

REVIEW ARTICLE

Childhood Obesity: an Evidence-Based Review of Assessment & Treatment by Family Medicine Physicians

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This article provides an evidence-based review of assessment and treatment tools for childhood obesity that can be implemented under the time constraints and within the skill set of a family medicine physician. Family medicine practitioners often form long-term relationships with patients and their families based on trust and familiarity. Despite this ideal position to help children and their families, many family medicine physicians meet barriers, such as lack of time or skill in addressing weight issues. Currently, there is a significant need for practical strategies to be applied in a family medicine setting. This article reviews evidence-based recommendations from expert committee guidelines and meta-analysis data. Universal assessment of risk for obesity through Body Mass Index percentiles, eating habits, activity level, and other medical risk factors is described. The use of motivational interviewing and supportive language to help engage families is also discussed. Comprehensive, family-based lifestyle interventions are found to be the most effective for long-term improvements in health. Patient education and physician resources are provided.

INTRODUCTION

Childhood obesity and associated conditions have been identified as a critical public health concern for the United States.¹ Recently, National Center for Disease Control (CDC) data have shown that the weight of nearly one-third of children aged 2 to 19 in the United States is in the range of overweight or obesity. This proportion is even higher in certain demographic groups.² Short-term adverse health, social, emotional, and economic outcomes have been reported to occur in childhood.³ Long-term consequences of childhood obesity can also manifest and persist in adulthood through increased rates of morbidity and mortality.⁴⁻⁶

In response, the American Academy of Pediatrics, American Medical Association, American Osteopathic Association (Figure 1), Institute of Medicine, Center for Disease Control, and U.S. Preventative Services Task Force have published evidence and expert-based recommendations for primary care screening and treatment of overweight and obesity in the pediatric population.⁷⁻¹⁰ In particular, the Institute of Medicine recommends a “systems approach” to change the multiple environments that affect a child’s food intake and physical activity level. The settings include home, health-care, education, community, and government policy. From a clinical level, the United States Preventative Services Task Force currently provides a Grade B recommendation for clinicians. Children aged 6 years and older should be screened for obesity and start or be referred for intervention.

However, family medicine physicians often meet practical barriers in implementing prevention and treatment of childhood obesity. A recent national survey found that only 39% of all family practice providers routinely assessed obesity risk through BMI percentiles in children.¹¹ Also, family medicine physicians were less likely to

provide guidance on nutrition and physical activity compared to pediatricians. Lack of time, awareness, and comfort or skill in counseling families have all been identified as barriers to addressing the issues of unhealthy weight.¹⁰⁻¹²

As a result, there is currently a significant need for effective strategies to be utilized within the primary care clinical setting. In particular, family medicine physicians with long-term relationships in caring for children and their families have a vital role to play in the prevention and treatment of childhood obesity. Additionally, osteopathic physicians, who are trained in holistic lifestyle treatments, are particularly well suited to lead or be a part of early childhood obesity interventions.¹³

The purpose of this review article is to provide family medicine physicians with a practical evidence-based approach to addressing childhood and adolescent obesity. First, the physician screens weight using BMI percentiles and specific factors associated with obesity are assessed to determine health risks. Then, as appropriate, a comprehensive family-based intervention is implemented in a staged approach. Lastly, behavioral strategies and patient education resources are provided to support long-term patient and family engagement.

SCREENING WEIGHT USING BMI PERCENTILES

Increased levels of body fat are associated with increased health risks in children.¹⁴ The body mass index (BMI) is traditionally used to assess body fat by measuring body weight adjusted for height. While BMI values are not diagnostic of adipose levels, they correlate to total body fat.¹⁵ BMI has been found to be the most appropriate adiposity screening test in children.¹⁶ High childhood BMI has been associated with atherosclerosis,⁶ adult obesity,⁴ and increased total mortality⁵ in the longitudinal Bogalusa Heart studies.

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In children and adolescents, the use of BMI percentiles is recommended since the categorization of body fat is based on age and gender.¹⁷ This differs from the standard adult categorization based on absolute BMI.¹⁸ In children, a “healthy” BMI falls in the range of the 5th to 84th percentile. Potentially concerning excessive weight begins at the 85th percentile and can be further classified by percentile to “overweight,” “obesity,” and “severe obesity” (Table 1).

