Effects of diet plus exercise on weight change in parents and children. *Journal of Consulting and Clinical Psychology* 1984; 52:429-437.

Epstein LH, Wing RR, Penner BC, Kress MJ. Effect of diet and controlled exercise on weight loss in obese children. *J Pediatr* 1985;107:358-61.

Gutin B, Barbeau P, Owens S, Lemmon C, Bauman M, Allison J, Kang H, Litaker M. Effects of exercise intensity on cardiovascular fitness, total body composition, and visceral adiposity of obese adolescents *Am J Clin Nutr* 2002;75:818-26.

Owens S, Gutin B, Allison J, Riggs S, Ferguson M, Litaker M, Thompson W. Effect of physical training on total and visceral fat in obese children. *Medicine & Science in Sports & Exercise* 1999;31:143-148

Rocchini AP, Katch V, Anderson J, Hinderliter J, Becque D, Martin M, Marks C. Blood Pressure in Obese Adolescents: Effect of Weight Loss. *Pediatrics* 1988;82:16-23.

Schwingshandl J, Sudi K, et al. Effect of an individualized training programme during weight reduction on body composition: a randomized trial. *Arch Dis Child* 1999; 81:426-8.

Epstein LH, Paluch RA, Gordy CC, Dorn J. Decreasing sedentary behaviors in treating pediatric obesity. *Arch Pediatr Adolesc Med* 2000; 154 (3):220-6.

Epstein LH, Paluch RA, and Raynor HA. Sex Differences in Obese Children and Siblings in Family-based Obesity Treatment. *Obesity Research* 2001;9:746-753

Epstein LH, Valoski AM, Vara LS, McCurley J, Wisniewski L, Kalarchian MA, Klein KR, Shrager LR. Effects of decreasing sedentary behavior and increasing activity on weight change in obese children. *Health Psychol*

1995;14:109-15.

Levine, M., Ringham, R., Kalarchian, M., Wisniewski, L., and Marcus, M. Is family-based behavioral weight control appropriate for severe pediatric obesity? *Int J Eat Disord.* 2001 Nov;30(3):318-28.

Robinson TN. Reducing children's television viewing to prevent obesity: a randomized controlled trial. *JAMA* 1999; 282: 1561-7.

Saelens B, Sallis J, Wilfley D, Patrick K, Cella J, and Buchta R. Behavioral Weight Control for Overweight Adolescents Initiated in Primary Care. *Obesity Research* 2002;10:22-32

DISC. Efficacy and safety of lowering dietary intake of fat and cholesterol in children with elevated low-density lipoprotein cholesterol. The Dietary Intervention Study in Children (DISC). The Writing Group for the DISC Collaborative Research Group. *JAMA* 1995;273:1429-35.

Epstein LH, Paluch RA, Gordy CC, Saelens BE, Ernst MM. Problem solving in the treatment of childhood obesity. *J Consult Clin Psychol* 2000;68:717-21.

Flodmark CE, Ohlsson T, Ryden O, Sveger T. Prevention of progression to severe obesity in a group of obese schoolchildren treated with family therapy. *Pediatrics* 1993; 91: 880-84.

Golan M, Weizman A, Apter A, Fainaru M. Parents as the exclusive agents of change in the treatment of childhood obesity. Am J Clin Nutr 1998;67:1130-1135.

Graves T, Meyers AW, Clark L. An evaluation of parental problem-solving training in the behavioral treatment of childhood obesity. *Journal of Consulting and Clinical Psychology* 1988; 56:246-250.

Israel AC, Guile CA, Baker JE. An evaluation of enhanced self-regulation training in the treatment of childhood obesity. *J Pediatr Psychol* 1994; 19:737-49.

Obarzanek E, Kimm SY, Barton BA, Van Horn L L, Kwiterovich PO Jr, Simons-Morton DG, Hunsberger SA, Lasser NL, Robson AM, Franklin FA Jr, Lauer RM, Stevens VJ, Friedman LA, Dorgan JF, Greenlick MR; DISC Collaborative Research Group. Long-term safety and efficacy of a cholesterol-lowering diet in children with elevated low-density lipoprotein cholesterol: seven-year results of the Dietary Intervention Study in Children (DISC). Pediatrics. 2001 Feb;107(2):256-64.

Saelens B, Sallis J, Wilfley D, Patrick K, Cella J, and Buchta R. Behavioral Weight Control for Overweight Adolescents Initiated in Primary Care. *Obesity Research* 2002;10:22-32

Brown R, Sothern M, Suskind R, Udall J, Blecker U. Racial differences in the lipid profiles of obese children and adolescents before and after significant weight loss. *Clinical Pediatrics* 2000; 39: 427-431.

Brownell KD, Kelman JH, Stunkard AJ. Treatment of obese children with and without their mothers: changes in weight and blood pressure. Pediatrics 1983; 71: 515-23.

Chen W, Chen SC, Hsu HS, Lee C. Counseling clinic for pediatric weight reduction: program formulation and follow-up. *J Formos Med Assoc* 1997; 96 59-62.

Coates TJ, Killen JD, Slinkard LA. Parent participation in a treatment program for overweight adolescents. *Int J Eat Disord* 1982; 1: 37-48.

de Mello ED, Luft VC, Meyer F. Individual outpatient care versus group education programs. Which leads to greater change in dietary and physical activity habits for obese children? *J Pediatr* (Rio J). 2004 Nov-Dec;80(6):468-74.

Epstein LH, Paluch RA, Gordy CC, Dorn J. Decreasing sedentary behaviors in treating pediatric obesity. *Arch Pediatr Adolesc Med* 2000; 154 (3):220-6.

Epstein LH, Paluch RA, Gordy CC, Saelens BE, Ernst MM. Problem solving in the treatment of childhood obesity. *J Consult Clin Psychol* 2000;68:717-21.

Epstein LH, Paluch RA, and Raynor HA. Sex Differences in Obese Children and Siblings in Family-based Obesity Treatment. *Obesity Research* 2001;9:746-753

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year follow-up of behavioral, family-based treatment for obese children. *JAMA* 1990; 264: 2519-2523.

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year outcomes of behavioral family-based treatment for childhood obesity. *Health Psychology.* 1994, 13:373-383.

Epstein LH, Valoski AM, Vara LS, McCurley J, Wisniewski L, Kalarchian MA, Klein KR, Shrager LR. Effects of decreasing sedentary behavior and increasing activity on weight change in obese children. *Health Psychol* 1995;14:109-15.

Epstein LH, Wing RR, Koeske R, and Valoski A. Effect of parent weight on weight loss in obese children. *Journal of Consulting and Clinical Psychology.* 54(3): 400-401, 1986.

Epstein LH, Wing RR, Koeske R, Valoski A. Effects of diet plus exercise on weight change in parents and children. *Journal of Consulting and Clinical Psychology* 1984; 52:429-437.

Epstein LH, Wing RR, Koeske R, Valoski A. A Comparison of Lifestyle Exercise, Aerobic Exercise, and Calisthenics on Weight Loss in Obese Children. *Behavior Therapy* 1985;16;345-56.

Epstein LH, Wing RR, Penner BC, Kress MJ. Effect of diet and controlled exercise on weight loss in obese children. *J Pediatr* 1985;107:358-61.

Epstein, L, Valoski A, Kalarchian M, et al. Do children lose and maintain weight easier than adults: a comparison of child and parent weight changes from six months to ten years. *Obes Res* 1995; 3:411-417.

Flodmark CE, Ohlsson T, Ryden O, Sveger T. Prevention of progression to severe obesity in a group of obese schoolchildren treated with family therapy. *Pediatrics* 1993; 91: 880-84.

Golan M, Weizman A, Apter A, Fainaru M. Parents as the exclusive agents of change in the treatment of childhood obesity. Am J Clin Nutr 1998;67:1130-1135.

Israel AC, Guile CA, Baker JE. An evaluation of enhanced self-regulation training in the treatment of childhood obesity. *J Pediatr Psychol* 1994; 19:737-49.

Kirschenbaum DS, Harris ES, Tomarken AJ. Effects of parental involvement in behavioral weight loss therapy for preadolescents. *Behavior Therapy* 1984;15:485-500.

Levine, M., Ringham, R., Kalarchian, M., Wisniewski, L., and Marcus, M. Is family-based behavioral weight control appropriate for severe pediatric obesity? *Int J Eat* Disord. 2001 Nov;30(3):318-28.

Miraglia del Giudice E, Santoro N, Marotta A, Nobili B, Di Toro, Perrone L. Inadequate leptin level negatively affects body fat loss during a weight reduction programme for childhood obesity. *Acta Paediatr* 2002; 91: 132-135.

Sothern, M., Hunter, S., Suskind R., Brown, R., Udall, J. and Blecker, U. Motivating the obese child to move: the role of structured exercise in pediatric weight management. *Southern Medical Journal* 1999; 92: 577-584.