In a clinical setting, routine assessment of BMI percentile is often calculated automatically through electronic medical records. A BMI percentile should be plotted at each visit using the appropriate CDC growth charts, which are available online.¹⁹ This allows for monitoring health changes over time and starting intervention when risks are present.

FIGURE 1:

American Osteopathic Association (AOA) Policy Statement on Pediatric Obesity.⁷

The American Osteopathic Association (AOA) encourages:

- A. Dissemination of research related to pediatric obesity and continuing medical education (CME)
- B. Primary care physicians to teach and use body mass index (BMI) measurements
- C. Physicians providing health care to children to:
 1. Monitor their patients for excessive weight gain
 2. Discuss the possible long- and short-term consequences of excessive weight gain (e.g., cardiovascular and respiratory problems) with patients and parents and institute a treatment plan or a referral as appropriate
 3. Advise patients to engage in moderate, physical activity daily, limit television, computer and video games, and spend family time together in physical activities
 4. Advise parents to eat together as a family, set goals for the appropriate number of fruits and vegetables per day, serve portion sizes that are right for a child’s age, limit snacking on empty calorie foods, and serve as role models for eating healthy foods

TABLE 1:

Terminology for BMI percentiles in children and adolescents.⁸

WEIGHT CATEGORIES	BMI PERCENTILES
Underweight	Less than 5 th percentile
Healthy Weight	5 th to 84 th percentile
Overweight	85 th to 94 th percentile
Obesity	95 th to 98 th percentile
Severe Obesity	Greater than 99 th percentile

CONFIRMING OBESITY THROUGH RISK ASSESSMENT

Once a patient is identified as having a BMI percentile corresponding to overweight or obesity (higher than 85th percentile), a comprehensive child-specific assessment must be performed to determine any health risks. The physician should evaluate medical risk, behavioral risk, and motivation to change.

MEDICAL RISK

The evaluation of medical risk consists of a review of comorbidities and complications associated with obesity. This includes family medical history, review of systems, vital signs, and physical exam signs.⁸ A thorough examination should be completed since obesity can affect all body systems.

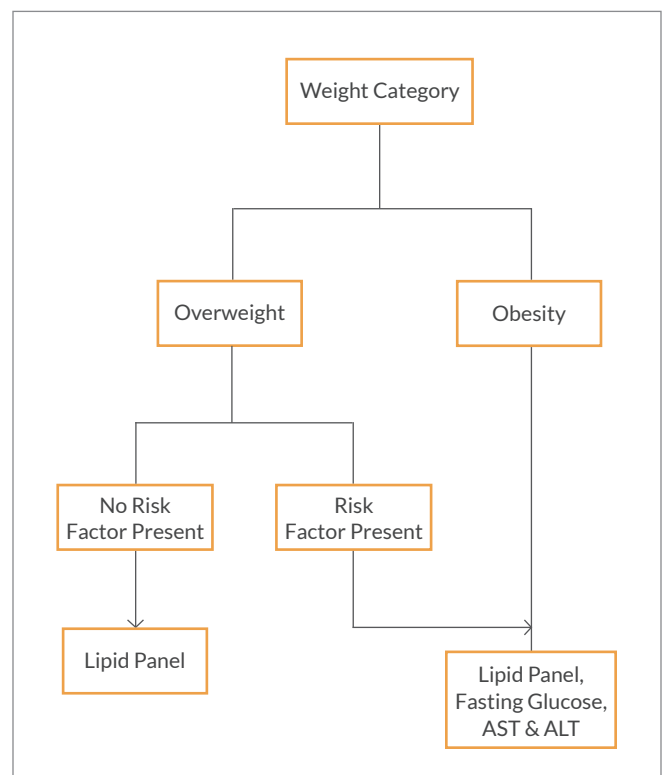
Physicians are encouraged to follow an algorithm for conducting laboratory testing based on medical risk (Figure 2). Screening laboratories may be required, such as a lipid panel, fasting glucose, aspartate transaminase (AST), or alanine transaminase (ALT). Laboratory screening should begin at age 10 and be performed every two years.

BEHAVIORAL RISK

A brief nutritional assessment of the eating habits of the child should be conducted and include the frequency of eating meals outside of the home, intake of calorie-containing beverages, nutrient dense food habits, and school lunch patterns.²⁰ In addition, an assessment of activity level including sedentary and physical

FIGURE 2:

Algorithm for laboratory testing based on weight category and risk factors.



activity should be done. Examples of sedentary behavior risk factors include the presence of a television in the child's bedroom, as well as screen time (i.e. television viewing, computer and video game use) greater than two hours in children over 2 years old.²¹ Physical activity consists of free play and organized sports or activities in the home and school. Although brief, these assessments are useful in determining health risks and identifying precise areas of intervention.

MOTIVATION TO CHANGE

Lastly, the perception of a child's health by herself or himself and by the family should be assessed. Children and parents may not recognize excess weight, even when the child's weight is categorized in the range of obesity.²²⁻²⁴ Cultural and socioeconomic influences can affect the manner in which a child's weight is perceived. Patients and families often demonstrate a greater focus on immediate and short-term effects of obesity versus long-term effects.²⁵ For this reason, scare tactics that emphasize long-term consequences are often ineffective.²⁶

The patient-centered counseling style of motivational interviewing can be a helpful technique to assess the readiness of a patient and family to change.^{27,28} The goal of this approach is to elicit the specific motivations for change and an understanding of thoughts or behaviors that may become barriers.²⁹ With a reflective listening style as such, physicians can encourage patients to find their own solutions.

PREPARING FOR INTERVENTION

Once a patient is identified as having evidence of a health risk, the discussion of weight and associated comorbidities with families may be a sensitive issue. Stigma and discrimination against children and adults with obesity are pervasive and exist within the medical community itself.³⁰ Furthermore, the occurrence of negative attitudes (e.g. shame, bias, embarrassment, blame) towards children and families with obesity often leads to health disparities and interference with effective intervention.³¹ However difficult discussions may be, it is necessary to appropriately address the medical issue.

Family medicine physicians can engage families by using sensitive and supportive language. For example, the terms "weight problem" and "unhealthy weight" were found to be more desirable and motivating for weight loss compared to terms such as "fat," "obese," and "extremely obese" in a national U.S. survey of parents.³¹ The trust and mutual respect established from long-standing patient-doctor relationships also facilitate discussions. Specifically mentioning that genetic and epigenetic factors do play a role in the susceptibility to obesity³² can be helpful in acknowledging the predisposition to excess weight in certain families. Emphasizing modifiable factors for weight management further enables families to engage in behavioral changes.

IMPLEMENTING A STAGED INTERVENTION

After a risk assessment is completed, the physician can begin to implement intervention through comprehensive lifestyle modifications. Programs have been found to be most effective when they include dietary, physical activity, and behavioral counseling

components.^{9,33} It is recommended to follow a staged approach that gradually transitions from general preventive education to more patient-specific treatment options. The clinical decision to advance from one stage to the next is based on the evaluation of the patient's health risks and level of success achieved.

The "Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity" can be used as a standard of care.⁸ Family medicine physicians may begin the initial stages of intervention within a typical primary care setting (Figure 3). The goal of the intervention differs by stages. Patients who do not meet the health goals of the initial stages should be referred to multidisciplinary teams with obesity specialists, which may utilize pharmacotherapy or surgery, as appropriate.²⁰

For patients in the range of healthy weight and overweight without any complications, intervention starts with general prevention messages (pre-stage) delivered at wellness visits, with the goal of encouraging lifelong, healthy behaviors. As a general rule, the next level of treatment should be considered when a patient does not show desired improvement over a 3 to 6 months period.

Stage 1 further reinforces healthy eating and activity habits with the additional goal of decreasing BMI percentile. Patients in the range of overweight with associated complications and obesity can be started at this level. Family- and patient-specific goals can be set. Stage 2 introduces structured weight management and is appropriate for patients who have not met goals in previous stages. This stage involves more support and structured behavioral modification recommendations with monthly follow-ups. The goal is to improve BMI percentile through weight maintenance or loss. Of note, weight loss should not exceed more than 1 lb (0.5 kg) per month for children age 2 to 11 years old, or more than 2 lb (1 kg) per week for older children and adolescents.

INCREASING SUCCESS IN ACHIEVING LIFESTYLE GOALS

Behavioral interventions are practical tools in making incremental lifestyle changes. Self-monitoring, stimulus control, goal setting, and positive reinforcement have been found to be effective.³⁴ With the adoption of behavioral interventions, children can form life-long habits.

Self-monitoring of target behaviors through logs can help patients and families to have a greater awareness of their triggers and behaviors. Once written in a log, unhealthy behaviors can be identified and acted upon more objectively. The family medicine physician can review logs with patients to provide personalized feedback.