Sothern, M., Despinasse, B., Brown, R., Suskind, R., Udall, J. and Blecker, U. Lipid profiles of obese children and adolescents before and after significant weight loss: differences according to sex. *Southern Medical Journal* 2000; 93: 278-282.

Sothern, M., Loftin, M., Udall, J., Suskind R., Ewing, T., Tang, S., & Blecker, U. Safety, feasibility and efficacy of a resistance training program in preadolescent obese children. *American Journal of the Medical Sciences*, 2000; 319: 370-375.

Sothern, M., Schumacher, H., von Almen, T., Carlisle, L., & Udall, J. Committed to Kids: an integrated, four level team approach to weight management in adolescents. *Journal of the American Dietetic Association* 2002;102:S81-S85.

Sothern, M., Udall, J. Suskind, R., Vargas, A., & Blecker, U. Weight loss and growth velocity in obese children after very low calorie diet, exercise and behavior modification. *Acta Paediatrica*, 2000; 89(9): 1036-43.

Wadden, T., Stunkard, A., Rich, L., Rubin, C., Sweidel, G, McKinney, S. Obesity in black adolescent girls: a controlled clinical trial of treatment by diet, behavior modification, and parental support. *Pediatrics*. 1990, 85(3): 345-352.

Brown R, Sothern M, Suskind R, Udall J, Blecker U. Racial differences in the lipid profiles of obese children and adolescents before and after significant weight loss. *Clinical Pediatrics* 2000; 39: 427-431.

Brownell KD, Kelman JH, Stunkard AJ. Treatment of obese children with and without their mothers: changes in weight and blood pressure. Pediatrics 1983; 71: 515-23.

Chen W, Chen SC, Hsu HS, Lee C. Counseling clinic for pediatric weight reduction: program formulation and follow-up. *J Formos Med Assoc* 1997; 96 59-62.

Coates TJ, Killen JD, Slinkard LA. Parent participation in a treatment program for overweight adolescents. *Int J Eat Disord* 1982; 1: 37-48.

de Mello ED, Luft VC, Meyer F. Individual outpatient care versus group education programs. Which leads to greater change in dietary and physical activity habits for obese children? *J Pediatr* (Rio J). 2004 Nov-Dec;80(6):468-74.

Epstein LH, Paluch RA, Gordy CC, Dorn J. Decreasing sedentary behaviors in treating pediatric obesity. *Arch Pediatr Adolesc Med* 2000; 154 (3):220-6.

Epstein LH, Paluch RA, Gordy CC, Saelens BE, Ernst MM. Problem solving in the treatment of childhood obesity. *J Consult Clin Psychol* 2000;68:717-21.

Epstein LH, Paluch RA, and Raynor HA. Sex Differences in Obese Children and Siblings in Family-based Obesity Treatment. *Obesity Research* 2001;9:746-753

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year follow-up of behavioral, family-based treatment for obese children. *JAMA* 1990; 264: 2519-2523.

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year outcomes of behavioral family-based treatment for childhood obesity. *Health Psychology*. 1994, 13:373-383.

Epstein LH, Valoski AM, Vara LS, McCurley J, Wisniewski L, Kalarchian MA, Klein KR, Shrager LR. Effects of decreasing sedentary behavior and increasing activity on weight change in obese children. *Health Psychol* 1995;14:109-15.

Epstein LH, Wing RR, Koeske R, and Valoski A. Effect of parent weight on weight loss in obese children. *Journal of Consulting and Clinical Psychology*. 54(3): 400-401, 1986.

Epstein LH, Wing RR, Koeske R, Valoski A. Effects of diet plus exercise on weight change in parents and children. *Journal of Consulting and Clinical Psychology* 1984; 52:429-437.

Epstein LH, Wing RR, Koeske R, Valoski A. A Comparison of Lifestyle Exercise, Aerobic Exercise, and Calisthenics on Weight Loss in Obese Children. *Behavior Therapy* 1985;16;345-56.

Epstein LH, Wing RR, Penner BC, Kress MJ. Effect of diet and controlled exercise on weight loss in obese children. *J Pediatr* 1985;107:358-61.

Epstein, L, Valoski A, Kalarchian M, et al. Do children lose and maintain weight easier than adults: a comparison of child and parent weight changes from six months to ten years. *Obes Res* 1995; 3:411-417.

Flodmark CE, Ohlsson T, Ryden O, Sveger T. Prevention of progression to severe obesity in a group of obese schoolchildren treated with family therapy. *Pediatrics* 1993; 91: 880-84.

Golan M, Weizman A, Apter A, Fainaru M. Parents as the exclusive agents of change in the treatment of childhood obesity. Am J Clin Nutr 1998;67:1130-1135.

Israel AC, Guile CA, Baker JE. An evaluation of enhanced self-regulation training in the treatment of childhood obesity. *J Pediatr Psychol* 1994; 19:737-49.

Kirschenbaum DS, Harris ES, Tomarken AJ. Effects of parental involvement in behavioral weight loss therapy for preadolescents. *Behavior Therapy* 1984;15:485-500.

Levine, M., Ringham, R., Kalarchian, M., Wisniewski, L., and Marcus, M. Is family-based behavioral weight control appropriate for severe pediatric obesity? *Int J Eat D*isord. 2001 Nov;30(3):318-28.

Miraglia del Giudice E, Santoro N, Marotta A, Nobili B, Di Toro, Perrone L. Inadequate leptin level negatively affects body fat loss during a weight reduction programme for childhood obesity. *Acta Paediatr* 2002; 91: 132-135.

Sothern, M., Hunter, S., Suskind R., Brown, R., Udall, J. and Blecker, U. Motivating the obese child to move: the role of structured exercise in pediatric weight management. *Southern Medical Journal* 1999; 92: 577-584.

Sothern, M., Despinasse, B., Brown, R., Suskind, R., Udall, J. and Blecker, U. Lipid profiles of obese children and adolescents before and after significant weight loss: differences according to sex. *Southern Medical Journal* 2000; 93: 278-282.

Sothern, M., Loftin, M., Udall, J., Suskind R., Ewing, T., Tang, S., & Blecker, U. Safety, feasibility and efficacy of a resistance training program in preadolescent obese children. *American Journal of the Medical Sciences*, 2000; 319: 370-375.

Sothern, M., Schumacher, H., von Almen, T., Carlisle, L., & Udall, J. Committed to Kids: an integrated, four level team approach to weight management in adolescents. *Journal of the American Dietetic Association* 2002;102:S81-S85.

Sothern, M., Udall, J. Suskind, R., Vargas, A., & Blecker, U. Weight loss and growth velocity in obese children after very low calorie diet, exercise and behavior modification. *Acta Paediatrica*, 2000; 89(9): 1036-43.

Wadden, T., Stunkard, A., Rich, L., Rubin, C., Sweidel, G, McKinney, S. Obesity in black adolescent girls: a controlled clinical trial of treatment by diet, behavior modification, and parental support. *Pediatrics*. 1990, 85(3): 345-352.

Brown R, Sothern M, Suskind R, Udall J, Blecker U. Racial differences in the lipid profiles of obese children and adolescents before and after significant weight loss. *Clinical Pediatrics* 2000; 39: 427-431.

Brownell KD, Kelman JH, Stunkard AJ. Treatment of obese children with and without their mothers: changes in weight and blood pressure. Pediatrics 1983; 71: 515-23.

Chen W, Chen SC, Hsu HS, Lee C. Counseling clinic for pediatric weight reduction: program formulation and follow-up. *J Formos Med Assoc* 1997; 96 59-62.

Coates TJ, Killen JD, Slinkard LA. Parent participation in a treatment program for overweight adolescents. *Int J Eat Disord* 1982; 1: 37-48.

DISC. Efficacy and safety of lowering dietary intake of fat and cholesterol in children with elevated low-density lipoprotein cholesterol. The Dietary Intervention Study in Children (DISC). The Writing Group for the DISC Collaborative Research Group. *JAMA* 1995;273:1429-35.

Eliakim A, Friedland O, Kowen G, Wolach B, Nemet D. Parental obesity and higher pre-intervention BMI reduce the likelihood of a multidisciplinary childhood obesity program to succeed--a clinical observation. *J Pediatr Endocrinol Metab*. 2004 Aug;17(8):1055-61.

Eliakim A, Kaven G, Berger I, Friedland O, Wolach B, Nemet D. The effect of a combined intervention on body mass index and fitness in obese children and adolescents-a clinical experience. *Eur J Pediatr*. 2002; 161:449-454

Epstein LH, Paluch RA, Gordy CC, Dorn J. Decreasing sedentary behaviors in treating pediatric obesity. *Arch Pediatr Adolesc Med* 2000; 154 (3):220-6.

Epstein LH, Paluch RA, Gordy CC, Saelens BE, Ernst MM. Problem solving in the treatment of childhood obesity. *J Consult Clin Psychol* 2000;68:717-21.

Epstein LH, Paluch RA, and Raynor HA. Sex Differences in Obese Children and Siblings in Family-based Obesity Treatment. *Obesity Research* 2001;9:746-753

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year follow-up of behavioral, family-based treatment for obese children. *JAMA* 1990; 264: 2519-2523.

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year outcomes of behavioral family-based treatment for childhood obesity. *Health Psychology*. 1994, 13:373-383.

Epstein LH, Valoski AM, Vara LS, McCurley J, Wisniewski L, Kalarchian MA, Klein KR, Shrager LR. Effects of decreasing sedentary behavior and increasing activity on weight change in obese children. *Health Psychol* 1995;14:109-15.

Epstein LH, Wing RR, Koeske R, and Valoski A. Effect of parent weight on weight loss in obese children. *Journal of Consulting and Clinical Psychology*. 54(3): 400-401, 1986.

Epstein LH, Wing RR, Koeske R, Valoski A. Effects of diet plus exercise on weight change in parents and children. *Journal of Consulting and Clinical Psychology* 1984; 52:429-437.

Epstein LH, Wing RR, Koeske R, Valoski A. A Comparison of Lifestyle Exercise, Aerobic Exercise, and Calisthenics on Weight Loss in Obese Children. *Behavior Therapy* 1985;16;345-56.

Epstein LH, Wing RR, Penner BC, Kress MJ. Effect of diet and controlled exercise on weight loss in obese children. *J Pediatr* 1985;107:358-61.

Epstein, L, Valoski A, Kalarchian M, et al. Do children lose and maintain weight easier than adults: a comparison of child and parent weight changes from six months to ten years. *Obes Res* 1995; 3:411-417.

Figueroa-Colon R, von Almen TK, Franklin FA, Schuftan C, Suskind RM. Comparison of two hypocaloric diets in obese children. Am J Dis Child. 1993 Feb;147(2):160-6.

Flodmark CE, Ohlsson T, Ryden O, Sveger T. Prevention of progression to severe obesity in a group of obese schoolchildren treated with family therapy. *Pediatrics* 1993; 91: 880-84.

Golan M, Crow S. Targeting parents exclusively in the treatment of childhood obesity: long-term results. *Obes Res* 2004;12:357-361.

Golan M, Weizman A, Apter A, Fainaru M. Parents as the exclusive agents of change in the treatment of childhood obesity. Am J Clin Nutr 1998;67:1130-1135.

Goldfield GS, Epstein LH, Kilanowski CK, Paluch RA, Kogut-Bossler B. Cost-effectiveness of group and mixed family-based treatment for childhood obesity. *Int J Obes Relat Metab Disord*. 2001 Dec;25(12):1843-9.

Graves T, Meyers AW, Clark L. An evaluation of parental problem-solving training in the behavioral treatment of childhood obesity. *Journal of Consulting and Clinical Psychology* 1988; 56:246-250.

Israel AC, Guile CA, Baker JE. An evaluation of enhanced self-regulation training in the treatment of childhood obesity. *J Pediatr Psychol* 1994; 19:737-49.

Kirschenbaum DS, Harris ES, Tomarken AJ. Effects of parental involvement in behavioral weight loss therapy for preadolescents. *Behavior Therapy* 1984;15:485-500.

Levine, M., Ringham, R., Kalarchian, M., Wisniewski, L., and Marcus, M. Is family-based behavioral weight control appropriate for severe pediatric obesity? *Int J Eat D*isord. 2001 Nov;30(3):318-28.

McDuffie JR, Calis KA, Uswaifo GI, Sebring NG, Fallon EM, Hubbard VS, Yanovski JA. Three-month tolerability of orlistat in adolescents with obesity-related comorbidities. *Obes Res* 2002;10:642-650.

Mellin LM, Slinkard LA, Irwin CE. Adolescent obesity intervention: validation of the SHAPEDOWN program. *J Am Diet Assoc* 1987; 87:333-8.

Miraglia del Giudice E, Santoro N, Marotta A, Nobili B, Di Toro, Perrone L. Inadequate leptin level negatively affects body fat loss during a weight reduction programme for childhood obesity. *Acta Paediatr* 2002; 91: 132-135.

Nuutinen O, and Knip M. Long-term weight control in obese children: persistence of treatment outcome and metabolic changes. *International Journal of Obesity* 1992;16:279-287.

Nuutinen O. Long-term effects of dietary counseling on nutrient intake and weight loss in obese children. *Eur J Clin Nutr*. 1991 Jun;45(6):287-97.

Obarzanek E, Kimm SY, Barton BA, Van Horn L L, Kwiterovich PO Jr, Simons-Morton DG, Hunsberger SA, Lasser NL, Robson AM, Franklin FA Jr, Lauer RM, Stevens VJ, Friedman LA, Dorgan JF, Greenlick MR; DISC Collaborative Research Group. Long-term safety and efficacy of a cholesterol-lowering diet in children with elevated low-density lipoprotein cholesterol: seven-year results of the Dietary Intervention Study in Children (DISC). Pediatrics. 2001 Feb;107(2):256-64.

Sothern, M., Hunter, S., Suskind R., Brown, R., Udall, J. and Blecker, U. Motivating the obese child to move: the role of structured exercise in pediatric weight management. *Southern Medical Journal* 1999; 92: 577-584.

Sothern, M., Despinasse, B., Brown, R., Suskind, R., Udall, J. and Blecker, U. Lipid profiles of obese children and adolescents before and after significant weight loss: differences according to sex. *Southern Medical Journal* 2000; 93: 278-282.

Sothern, M., Loftin, M., Udall, J., Suskind R., Ewing, T., Tang, S., & Blecker, U. Safety, feasibility and efficacy of a resistance training program in preadolescent obese children. *American Journal of the Medical Sciences*, 2000; 319: 370-375.

Sothern, M., Schumacher, H., von Almen, T., Carlisle, L., & Udall, J. Committed to Kids: an integrated, four level team approach to weight management in adolescents. *Journal of the American Dietetic Association* 2002;102:S81-S85.

Sothern, M., Udall, J. Suskind, R., Vargas, A., & Blecker, U. Weight loss and growth velocity in obese children after very low calorie diet, exercise and behavior modification. *Acta Paediatrica*, 2000; 89(9): 1036-43.

Spieth L, Harnish J, Lenders C, Raezer L, Pereira M, Hangen SJ, Ludwig D. A Low-Glycemic Index Diet in the Treatment of Pediatric Obesity *Arch Pediatr Adolesc Med* 2000;154:947-951

Wadden, T., Stunkard, A., Rich, L., Rubin, C., Sweidel, G, McKinney, S. Obesity in black adolescent girls: a controlled clinical trial of treatment by diet, behavior modification, and parental support. *Pediatrics*. 1990, 85(3): 345-352.

Brown R, Sothern M, Suskind R, Udall J, Blecker U. Racial differences in the lipid profiles of obese children and adolescents before and after significant weight loss. *Clinical Pediatrics* 2000; 39: 427-431.

Brownell KD, Kelman JH, Stunkard AJ. Treatment of obese children with and without their mothers: changes in weight and blood pressure. Pediatrics 1983; 71: 515-23.

Chen W, Chen SC, Hsu HS, Lee C. Counseling clinic for pediatric weight reduction: program formulation and follow-up. *J Formos Med Assoc* 1997; 96 59-62.

Coates TJ, Killen JD, Slinkard LA. Parent participation in a treatment program for overweight adolescents. *Int J Eat Disord* 1982; 1: 37-48.

de Mello ED, Luft VC, Meyer F. Individual outpatient care versus group education programs. Which leads to greater

change in dietary and physical activity habits for obese children? *J Pediatr* (Rio J). 2004 Nov-Dec;80(6):468-74.

Epstein LH, Paluch RA, Gordy CC, Dorn J. Decreasing sedentary behaviors in treating pediatric obesity. *Arch Pediatr Adolesc Med* 2000; 154 (3):220-6.

Epstein LH, Paluch RA, Gordy CC, Saelens BE, Ernst MM. Problem solving in the treatment of childhood obesity. *J Consult Clin Psychol* 2000;68:717-21.

Epstein LH, Paluch RA, and Raynor HA. Sex Differences in Obese Children and Siblings in Family-based Obesity Treatment. *Obesity Research* 2001;9:746-753

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year follow-up of behavioral, family-based treatment for obese children. *JAMA* 1990; 264: 2519-2523.

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year outcomes of behavioral family-based treatment for childhood obesity. *Health Psychology*. 1994, 13:373-383.

Epstein LH, Valoski AM, Vara LS, McCurley J, Wisniewski L, Kalarchian MA, Klein KR, Shrager LR. Effects of decreasing sedentary behavior and increasing activity on weight change in obese children. *Health Psychol* 1995;14:109-15.

Epstein LH, Wing RR, Koeske R, and Valoski A. Effect of parent weight on weight loss in obese children. *Journal of Consulting and Clinical Psychology*. 54(3): 400-401, 1986.

Epstein LH, Wing RR, Koeske R, Valoski A. Effects of diet plus exercise on weight change in parents and children. *Journal of Consulting and Clinical Psychology* 1984; 52:429-437.