Stimulus control involves encouraging healthier foods or activities that promote exercise. For example, unhealthy snacks can be removed from the household. With a modified environment, parents can impose fewer restrictions on the child's behavior. Thus, children may feel more trusted and empowered to make their own health decisions.

Goal setting should focus on specific and quantifiable results. During a visit, the physician can encourage the patient to set attainable activity or nutrition goals. For instance, a patient may commit

FIGURE 3:

Family medicine stages for treatment of child and adolescent obesity.⁸

	NUTRITION GUIDELINES	ACTIVITY GUIDELINES	MONITORING	GOALS
Pre-Stage Healthy weight ↓ Overweight, no health risk ↓	PREVENTION			
	<ul style="list-style-type: none"> Limit sugar-sweetened beverages Encourage consumption of fruits and vegetables Eat a healthy breakfast daily Most meals eaten at home at a family table 	<ul style="list-style-type: none"> ≤ 2 hours daily screen time. No screen time for children under 2 years of age Moderate to vigorous physical activity for ≥ 1 hour daily 	<ul style="list-style-type: none"> Reinforce goals at preventive care visits 	<ul style="list-style-type: none"> Adoption of healthy lifestyle habits and attitudes Maintenance of BMI Prevention of medical complications
Stage 1 Overweight, health risk ↓ Obesity ↓	PREVENTION PLUS			
	Pre-Stage, plus: <ul style="list-style-type: none"> Patient specific healthy eating goals Allow self-regulation of meals for children over 12 years of age 	Pre-Stage, plus: <ul style="list-style-type: none"> Patient specific activity goals Activity may be structured or unstructured 	<ul style="list-style-type: none"> Reinforce at each visit Follow-up frequency tailored to patient Reassess at 3 to 6 months 	<ul style="list-style-type: none"> Adoption of healthy lifestyle habits and attitudes Improved associated conditions
Stage 2	STRUCTURED WEIGHT MANAGEMENT			
	Stage 1, plus: <ul style="list-style-type: none"> Daily eating plan for all meals and snacks (by dietician or experienced physician) Limit portion size Emphasize low energy density foods 	Stage 1, plus: <ul style="list-style-type: none"> ≤ 1 hour of screen time daily 1 hour of daily planned, supervised physical activity 	<ul style="list-style-type: none"> Monthly office visits Monitor through logs Rewards for target behaviors 	Stage 1, plus: <ul style="list-style-type: none"> Gradual weight loss

to limit soda to one serving a day. Progress should be reviewed at subsequent visits. By reaching goals, children may enjoy increased self-confidence and engagement in making changes in their own lives.

Praise and nonfood rewards may also be used to provide positive reinforcement for reaching goals. A physician can demonstrate to parents how to praise a child for his or her efforts during a follow-up visit. A parent may reward a child by engaging in his or her favorite activity, such as riding bicycles together.

The likelihood of achieving lifestyle goals can be further strengthened through family involvement.^{8, 33, 35-38} The importance of parents and other caregivers in helping their child or adolescent develop healthy habits has been demonstrated to result in greater success than targeting the child alone. With a healthier home environment, parents also serve as role models to enable and enforce improved nutrition and increased physical activity. The strong evidence for family involvement during intervention highlights the unique advantages of family medicine physicians, who can counsel and treat all members of the family.

PROVIDING PATIENTS AND FAMILIES WITH EDUCATIONAL RESOURCES

Professional organizations and governmental agencies make evidence-based resources available to help children and their families improve nutrition and increase physical activity. These resources typically leverage community and family settings to improve underlying health behaviors responsible for overweight and obesity. Families and patients can be referred to these resources directly, or information may be provided at office visits. Below and on page 30 is a list of select patient resources available at a national level:

- The “We Can!” initiative, or “Ways to Enhance Children’s Activity and Nutrition”, was created by the National Institutes of Health³⁹ and offers a website with healthy weight education and tips, worksheets, and community resources to change behaviors in families. A health professional’s section provides training and curriculum to use with families. The “We Can!” curriculum focuses on parents and families as primary influences for change in youth, following successful obesity prevention strategies reported by the Institute of Medicine’s Committee on Prevention of Obesity in Children and Youth.⁴⁰ Upon completion of the curriculum, parents and children were found to have improved their knowledge, attitudes, and

behaviors related to healthy eating and physical activity.⁴¹ Specifically, data have shown statistically significant improvements in 12 out of 15 measures (80%) related to energy balance, portion size, healthy eating, physical activity, and screen time.