Epstein LH, Wing RR, Koeske R, Valoski A. A Comparison of Lifestyle Exercise, Aerobic Exercise, and Calisthenics on Weight Loss in Obese Children. *Behavior Therapy* 1985;16;345-56.

Epstein LH, Wing RR, Penner BC, Kress MJ. Effect of diet and controlled exercise on weight loss in obese children. *J Pediatr* 1985;107:358-61.

Epstein, L, Valoski A, Kalarchian M, et al. Do children lose and maintain weight easier than adults: a comparison of child and parent weight changes from six months to ten years. *Obes Res* 1995; 3:411-417.

Flodmark CE, Ohlsson T, Ryden O, Sveger T. Prevention of progression to severe obesity in a group of obese schoolchildren treated with family therapy. *Pediatrics* 1993; 91: 880-84.

Golan M, Weizman A, Apter A, Fainaru M. Parents as the exclusive agents of change in the treatment of childhood obesity. Am J Clin Nutr 1998;67:1130-1135.

Israel AC, Guile CA, Baker JE. An evaluation of enhanced self-regulation training in the treatment of childhood obesity. *J Pediatr Psychol* 1994; 19:737-49.

Kirschenbaum DS, Harris ES, Tomarken AJ. Effects of parental involvement in behavioral weight loss therapy for preadolescents. *Behavior Therapy* 1984;15:485-500.

Levine, M., Ringham, R., Kalarchian, M., Wisniewski, L., and Marcus, M. Is family-based behavioral weight control appropriate for severe pediatric obesity? *Int J Eat D*isord. 2001 Nov;30(3):318-28.

Miraglia del Giudice E, Santoro N, Marotta A, Nobili B, Di Toro, Perrone L. Inadequate leptin level negatively affects body fat loss during a weight reduction programme for childhood obesity. *Acta Paediatr* 2002; 91: 132-135.

Sothern, M., Hunter, S., Suskind R., Brown, R., Udall, J. and Blecker, U. Motivating the obese child to move: the role of structured exercise in pediatric weight management. *Southern Medical Journal* 1999; 92: 577-584.

Sothern, M., Despinasse, B., Brown, R., Suskind, R., Udall, J. and Blecker, U. Lipid profiles of obese children and adolescents before and after significant weight loss: differences according to sex. *Southern Medical Journal* 2000; 93: 278-282.

Sothern, M., Loftin, M., Udall, J., Suskind R., Ewing, T., Tang, S., & Blecker, U. Safety, feasibility and efficacy of a resistance training program in preadolescent obese children. *American Journal of the Medical Sciences*, 2000; 319: 370-375.

Sothern, M., Schumacher, H., von Almen, T., Carlisle, L., & Udall, J. Committed to Kids: an integrated, four level team approach to weight management in adolescents. *Journal of the American Dietetic Association* 2002;102:S81-S85.

Sothern, M., Udall, J. Suskind, R., Vargas, A., & Blecker, U. Weight loss and growth velocity in obese children after very low calorie diet, exercise and behavior modification. *Acta Paediatrica*, 2000; 89(9): 1036-43.

Wadden, T., Stunkard, A., Rich, L., Rubin, C., Sweidel, G, McKinney, S. Obesity in black adolescent girls: a controlled clinical trial of treatment by diet, behavior modification, and parental support. *Pediatrics*. 1990, 85(3): 345-352.

Chanoine J-P, Hampl S, Jansen C, Boldrin M, Hauptman J. Effect of orlistat on weight and body composition in obese adolescents. A randomized controlled trial. *JAMA* 2005;293:2873-2883.

Maahs D, de Serna DG, Kolotkin RL, Ralston S, Sandate J, Qualls C, Schade DS. Randomized, double-blind, placebo-controlled trial of orlistat for weight loss in adolescents. *Endocr Pract* 2006;12:18-28.

McDuffie JR, Callis KA, Uwalo NG, Fallon EM, Frazier TE, Hubbard VS, Yanovski JA. Efficacy of orlistat as an adjunct to behavioral treatment in overweight African-American and Caucasian adolescents with obesity-related co-morbid conditions. *J Pediatr Endocrinol Medab* 2004;17:307-319.

McDuffie JR, Calis KA, Uswaifo GI, Sebring NG, Fallon EM, Hubbard VS, Yanovski JA. Three-month tolerability of orlistat in adolescents with obesity-related comorbidities. *Obes Res* 2002;10:642-650.

Ozkan B, Berekey A, Turan S, Keskin S. Addition of orlistat to conventional treatment in adolescents with severe

obesity. *Eur J Pediatr* 2004;163:738-741.

- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

  International Dietetics and Nutrition Terminology (IDNT) Reference Manual: Standardized Language for the Nutrition Care Process 2007. American Dietetic Association.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Decreasing Sedentary Behaviors in Children and Adolescents

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

  PWM: Decreasing Sedentary Behaviors - Children

  Children should be counseled to reduce or limit sedentary activities (e.g., television, video games, "screen time"). Intervention research indicates that reducing sedentary activities may have both short-term and longer-term benefits in terms of pediatric obesity. Observational research also indicates that television time may also be associated with increased consumption of energy-dense foods.

  Rating: Fair
  Imperative

  PWM: Decreasing Sedentary Behaviors - Adolescents

  Adolescents should be counseled to reduce or limit sedentary activities (e.g., TV, video games, "screen time"). Limited intervention research indicates that reducing sedentary activities may have both short term benefits in terms of pediatric obesity.

  Rating: Weak
  Imperative

  - Risks/Harms of Implementing This Recommendation

    None.

  - Conditions of Application

    None.

  - Potential Costs Associated with Application

    Absence of health insurance coverage for weight management could limit program access.

  - Recommendation Narrative

    Five studies (four RCTs and one non-randomized trial) were analyzed that included an intervention to reduce sedentary behaviors (e.g., television-watching), as part of a multi-component childhood weight management program. Only one study examined adolescents (Saelens B, Sallis J, et al 2002), while the others focused on children (ages six to 12). All studies earned a positive quality rating.

    In children (ages six to 12), the addition of interventions to decrease sedentary activities to a multi-component pediatric obesity program is associated with improved adiposity outcomes. For adolescents however, the results are promising but less clear.

    Research also indicates that the effectiveness of interventions to reduce sedentary behaviors may be more effective for boys and is dose-dependent.

    Some very limited research (Epstein LH, Valoski AM, Vara LS, McCurley J, et al. 1995 Health Psych) suggests that interventions to reduce sedentary behaviors may be more effective than interventions to increase physical activity alone. However, this research is too limited to be generalized.

  - Recommendation Strength Rationale

    The number of studies on the reduction of sedentary activities and the treatment of pediatric obesity was limited, though the results are consistent (Grade II). The findings with regard to adolescents is promising, but even more limited (Grade III).

- Minority Opinions

  None.

- Supporting Evidence

  The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

  What is the effectiveness of using a program to decrease sedentary behaviors as a part of an intervention program to treat childhood obesity?

  Is frequent television viewing associated with a higher risk or prevalence of overweight among youth?

  Is frequent use of video games associated with a higher risk or prevalence of overweight among youth?

  - References

    Epstein LH, Paluch RA, Gordy CC, Dorn J. Decreasing sedentary behaviors in treating pediatric obesity. *Arch Pediatr Adolesc Med* 2000; 154 (3):220-6.

    Epstein LH, Paluch RA, and Raynor HA. Sex Differences in Obese Children and Siblings in Family-based Obesity Treatment. *Obesity Research* 2001;9:746-753

    Epstein LH, Valoski AM, Vara LS, McCurley J, Wisniewski L, Kalarchian MA, Klein KR, Shrager LR. Effects of decreasing sedentary behavior and increasing activity on weight change in obese children. *Health Psychol* 1995;14:109-15.

    Levine, M., Ringham, R., Kalarchian, M., Wisniewski, L., and Marcus, M. Is family-based behavioral weight control appropriate for severe pediatric obesity? *Int J Eat Disord*. 2001 Nov;30(3):318-28.

    Robinson TN. Reducing children's television viewing to prevent obesity: a randomized controlled trial. *JAMA* 1999; 282: 1561-7.

    Saelens B, Sallis J, Wilfley D, Patrick K, Cella J, and Buchta R. Behavioral Weight Control for Overweight Adolescents Initiated in Primary Care. *Obesity Research* 2002;10:22-32

    Andersen RE, Crespo CJ, Bartlet SJ, Cheskin LJ, Pratt M. Relationship of physical activity and television watching with body weight and level of fatness among children. *Journal of the American Medical Association.* 1998; 279: 938-942.

    Ariza AJ, Chen EH, Binns HJ, Christoffel KK. Risk factors for overweight in five- to six-year-old Hispanic-American children: A pilot study. *J Urban Health* 2004;81:150-161.

    Berkey CS, Rockett HRH, Field AE, Gillman MW, Frazier AL, Camargo CA, Colditz GA. Activity, dietary intake, and weight changes in a longitudinal study of preadolescent and adolescent boys and girls. *Pediatrics* 2000; 105: 1-9.

    Berkey CS, Rockett HRH, Gillman MW, Colditz GA, 2003. One-year change in activity and in inactivity among 10 to 15 year old boys and girls: Relationship to change in body mass index. *Pediatrics.* 111 (4): 836-843.

    Bogaert N, Steinbeck KS, Baur LA, Brock K, Bermingham MA. Food, activity and family--environmental vs biochemical predictors of weight gain in children. *Eur J Clin Nutr*. 2003 Oct;57(10):1242-9.

    Brewis A. Biocultural aspects of obesity in young Mexican schoolchildren. *Am J Hum Biol*. 2003 May-Jun;15(3):446-60.

    Crespo CJ, Smit E, Troiano RP, Bartlett SJ, Macera CA, Andersen RE. Television watching, energy intake, and obesity in US children. *Arch Pediatric Adolescent Medicine* 2001;155:360-65.

    Crooks DL. Food consumption, activity, and overweight among elementary school children in an Appalachian Kentucky community. *American Journal of Physical Anthropology* 2000;112: 159-170

    Dennison BA, Erb TA, Jenkins PL Television viewing and television in bedroom associated with overweight risk among low income preschool children. *Pediatrics*. 2002;109:1028-35.

    Dietz WH, Gortmaker SL. Do we fatten our children at the television set? Obesity and television viewing in children and adolescents. *Pediatrics* 1985;75:807-812

    Dowda, M., Ainsworth, B.E., Addy, C.L., Saunders, R. Riner, W. Environmental influences, physical activity, and weight status in 8 to 16 year-olds. *Archives of Pediatric and Adolescent Medicine* 2001; 155:711-717.

    DuRant R, Baranowski T, Johnson M, Thompson W. The relationship among television watching, physical activity, and body composition of young children. *Pediatrics*. 1994;94:449-455.

    Dwyer JT, Stone EJ, Yang M, Feldman H, Webber LS, Must A, Perry CL, Nader PR, Parcel GS. Predictors of overweight and overfatness in a multiethnic pediatric population *American Journal of Clinical Nutrition* 1998;67:602-610

    Eisenmann, J.C., Bartee, R.T., Wang, M.Q. Physical activity, TV viewing and weight in U.S. youth: 1999 Youth Risk Behavior Survey. *Obesity Research* 2002; 10(5): 379-385

    Felton, G.M., Dowda, M., Ward, D.S., Dishman, R.K., Trost, S.G., Saunders, R., & Pate, R.R. (2002). Differences in physical activity between black and white girls living in rural and urban areas. *Journal of School Health*, 72 (6), 250-255

    Fontvieille AM, Kriska A, Ravussin E. Decreased physical activity in Pima Indian compared with Caucasian children. *International Journal of Obesity* 1993;17: 445-452.

Francis LA, Lee Y, Birch LL. Parental weight status and girls' television viewing, snacking, and body mass indexes. *Obes Res* 2003;11:143-51.

Giammattei J, Blix G, Marshah HH, Wollitzer AO, Pettitt DJ. Television watching and soft drink consumption: associations with obesity in 11- to 13-year old schoolchildren. *Arch Pediatr Adolesc Med* 2003;157:882-886.

Gordon-Larsen P, Adair LS, Popkin BM. Ethnic differences in physical activity and inactivity patterns and overweight status *Obesity Research* 2002; 10: 141-149.

Gordon-Larsen P. Obesity-related knowledge, attitudes, and behaviors in obese and non-obese urban Philadelphia female adolescents. *Obesity Research* 2001;9(2):112-18

Gray A., & Smith, C. (2003). Fitness, dietary intake, and body mass index in urban native American youth. *Journal of American Dietetic Association*, 103(9), 1187-1191.

Guillaume M, Lapidus L, Bjorntorp P, Lambert A. Physical activity, obesity and cardiovascular risk factors in children. The Belgian Luxembourg child study II. *Obesity Research* 1997; 5: 549-556.

Hanley AJG, Harris SB, Gittelsohn J, Wolever TMS, Saksvig B, Zinman B. Overweight among children and adolescents in a Native Canadian community: prevalence and associated factors. *Am J Clin Nutr*, 2000; 71: 693-700.

Hernandez B, Gortmaker SL, Colditz GA, Peterson KE, Laird LM, Parra-Cabrera S. Association of obesity with physical activity, television programs and other forms of video viewing among children in Mexico City. *International Journal of Obesity and Related Metabolic Disorders* 1999;23:845-854.

Horn OK, Paradis G, Potvin L, Macaulay AC, Desrosiers S. Correlates and predictors of adiposity among Mohawk children. *Preventive Medicine* 2001; 33: 274-281.

Janz KF, Levy SM, Burns TL, Torner JC, Willing MC, Warren JJ Fatness, physical activity, and television viewing in children during the adiposity rebound period: The Iowa bone development study. *Preventative Medicine* 2002;35:563-71

Katzmarzyk, P., Malina, R.M., Song, T.M., Bouchard, C. Television viewing, physical activity, and health related fitness of youth in the Quebec family study. *Journal of Adolescent Health* 1998; 23:318-325.

Kelishadi R, Pour MH, Sarraf-Zadegan N, Sadry GH, Ansari R, Alikhassy H, Bashardoust N. Obesity and associated modifiable environmental factors in Iranian adolescents: Isfahan Healthy Heart Program - Heart Health Promotion from Childhood. *Pediatr Int*. 2003 Aug;45(4):435-42.

Kimm SYS, Obarzanek E, Barton BA, Aston CE, Similo SL, Morrison JA, Sabry ZA, Schreiber GB, McMahon RP, 1996. Race, socioeconomic status, and obesity in 9- to 10- year old girls: The NHLBI growth and health study. Annual Epidemiology, 6 (4), 266-275.

Lin BH, Huang CL, French SA. Factors associated with women's and children's body mass indices by income status. *Int J Obes Relat Metab Disord*. 2004 Apr;28(4):536-42.

Locard E, Mamelle N, Billette A, Miginiac M, Munoz F, Rey S. Risk factors of obesity in a fiver year old population. Parental versus environmental factors. *Int J Obes* 1992;16:721-9.

Lowry, R., Wechsler, H., Galuska, A., Fulton, J.E., & Kann, L. Television viewing and its associations with overweight, sedentary lifestyle, and insufficient consumption of fruits and vegetables among US high school students: differences by race, ethnicity, and gender. *J Sch Health* 2002;72(10):413-421.

Maffeis C, Talamini G, Tato L. Influence of diet, physical activity and parents' obesity on children's adiposity: a four-year longitudinal study. *International Journal of Obesity and Related Metabolic Disorders* 1998;22: 758-764.

Maffeis C, Talamini G, Tato L. Influence of diet, physical activity and parents' obesity on children's adiposity: A four-year longitudinal study. *Int J Obes.* 1998; 22: 758-764.

McMurray RG, Harrell JS, Deng S, Bradley CB, Cox LM, Bangdiwala SI. The influence of physical activity, socioeconomic status, and ethnicity on the weight status of adolescents. *Obesity Research* 2000;8(2):130-39.

Muller MJ, Koertzinger I, Mast M, Langnase K, Grund A. Physical activity and diet in 5 and 7 years old children. Nutrition Society. 1999;2(3a):443-44.

Muller, MJ, Grund, A, Krause, H, Siewers, M, Bosy-Westphal, A, & Rieckert, H. Determinants of fat mass in prepubertal children. *Br J Nutr* 2002;88:545-554.

Neutzling, M.B., Taddei, J.A.A.C., & Gigante, D.P. Risk factors of obesity among Brazilian adolescents: a case-control study. *Public Health Nutr*. 2003 Dec;6(8):743-9.

Obarzanek E, Schreiber GB, et al. Energy intake and physical activity in relation to indexes of body fat: National heart, lung, and blood institute growth and health study. *American Journal of Clinical Nutrition* 1994; 60: 15-22.

O'Loughlin J, Gray-Donald K, Paradis G, Meshefedjian G One- and two-year predictors of excess weight gain among elementary schoolchildren in multiethnic, low-income, inner city neighborhoods. *American Journal of Epidemiology* 2000; 152: 739-746

Proctor MH, Moore LL, Gao D, Cupples LA, Bradlee ML, Hood MY, Ellison RC. Television viewing and change in body fat from preschool to early adolescence: The Framingham children's study. *International Journal of Obesity.* 2003; 27: 827-833.

Robinson TN, Hammer LD, Killen JD, Kraemer HC, Wilson DM, Hayward C, Taylor CB, 1993. Does television viewing increase obesity and reduce physical activity? Cross-sectional and longitudinal analyses among adolescent girls. Pediatrics, 91(2), 273-280.

Skinner JD, Bounds W, Carruth BR, Morris M, Ziegler P. Predictors of children's body mass index: A longitudinal study of diet and growth in children aged two to eight years. *Int J Obes Relat Metab Disord*. 2004 Apr; 28(4): 476-482.