- “5-2-1-0 Let’s Go!” is a national campaign with a focus on families.⁴² This campaign promotes daily behavioral targets of 5 fruits and vegetables, 2 hours or less of screen time, 1 hour or more of physical activity, and 0 sugar-sweetened beverages. A healthcare toolkit contains office posters and handouts for patients. A provider section also includes screening questionnaires and additional education. Implementation of the “5-2-1-0 Let’s Go!” campaign in pilot communities has been shown to increase fruit and vegetable consumption while decreasing sugar-sweetened beverage intake in children.⁴³
- “Let’s Stop Childhood Obesity!” is a brochure by the American College of Osteopathic Pediatricians that can be distributed to families.⁴⁴ Information on the definition, causes, complications and prevention of childhood obesity is reviewed. The American College of Osteopathic Family Physicians has developed a patient education poster that can be displayed in an office setting,⁴⁵ which discusses the effects of childhood obesity and offers tips for families. Additional tips on healthy eating and physical activity can be found on the American Osteopathic Association’s website.⁴⁶ Strategies outlined in the brochure, poster and website are aligned with American Osteopathic Association Policy Statement on childhood obesity.⁷

CONCLUSION

Family medicine physicians have the opportunity to play an important role in decreasing the rates of childhood obesity by tailoring evidence-based recommendations to patients and their families. In particular, family medicine physicians have distinctive advantages such as longstanding doctor-patient relationships, an increased understanding of family dynamics, and an ability to treat all members of the family. Children with health risks can be identified through routine monitoring of body mass index percentiles and comprehensive risk assessment. Use of motivational interviewing and supportive language can help to engage families in a staged approach to comprehensive lifestyle interventions. Behavioral interventions and educational resources are also useful tools for families. As the understanding of childhood obesity expands, guidelines continue to evolve and will need to be periodically reviewed by the medical community. In clinical practice, family medicine physicians remain essential in the diagnosis and treatment of childhood obesity.

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REFERENCES

1. U.S. Department of Health and Human Services (2010). The Surgeon General’s Vision for a Healthy and Fit Nation. Rockville, MD: U.S. Department of Health and Human Services, Office of the Surgeon General. <http://www.surgeongeneral.gov/priorities/healthy-fit-nation/obesityvision2010.pdf>
2. Ogden C.L., Carroll M.D., Kit B.K., and Flegal K.M. (2014). Prevalence of Childhood and Adult Obesity in the United States, 2011-2012. *JAMA-J Am Med Assoc*, 311(8):806-814. <http://jama.jamanetwork.com/article.aspx?articleid=1832542>
3. Must A., and Strauss R.S. (1999). Risks and Consequences of Childhood and Adolescent Obesity. *Int J Obesity*, 23(2): S2-S11. <http://www.nature.com/ijo/journal/v23/n2s/pdf/0800852a.pdf>
4. Freedman D.S., Khan L.K., Serdula M.K., Dietz W.H., Srinivasan S.R., and Berenson G.S. (2005). The Relation of Childhood BMI to Adult Adiposity: the Bogalusa Heart Study. *Pediatrics*, 115(1):22-27. <http://pediatrics.aappublications.org/content/115/1/22.abstract>
5. Freedman D.S., Mei Z., Srinivasan S.R., Berenson G.S., and Dietz W.H. (2007). Cardiovascular Risk Factors and Excess Adiposity Among Overweight Children and Adolescents: the Bogalusa Heart Study. *J Pediatr*, 150(1):12-17. <http://www.sciencedirect.com/science/article/pii/S0022347606008171>
6. Berenson G.S., Srinivasan S.R., Bao W., Newman W.P., Tracy R.E., and Wattigney W.A. (1998). Association Between Multiple Cardiovascular Risk Factors and Atherosclerosis in Children and Young Adults. *New Engl J Med*, 338(23):1650-1656. <http://www.nejm.org/doi/pdf/10.1056/NEJM199806043382302>
7. American Osteopathic Association (2013). Policy Compendium, Resolution H320-A/08, Reaffirmed as Amended / BSAPH / BOFHP 2013. <http://www.osteopathic.org/inside-aoa/events/annual-business-meeting/Documents/2013%20Annual%20Business%20Meeting/2013%20HOD%20Resolutions/All-HOD-A-2013-Resolutions-ACTIONS.pdf>
8. Barlow S.E., and the Expert Committee (2007). Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report. *Pediatrics*, 120(S4):S164-S192. http://pediatrics.aappublications.org/content/120/Supplement_4/S164.full.pdf
9. U.S. Preventive Services Task Force (2010). Screening for Obesity in Children and Adolescents: U.S. Preventive Services Task Force Recommendation Statement. *Pediatrics*, 125(2):361-367. <http://pediatrics.aappublications.org/content/early/2010/01/18/peds.2009-2037.full.pdf+html>
10. Institute of Medicine (2012). Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation. Washington, DC: The National Academies Press. http://www.nap.edu/download.php?record_id=13275#
11. Huang T.T.-K., Borowski L.A., Liu B., Galuska D.A., Ballard-Barbash R., Yanovski S.Z., Olster D.H., Atienza A.A., and Smith A.W. (2011). Pediatricians’ and Family Physicians’ Weight-Related Care of Children in the U.S. *Am J Prev Med*, 41(1):24-32. [http://www.ajpmonline.org/article/S0749-3797\(11\)00237-6/pdf](http://www.ajpmonline.org/article/S0749-3797(11)00237-6/pdf)
12. Van Gerwen M., Franc C., Rosman S., Le Vaillant M., and Pelletier-Fleury N. (2009) Primary Care Physicians’ Knowledge, Attitudes, Beliefs and Practices Regarding Childhood Obesity: a Systematic Review. *Obes Rev*, 10(2):227-236. <http://onlinelibrary.wiley.com/doi/10.1111/j.1467-789X.2008.00532.x/abstract;jsessionid=EBD0BC38B8166EE1EC9324259973A56F.f04t02?deniedAccessCustomisedMessage=&userIsAuthenticated=false>
13. Wieting, J.M. (2008). Cause and Effect in Childhood Obesity: Solutions for a National Epidemic. *J Am Osteopath Assoc*, 108(10):545-552. <http://jaoa.org/article.aspx?articleId=2093529>