Stettler, N., Signer, T.M., Suter, P.M. (2004). Electronic games and environmental factors associated with childhood obesity in Switzerland. *Obesity Research*, 12 (6), 896-903.

Storey ML, Forshee RA, Weaver AR, Sansalone WR. Demographic and lifestyle factors associated with body mass index among children and adolescents. *Int J Food Sci Nutr* 2003; 54: 491-503.

Strauss RS, Knight J. Influence of the home environment on the development of obesity in children. *Pediatrics*. 1999 Jun;103(6):e85.

Sugimori H, Yoshida K, Izuno T, Miyakawa M, Suka M, Sekine M, Yamagami T, Kagamimori S. Analysis of factors that influence body mass index from ages 3 to 6 years: A study based on the Toyama cohort study. *Pediatr Int.* 2004 Jun;46(3):302-10.

Tanasescu M, Ferris AM, Himmelgreen DA, Rodriguez N, Pérez-Escamilla R. Biobehavioral factors are associated with obesity in Puerto Rican children. *J Nutr* 2000;130:1734-42.

Toyran M, Ozmert E, Yardakok K. Television viewing and its effect on physical health of school age children. *The Turkish Journal of Pediatrics* 2002; 44: 194-203.

Wake M, Hesketh K, Waters E. Television, computer use and body mass index in Australian primary school children. *Journal of Paediatric Child Health* 2003;39:130-34

Wardle J, Guthrie C, Sanderson S, Birch L, Plomin R. Food and activity preferences in children of lean and obese parents. *Int J Obes* 2001; 25: 971-7.

Berkey CS, Rockett HRH, Field AE, Gillman MW, Frazier AL, Camargo CA, Colditz GA. Activity, dietary intake, and weight changes in a longitudinal study of preadolescent and adolescent boys and girls. *Pediatrics* 2000; 105: 1-9.

Crooks DL. Food consumption, activity, and overweight among elementary school children in an Appalachian Kentucky community. *American Journal of Physical Anthropology* 2000;112: 159-170

Dwyer JT, Stone EJ, Yang M, Feldman H, Webber LS, Must A, Perry CL, Nader PR, Parcel GS. Predictors of overweight and overfatness in a multiethnic pediatric population *American Journal of Clinical Nutrition* 1998;67:602-610

Hernandez B, Gortmaker SL, Colditz GA, Peterson KE, Laird LM, Parra-Cabrera S. Association of obesity with physical activity, television programs and other forms of video viewing among children in Mexico City. *International Journal of Obesity and Related Metabolic Disorders* 1999;23:845-854.

McMurray RG, Harrell JS, Deng S, Bradley CB, Cox LM, Bangdiwala SI. The influence of physical activity, socioeconomic status, and ethnicity on the weight status of adolescents. *Obesity Research* 2000;8(2):130-39.

O'Loughlin J, Gray-Donald K, Paradis G, Meshefedjian G One- and two-year predictors of excess weight gain among elementary schoolchildren in multiethnic, low-income, inner city neighborhoods. *American Journal of Epidemiology* 2000; 152: 739-746

Wake M, Hesketh K, Waters E. Television, computer use and body mass index in Australian primary school children. *Journal of Paediatric Child Health* 2003;39:130-34

- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

  None.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Physical Activity in the Treatment of Childhood and Adolescent Obesity

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

  PWM: Physical Activity

  Physical activity should be included as part of a multi-component pediatric weight-management program. Research indicates that increasing physical activity as part of a multi-component program results in significant improvements in weight status and body composition in children and adolescents.

  Rating: Strong
  Imperative

  - Risks/Harms of Implementing This Recommendation

Physical Activity Risks

- Consultation with a physician prior to beginning an exercise program is needed. Consultation with an exercise specialist is recommended if an exercise prescription is given
- Intense physical activity in some overweight and obese individuals may contribute to disability or death.

- Conditions of Application

None.

- Potential Costs Associated with Application

- If the physical activity component of the pediatric weight-management program includes organized exercise sessions, program resources and personnel will need to be available
- If physical activity is required, program resources may be necessary to facilitate this
- Absence of health insurance coverage for weight management could limit program access.

- Recommendation Narrative

Physical Activity is an Integral Part of Pediatric Weight Management

28 randomized and controlled trials, 16 studies of other design and one review article reported on treatment programs for childhood obesity.

The evidence indicates that including a physical activity component as part of a multi-disciplinary weight-management program for children and adolescents is both standard practice and makes important contributions to the overall goal of weight loss.

Six RCTs compared the same diet and behavioral interventions with and without an exercise component.

- Three studies reported at least short-term improvements in at least one adiposity measure when exercise was added to the program (Epstein LH, Wing RR, Penner BC, Kress, 1985; Gutin B, Barbeau P et al, 2002; Becque MD, Katch V et al, 1988). Only the Epstein study examined the differences between groups at 12 months. By this time, the between-group differences had disappeared.
- Three studies (Epstein LH, Wing RR, Koeske R, Valoski, 1984; Rocchini AP, Katch V et al, 1988; Schwingshandl J, Sudi K et al, 1999) did not find any significant differences in adiposity measures when a physical activity component was added to a diet and behavior intervention.

Only one study (Owens S, Gutin B et al, 1999) examined the ability to bring about weight loss with physical activity alone. The authors report that participation in a four-month, high-intensity, five-days-a-week program, brought about greater reduction in total fat mass and increased fat-free mass than controls. It is worth noting that subjects were paid ($1 per session) to participate in the exercise sessions. There was no report of longer-term outcomes.

As the above studies indicate, the link between physical activity and weight loss appears to be dependent upon other factors such as the type of physical activity intervention (e.g., see Epstein LH, Wing RR, Koeske R, Valoski A. 1985 below), intensity, duration and frequency of exercise (Grade I).

What Type of Physical Activity Intervention Is Best?

Three RCTs (Epstein LH, Wing RR, Koeske R, Valoski A. 1985; Epstein LH, Paluch RA, Gordy CC, Dorn, 2000; Gutin B, Barbeau P et al, 2002) and one non-randomized trial (Sothern M, Loftin M et al, 2000) compared physical activity interventions either in terms of the type of activity (Sothern M, Loftin M et al, 2000; Epstein LH, Wing RR, Koeske R, Valoski A, 1985) or in terms of intensity (Gutin B, Barbeau P et al, 2002; Epstein LH, Paluch RA, Gordy CC, Dorn, 2000). Epstein LH, Valoski A, Wing RR, McCurley J, 1994, reports on the ten-year outcomes of Epstein LH, Wing RR, Koeske R, Valoski A, 1985.

Only Epstein LH, Wing RR, Koeske R, Valoski A, 1985, report statistically significant differences among different physical activity interventions: Subjects in a lifestyle physical activity group maintained greater weight loss at two years, compared to aerobics and calisthenics groups. Epstein LH, Valoski A, Wing RR, McCurley J, 1994, report that differences among exercise interventions (aerobics vs. calisthenics and lifestyle activity vs. calisthenics) persisted over 10 years.

Thus, while lifestyle physical activity interventions may provide longer-lasting benefits, the research is still too limited to draw any strong conclusions (Grade III).

- Recommendation Strength Rationale

Both intervention and observational research are consistent in demonstrating a significant contribution to adiposity improvement from the inclusion of a physical activity intervention as part of a multi-component pediatric weight-management program.

- Minority Opinions

None.

- Supporting Evidence

The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

What is the effectiveness of using a program to increase physical activity as a part of an intervention program to treat childhood obesity?

How do different physical activity interventions **compare** as part of a multicomponent childhood obesity treatment program?

- References

Becque MD, Katch V, Rocchini A, Marks C, and Moorehead C. Coronanry Risk Incidence of Obese Adolescents: Reduction by Exercise Plus Diet Intervention/ *Pediatrics* 1988;81;605-12.

Epstein LH, Paluch RA, Gordy CC, Dorn J. Decreasing sedentary behaviors in treating pediatric obesity. *Arch Pediatr Adolesc Med* 2000; 154 (3):220-6.

Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year outcomes of behavioral family-based treatment for childhood obesity. *Health Psychology*. 1994, 13:373-383.

Epstein LH, Wing RR, Koeske R, Valoski A. Effects of diet plus exercise on weight change in parents and children. *Journal of Consulting and Clinical Psychology* 1984; 52:429-437.

Epstein LH, Wing RR, Penner BC, Kress MJ. Effect of diet and controlled exercise on weight loss in obese children. *J Pediatr* 1985;107:358-61.

Gutin B, Barbeau P, Owens S, Lemmon C, Bauman M, Allison J, Kang H, Litaker M. Effects of exercise intensity on cardiovascular fitness, total body composition, and visceral adiposity of obese adolescents *Am J Clin Nutr* 2002;75:818-26.