14. Williams D.P., Going S.B., Lohman T.G., Harsha D.W., Srinivasan S.R., Webber L.S., and Berenson G.S. (1992). Body Fatness and Risk for Elevated Blood Pressure, Total Cholesterol, and Serum Lipoprotein Ratios in Children and Adolescents. *Am J Public Health*, 82(3):358-363. <http://ajph.aphapublications.org/doi/pdfplus/10.2105/AJPH.82.3.358>
15. Freedman D.S., Wang J., Thornton J.C., Mei Z., Sopher A.B., Pierson R.N., Dietz W.H., and Horlick M. (2009). Classification of Body Fatness by Body Mass Index-for-Age Categories Among Children. *Arch Pediat Adol Med*, 163(9):805-811. <http://archpedi.jamanetwork.com/article.aspx?articleid=382077&resultClick=3>
16. Power C., Lake J.K., and Cole T.J. (1997). Measurement and Long-Term Health Risks of Child and Adolescent Fatness. *Int J Obesity*, 21(7):507-526. <http://www.nature.com/ijo/journal/v21/n7/pdf/0800454a.pdf>
17. Kuczmarski R.J., Ogden C.L., Guo S.S., Grummer-Strawn L.M., Flegal K.M., Mei Z., Wei R., Curtin L.R., Roche A.F., and Johnson C.L. (2002). 2000 CDC Growth Charts for the United States: Methods and Development. *Vital Health Stat*, 11(246):1-190. http://www.cdc.gov/nchs/data/series/sr_11/sr11_246.pdf
18. Expert Panel on the Identification, Evaluation, and Treatment of Overweight in Adults (1998). Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: Executive Summary. *Am J Clin Nutr*, 68(4):899-917. <http://ajcn.nutrition.org/content/68/4/899.long>
19. Center for Disease Control (2010). WHO Growth Standards and CDC Growth Charts. Retrieved on 5/31/2015 from <http://www.cdc.gov/growthcharts>
20. Eisenmann J.C., for the Subcommittee on Assessment in Pediatric Obesity Management Programs, National Association of Children's Hospital and Related Institutions (2011). Assessment of Obese Children and Adolescents: a Survey of Pediatric Obesity-Management Programs. *Pediatrics*, 128(S2):S51-S58. http://pediatrics.aappublications.org/content/128/Supplement_2/S51.full.pdf
21. Mitchell J.A., and Byun W. (2014). Sedentary Behavior and Health Outcomes in Children and Adolescents. *Am J Lifestyle Med*, 8(3):173-199. <http://ajl.sagepub.com/content/8/3/173.full>
22. Zeller M.H., Ingerski L.M., Wilson L., and Modi A.C. (2010). Factors Contributing to Weight Misperception in Obese Children Presenting for Intervention. *Clin Pediatr*, 49(4):330-336. <http://cpj.sagepub.com/content/49/4/330.full.pdf+html>
23. Eckstein K.C., Mikhail L.M., Ariza A.J., Thomson J.S., Millard S.C., and Binns, H.J., for the Pediatric Practice Research Group (2006). Parents' Perceptions of Their Child's Weight and Health. *Pediatrics*, 117(3):681-690. <http://pediatrics.aappublications.org/content/117/3/681.full.pdf+html>
24. Huang J.S., Becerra K., Oda T., Walker E., Xu R., Donohue, M., Chena I., Curbelo V., and Breslow A. (2007). Parental Ability to Discriminate the Weight Status of Children: Results of a Survey. *Pediatrics*, 120(1):112-119. <http://pediatrics.aappublications.org/content/120/1/e112.full.pdf+html>
25. Crawford D., Timperio A., Telford A., and Salmon J. (2006). Parental Concerns About Childhood Obesity and the Strategies Employed to Prevent Unhealthy Weight Gain in Children. *Public Health Nutr*, 9(7):889-895. http://journals.cambridge.org/download.php?file=%2FPHN%2FPHN9_07%2F51368980006001479a.pdf&code=d0789eb3d117d07d0efbe7a12d05dd39
26. Hill D., Chapman S., and Donovan R. (1998). The Return of Scare Tactics. *Tob Control*, 7(1):5-8. <http://tobaccocontrol.bmj.com/content/7/1/5.full.pdf+html>
27. Schwartz R.P., Hamre R., Dietz W.H., Wasserman R.C., Slora E.J., Myers E.F., Sullivan S., Rockett H., Thoma K.A., Dumitru G., and Resnicow K.A. (2007). Office-Based Motivational Interviewing to Prevent Childhood Obesity: a Feasibility Study. *Arch Pediat Adol Med*, 161(5):495-501. <http://archpedi.jamanetwork.com/article.aspx?articleid=570359>