Owens S, Gutin B, Allison J, Riggs S, Ferguson M, Litaker M, Thompson W. Effect of physical training on total and visceral fat in obese children. *Medicine & Science in Sports & Exercise* 1999;31:143-148

Rocchini AP, Katch V, Anderson J, Hinderliter J, Becque D, Martin M, Marks C. Blood Pressure in Obese Adolescents: Effect of Weight Loss. *Pediatrics* 1988;82:16-23.

Schwingshandl J, Sudi K, et al. Effect of an individualized training programme during weight reduction on body composition: a randomized trial. *Arch Dis Child* 1999; 81:426-8.

- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

None.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Adjunct Therapies: Use of Weight Loss Medications in Treating Obesity in Adolescents

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

PWM: Collaboration with Health Care Team

The dietitian should collaborate with the health-care team regarding the use of weight-loss medications as an adjunct therapy within a multi-component pediatric weight-management program for adolescents. Clinical outcomes are likely to be enhanced with the participation of a dietitian.

Rating: Consensus
Imperative

PWM: Weight Loss Medication

If a weight-loss medication is selected as an adjunct therapy, then an over-the-counter or prescription gastrointestinal lipase inhibitor (e.g., orlistat), approved by the FDA for use in adolescents, may be recommended to treat obese adolescents participating in a multi-component pediatric weight-management program. Research indicates that a gastrointestinal lipase-inhibitor further improves weight status and body composition in some individuals within a multi-component adolescent weight-management program. However, the FDA has not studied or approved the use of this class of medication for children under the age of 12.

Rating: Fair
Conditional

For FDA drug approval information, see http://www.accessdata.fda.gov/scripts/cder/drugsatfda/index.cfm?fuseaction=Search.Search_Drug_Name.

- Risks/Harms of Implementing This Recommendation

Gastrointestinal Lipase Inhibitor

Adverse effects from the use of a gastrointestinal lipase inhibitor were determined by the intake level of dietary fat

(the higher the intake of dietary fat, the higher the likelihood of adverse effects). Adverse effects generally improved over time. Commonly occurring adverse effects include:

- Malabsorption of fat soluble vitamins
- Increased defecation
- Oily spotting on clothing
- Soft stools
- Increased flatus
- Fatty or oily stools
- Fecal incontinence.

- Conditions of Application

  - If a gastrointestinal lipase inhibitor is used as an adjunct therapy, the FDA has only approved one gastrointestinal lipase inhibitor for use in weight-loss therapy among adolescents (over 12 years) http://www.accessdata.fda.gov/scripts/cder/drugsatfda/index.cfm?fuseaction=Search.Label_ApprovalHistory
  - Close medical monitoring is critical when over-the-counter or prescription weight-loss drugs are used as an adjunct therapy in a multi-component pediatric weight-management program.
  - A daily multi-vitamin is necessary when a gastrointestinal lipase inhibitor is used.

- Potential Costs Associated with Application

  Including weight-loss medications within a multi-component adolescent weight-management program requires the supervision of the appropriate healthcare professional. Some programs may incur additional staffing costs to include this type of adjunct therapy.

- Recommendation Narrative

  Because research continues apace, and new drugs are approved continually, the reader is encouraged to check the FDA website for information on a particular drug to see if it has been approved for use in a pediatric population for weight loss. The list of drugs (and associated information) approved by the FDA may be found at http://www.accessdata.fda.gov/scripts/cder/drugsatfda/index.cfm?fuseaction=Search.Search_Drug_Name.

  Gastrointestinal Lipase Inhibitor

  - A gastrointestinal lipase inhibitor may be moderately effective in promoting short-term weight loss (12 months or less), as part of a comprehensive weight-loss program (diet, exercise and behavioral therapy), in adolescents. However, application is limited by gastrointestinal adverse events.
  - Long-term efficacy and tolerability of a gastrointestinal lipase inhibitor as part of a comprehensive behavioral treatment program for adolescents has not been thoroughly studied
  - As seen with adults, adverse side effects are gastrointestinal, usually occur early in treatment and tend to decrease in time (Grade II).

- Recommendation Strength Rationale

  The combination of FDA approval (in 2003) as well as a number of well-designed and well-powered studies (Grade II) argues for a Fair rating. One gastrointestinal lipase inhibitor has been approved by the FDA for use as a weight-loss medication in adolescents (aged less than 12 years).

- Minority Opinions

  None.

- Supporting Evidence

  The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

  What is the effectiveness of using orlistat as part of a childhood obesity treatment program?

  What is the effectiveness of using sibutramine as part of a childhood obesity treatment program?

- References

  Chanoine J-P, Hampl S, Jansen C, Boldrin M, Hauptman J. Effect of orlistat on weight and body composition in obese adolescents. A randomized controlled trial. *JAMA* 2005;293:2873-2883.

  Maahs D, de Serna DG, Kolotkin RL, Ralston S, Sandate J, Qualls C, Schade DS. Randomized, double-blind, placebo-controlled trial of orlistat for weight loss in adolescents. *Endocr Pract* 2006;12:18-28.

  McDuffie JR, Calis KA, Uwalo NG, Fallon EM, Frazier TE, Hubbard VS, Yanovski JA. Efficacy of orlistat as an adjunct to behavioral treatment in overweight African-American and Caucasian adolescents with obesity-related co-morbid conditions. *J Pediatr Endocrinol Medab* 2004;17:307-319.

  McDuffie JR, Calis KA, Uswaifo GI, Sebring NG, Fallon EM, Hubbard VS, Yanovski JA. Three-month tolerability of orlistat in adolescents with obesity-related comorbidities. *Obes Res* 2002;10:642-650.

  Ozkan B, Berekey A, Turan S, Keskin S. Addition of orlistat to conventional treatment in adolescents with severe obesity. *Eur J Pediatr* 2004;163:738-741.

  Berkowitz RI, Wadden TA, Tershakovec AM, Cronquist JL. Behavior therapy and sibutramine for the treatment of adolescent obesity. *JAMA*. 2003;289:1805-1812.

  Godoy-Matos A, Carraro L, Vieira A, Oliveira J, Guedes EP, Mattos L, Rangel C, Moreira RO, Coutinho W,

Appolinario JC. Treatment of obese adolescents with sibutramine: a randomized, double-blind, controlled study. *J Clin Endocrinol Metab*. 2005;90:1460-1465.

Reisler G, Tauber T, Afriat R, Bortnik O, Goldman M. Sibutramine as an adjuvant therapy in adolescents suffering from morbid obesity. *Isr Med Assoc J*. 2006 Jan;8(1):30-2.

- References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

None.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Adjunct Therapies: Weight Loss Surgery and Adolescent Obesity

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

PWM: Weight Loss Surgery

Dietitians should collaborate with other members of the health-care team regarding the appropriateness of weight-loss surgery for severely obese adolescents who have not achieved weight-loss goals with less-invasive weight-loss methods and who meet specified criteria (see Conditions of Application below). Research indicates that for a subset of adolescents who meet the recommended criteria, weight-loss surgery may be effective in bringing about significant short-term and long-term weight loss. Obese children (under 13 years of age) are generally not considered to be appropriate candidates for weight-loss surgery.

Rating: Consensus
Imperative

- Risks/Harms of Implementing This Recommendation
  - Surgical complications,
  - Micro-nutrient deficiencies (e.g., vitamin D for African-Americans, vitamin K).
- Conditions of Application

The Expert Committee Recommendations include the following criteria for adolescents being considered for weight-loss surgery:

- Experienced failure of at least six months of organized weight-loss attempts, as determined by their primary care provider
- Have met certain anthropometric and medical criteria:
  - Be severely obese (BMI 40 or greater) with serious obesity-related medical complications or have a BMI of 50 or more with less-severe co-morbidities
  - Have co-morbidities related to obesity that might be resolved with durable weight loss
  - Have attained a majority of skeletal maturity (generally at least 13 years of age for girls and at least 15 years of age for boys).
- Demonstrate commitment to comprehensive medical and psychological evaluations both before and after weight-loss surgery
- Be capable and willing to adhere to nutritional guidelines post-operatively
- Possesses decisional capacity and participates in the decision process to undergo weight-loss surgery. In other words, the adolescent must want the intervention and understand what is involved.
- Have a supportive family environment
- Is being evaluated by a multi-disciplinary team that is involved in the patient selection, preparation and surgery as well as immediate and long-term post-operative follow-up care.

Potential candidates for bariatric surgery should be referred to centers with multi-disciplinary weight-management teams that have expertise in meeting the unique needs of obese adolescents. Surgery should be performed in institutions that are equipped to meet the tertiary needs of severely obese patients and to collect long-term data on the clinical outcomes of these patients.

- Potential Costs Associated with Application
  - If organizational and program costs are passed on to participants, this could limit program access. Additionally, parent commitment to program participation is required.
  - The absence of health insurance coverage for weight management could limit program access.
- Recommendation Narrative

What Are the Effects of Weight-Loss Surgery in Children and Adolescents?