28. Resnicow K., McMaster F., Bocian A., Harris D., Zhou Y., Snetselaar L., Schwartz R., Myers E., Gotlieb J., Foster J., Hollinger D., Smith K., Woolford S., Mueller D., and Wasserman R.C. (2015). Motivational Interviewing and Dietary Counseling for Obesity in Primary Care: an RCT. *Pediatrics*, 135(4):649-657. <http://pediatrics.aappublications.org/content/early/2015/03/25/peds.2014-1880.full.pdf+html>
29. Miller W.R., Rollnick S., and Conforti K. (2002). *Motivational Interviewing: Preparing People for Change* (2nd Ed.). New York, NY: The Guilford Press.
30. Puhl R.M., and Heuer C.A. (2010). Obesity Stigma: Important Considerations for Public Health. *Am J Public Health*, 100(6):1019-1028. <http://ajph.aphapublications.org/doi/pdf/10.2105/AJPH.2009.159491>
31. Puhl R.M., Peterson J.L., and Luedicke J. (2011). Parental Perceptions of Weight Terminology that Providers Use With Youth. *Pediatrics*, 128(4): 786-793. <http://pediatrics.aappublications.org/content/early/2011/09/21/peds.2010-3841.full.pdf+html>
32. Herrera B.M., Keildson S., and Lindgren C.M. (2011). Genetics and Epigenetics of Obesity. *Maturitas*. 69(1):41-49. [http://www.maturitas.org/article/S0378-5122\(11\)00079-X/pdf](http://www.maturitas.org/article/S0378-5122(11)00079-X/pdf)
33. Oude Luttikhuis H., Baur L., Jansen H., Shrewsbury V.A., O'Malley C., Stolk R.P., and Summerbell C.D. (2009). Interventions for Treating Obesity in Children. *Cochrane Db Syst Rev*, 1:1-175. http://www.researchgate.net/profile/Vanessa_Shrewsbury/publication/41487919_Interventions_for_treating_obesity_in_children/links/02bfe513192344b6db000000.pdf
34. Faith M.S., Van Horn L., Appel L.J., Burke L.E., Carson J.A.S., Franch H.A., Jakicic J.M., Kral T.V.E., Odoms-Young A., Wansink B., and Wylie-Rosett J., on behalf of the American Heart Association Nutrition and Obesity Committees of the Council on Nutrition, Physical Activity and Metabolism, Council on Clinical Cardiology, Council on Cardiovascular Disease in the Young, Council on Cardiovascular Nursing, Council on Epidemiology and Prevention, and Council on the Kidney in Cardiovascular Disease (2012). Evaluating Parents and Adult Caregivers as "Agents of Change" for Treating Obese Children: Evidence for Parent Behavior Change Strategies and Research Gaps: a Scientific Statement from the American Heart Association. *Circulation*, 125(9):1186-1207. <http://circ.ahajournals.org/content/125/9/1186.full.pdf+html>
35. Golan M., Kaufman V., and Shahar D.R. (2006). Childhood Obesity Treatment: Targeting Parents Exclusively v. Parents and Children. *Brit J Nutr*, 95(5):1008-1015. http://journals.cambridge.org/download.php?file=%2FBJN%2FBJN95_05%2F50007114506001322a.pdf&code=92f3f5b440cf08463f42f347c677729f
36. Golley R.K., Magarey A.M., Baur L.A., Steinbeck K.S., and Daniels L.A. (2007). Twelve-Month Effectiveness of a Parent-Led, Family-Focused Weight-Management Program for Prepubertal Children: a Randomized, Controlled Trial. *Pediatrics*, 119(3):517-525. <http://pediatrics.aappublications.org/content/119/3/517.full.pdf>
37. Hughes A.R., Stewart L., Chapple J., McColl J.H., Donaldson M.D.C., Kelnar C.J.H., Zabihollah M., Ahmed F., and Reilly J.J. (2008). Randomized, Controlled Trial of a Best-Practice Individualized Behavioral Program for Treatment of Childhood Overweight: Scottish Childhood Overweight Treatment Trial (SCOTT). *Pediatrics*, 121(3):539-546. <http://pediatrics.aappublications.org/content/121/3/e539.full.pdf+html>
38. Johnston C.A., Tyler C., McFarlin B.K., Poston W.S.C., Haddock C.K., Reeves R., and Foreyt J.P. (2007). Weight Loss in Overweight Mexican American Children: a Randomized, Controlled Trial. *Pediatrics*, 120(6):1450-1457. <http://pediatrics.aappublications.org/content/120/6/e1450.full.pdf+html>
39. National Heart, Lung, and Blood Institute (2013). "We Can!," Ways to Enhance Children's Activity and Nutrition. Retrieved on 5/31/2015 from <http://www.nhlbi.nih.gov/health/educational/wecan/>
40. Koplan J.P., Liverman C.T., and Kraak V.I. (2005). *Preventing Childhood Obesity: Health in the Balance*. Washington, DC: National Academies Press. http://books.nap.edu/openbook.php?record_id=11015