- A small number of case studies report sustained weight loss in severely obese adolescents with serious co-morbidities following weight-loss surgery. Associated surgical complications and short- and long-term macro- and micro-nutrient deficiencies are reported.
- However, the research on children and adolescents is still very limited and the ADA evidence-analysis work group for pediatric weight management recommends more research in the following areas.
    - *Surgical technique and design of the pre- and post-operative nutritional intervention*
        - Effects of different surgical procedures on children and adolescents
        - Impact of pre-operative weight loss on surgical complications and adherence to post-operative nutritional care plan
        - Optimal post-operative dietary progression, regarding the type, amount, consistency and texture of foods and the frequency of feedings
        - Role of the dietitian in pre- and post-operative care.
    - *Physiologic effects*
        - Short- and long-term changes in body composition (muscle mass and body fat)
        - Growth risks
        - Bone health
        - Management of excess skin following significant weight loss.
    - *Behavioral or psychological aspects*
        - Risk-taking behaviors (e.g., cigarette-smoking, substance abuse, sexually intimate relationships)
        - Impact on establishing a healthier lifestyle (e.g., making healthier food choices, becoming more physically active) and improving quality of life
        - Risk of developing an eating disorder
        - Body image distortion.

- Recommendation Strength Rationale

  A review paper of only six case studies involving a small number of patients (range, 11 to 41 patients) reports sustained weight loss in severely obese children and adolescents with serious co-morbidities following weight-loss surgery. Associated surgical complications and short- and long-term macro- and micro-nutrient deficiencies are reported.

- Minority Opinions

  None.

- Supporting Evidence

  The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

  - References
  - References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

    - Shekelle PG, Morton SC, Maglione MA, Suttorp M, Tu W, Li Z, Maggard M, Mojica WA, Shugarman L, Solomon V, Jungvig L, Newberry SJ, Mead D, Rhodes S. Pharmacological and Surgical Treatment of Obesity. *Evidence Report/Technology Assessment* No. 103. Available at http://www.ahrq.gov/downloads/pub/evidence/pdf/obespharm/obespharm.pdf
    - Sarah E. Barlow and and the Expert Committee. Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report. *Pediatrics,* 2007;120;S164-S192. (P. S185).

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Quick Links

Recommendations Summary

Pediatric Weight Management (PWM) Treatment Format Options: Group vs. Individual Intervention

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

  PWM: Group vs. Individual Interventions

  Either group or individual nutrition intervention may be used as part of a multi-component pediatric weight-management program. Limited research that compares individual vs. group format does not indicate differences in overall pediatric weight status. However, two studies suggest that some dietary outcome measures may be improved with an individual counseling format.

  Rating: Weak
  Imperative

  - Risks/Harms of Implementing This Recommendation

None.

- Conditions of Application

  Intervention format should be age and developmentally appropriate.

- Potential Costs Associated with Application

  - Both individual and group interventions may have different costs and resources associated with them
  - If organizational and program costs are passed on to participants, this could limit program access. Additionally, parent commitment to program participation is required.
  - The absence of health insurance coverage for weight management could limit program access.

- Recommendation Narrative

  Only four articles were identified that compared individual vs. group formats within the same pediatric obesity treatment program. This limited body of research did not find differences in weight status using group vs. individual counseling formats (Grade III).

  However, the two studies that reported dietary intake outcomes separately from adiposity outcomes (De Mello ED, Luft VC et al, 2004; Nuutinen O, 1991) found that changes in dietary intake varied according to treatment format. Additionally, De Mello ED, Luft VC et al, 2004, reported significant changes in physical activity measures only in the group intervention format.

  Goldfield GS, Epstein LH et al, 2001, found that a group intervention format (compared to a mixed treatment, group and individual treatment format) was associated with larger decreases in percentage overweight per dollar spent at 12 months. However, the authors point out that it is not clear whether this finding can be generalized to different subject populations

- Recommendation Strength Rationale

  Research directly comparing treatment formats within a single program was very limited.

- Minority Opinions

  None.

- Supporting Evidence

  The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

  How do group versus individual sessions compare in terms of effectiveness of treating childhood obesity?

  - References

    de Mello ED, Luft VC, Meyer F. Individual outpatient care versus group education programs. Which leads to greater change in dietary and physical activity habits for obese children? *J Pediatr* (Rio J). 2004 Nov-Dec;80(6):468-74.

    Goldfield GS, Epstein LH, Kilanowski CK, Paluch RA, Kogut-Bossler B. Cost-effectiveness of group and mixed family-based treatment for childhood obesity. *Int J Obes Relat Metab Disord*. 2001 Dec;25(12):1843-9.

    Nuutinen O, and Knip M. Long-term weight control in obese children: persistence of treatment outcome and metabolic changes. *International Journal of Obesity* 1992;16:279-287.

    Nuutinen O. Long-term effects of dietary counseling on nutrient intake and weight loss in obese children. *Eur J Clin Nutr*. 1991 Jun;45(6):287-97.

  - References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

    None.

- Pediatric Weight Management
- Pediatric Weight Management (PWM) Guideline (2007)

Recommendations Summary

Pediatric Weight Management (PWM) Optimal Length of Weight Management Therapy in Children and Adolescents

Click here to see the explanation of recommendation ratings (Strong, Fair, Weak, Consensus, Insufficient Evidence) and labels (Imperative or Conditional). To see more detail on the evidence from which the following recommendations were drawn, use the hyperlinks in the Supporting Evidence Section below.

- Recommendation(s)

  PWM: Optimal Length of Treatment

During the intensive treatment phase, Medical Nutrition Therapy for pediatric obesity should last at least three months or until initial weight-management goals are achieved. Because overweight and obesity are chronic, often life-long, conditions, it is critical that a weight-management plan be implemented after the intensive phase of treatment. A greater frequency of contacts between the patient and practitioner may lead to more successful weight loss and maintenance.

Rating: Consensus
Imperative

- Risks/Harms of Implementing This Recommendation

  Pediatric weight management can affect growth, development, metabolic parameters and sometimes produce unintended effects such as excessive weight loss and nutritional deficiencies. Therefore, continued monitoring by health-care professionals is warranted.

- Conditions of Application

  None.

- Potential Costs Associated with Application

  - If program costs are passed on directly to patients, this may limit access to the program for less affluent patients and their families
  - Absence of health insurance coverage for weight management could limit program access.

- Recommendation Narrative

  The large majority of studies we analyzed included a treatment phase for pediatric obesity that was at least three months long. The range of length of programs varied from a few weeks to over a year. We were not able, in this phase of the project, to determine if there were any systematic differences in outcomes based on length of treatment. However, since the programs that demonstrated longer-term (more than one year) outcomes were at least three months long, we consider this the minimum general recommendation for length of time.

  In addition to the evidence analysis carried out directly for this guideline, the work group consulted two other sets of recommendations:

  - Sarah E. Barlow and and the Expert Committee. Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report. *Pediatrics,* 2007; 120; S164-S192.

  Because the ADA Pediatric Weight Management Guideline focuses on treatment within the context of a multi-disciplinary program, the Expert Committee recommendations for Stage Three: Comprehensive Multidisciplinary Intervention are most relevant here:

  > "Frequent office visits should be scheduled; weekly visits for a minimum of 8 to 12 weeks seem to be most efficacious (Consistent Evidence). Subsequently, monthly visits can help maintain new behaviors" (pp. S183-S184).

  Additionally, this recommendation was also made with reverence to *The Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*, NIH Publication No. 98-4083, September 1998, produced by the National Heart, Lung, and Blood Institute in cooperation with the National Institute of Diabetes and Digestive and Kidney Diseases.

  Although the NHLBI guidelines for adults recommends a six-month treatment program, growth and development issues in children and adolescents argue for more flexibility in length of treatment. Also, weight loss may not be appropriate for all children, so the practitioner should use their clinical judgment when applying the NHLBI criteria.

- Recommendation Strength Rationale

  - Rating is based on consensus recommendations in Sarah E. Barlow and and the Expert Committee. Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report. *Pediatrics,* 2007; 120; S164-S192
  - While the NHLBI evidence categories are strong for this question, the strength rating for the recommendation for children and adolescents is weakened by the lack of *direct* evidence analysis on weight-maintenance programs for a pediatric population.

- Minority Opinions

  None.

- Supporting Evidence

  The recommendations were created from the evidence analysis on the following questions. To see detail of the evidence analysis, click the blue hyperlinks below (recommendations rated consensus will not have supporting evidence linked).

  - References
  - References not graded in Academy of Nutrition and Dietetics Evidence Analysis Process

  Sarah E. Barlow and and the Expert Committee. Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report. Pediatrics

2007;120;S164-S192.

The Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report, NIH Publication No. 98-4083, September 1998, produced by the National Heart, Lung, and Blood Institute in cooperation with the National Institute of Diabetes and Digestive and Kidney Diseases. Available at: http://www.nhlbi.nih.gov/guidelines/obesity/e_txtbk/txgd/40.htm.

To access the pdf of the NHLBI Clinical Guidelines click here:
http://www.nhlbi.nih.gov/guidelines/obesity/e_txtbk/index.htm.