41. National Heart, Lung, and Blood Institute (2007). "We Can!" Progress Report: Curriculum Implementation by the Intensive Sites. <https://www.nhlbi.nih.gov/health/educational/wecan/downloads/progsummary.pdf>
42. Maine Medical Center (2012). "Let's Go!" Program. Retrieved on 5/31/2015 from <http://www.letsgo.org>
43. Rogers V.W., Hart P.H., Motyka E., Rines E.N., Vine J., and Deatrick D.A. (2013). Impact of Let's Go! 5-2-1-0: A Community-Based, Multisetting Childhood Obesity Prevention Program. *J Pediatr Psychol*, 38(9):1010-1020. <http://jpepsy.oxfordjournals.org/content/38/9/1010.full.pdf+html>
44. American College of Osteopathic Pediatricians (2013). "Let's Stop Childhood Obesity!" Brochure. Retrieved on 5/31/2015 from <http://www.acoped.org/pdf/obesityinchildrenbrochureweb.pdf>
45. American College of Osteopathic Family Physicians (2015). Fight Childhood Obesity – Make Healthy Family Choices. Retrieved on 5/31/2015 from https://www.acofp.org/uploadedfiles/acofp/practice_management/health%20awareness%20poster%20-%20child%20obesity%20-%20lg.pdf
46. American Osteopathic Association (2015). General Health. Retrieved on 5/31/2015 from <http://www.osteopathic.org/osteopathic-health/about-your-health/health-conditions-library/general-health/pages/default.aspx>