Pediatric Obesity

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Key Points

- Screening for BMI should be done at every health supervision exam. Although weight management is a sensitive topic, all health care providers should feel comfortable addressing it with both patients and families.
- If a child's BMI is above the 85th percentile, the provider should evaluate risk factors and conduct medical and behavioral assessments to identify areas where changes can be implemented. Common modifications include eliminating sugary drinks, enforcing portion control, encouraging activity (≥ 1 hour daily), and limiting screen time (≤ 2 hours daily). Nutrition counseling may be beneficial.
- Regularly scheduled, close follow-up improves accountability and compliance in patients and families who are actively trying to improve weight status.
- Referral to other specialists and resources, including weight management centers, should be made as appropriate.

Definition

- Body Mass Index (BMI) is a measure of body fat based on the ratio of weight and height. BMI is calculated using the following formula: BMI = weight (kg)/ [height (m)] ^{2}
- BMI for a child strongly correlates with body fat percentages.
- To define overweight and obesity in children ages 2 to 20 years, use the gender-specific BMI-for-age growth charts published by the CDC. Table 1 outlines weight status category based on percentile range.

Table 1. Weight Status Category Percentile Range

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Table 1. Weight Status Category Percentile Range

Healthy weight	5th percentile to less than or equal to the 85th percentile
Overweight	85th percentile to less than or equal to the 95th percentile
Obese	Equal to or greater than the 95th percentile

Assessment

Risk Assessment

When a child's BMI is above the 85th percentile, the primary care provider should evaluate the following risks (Table 2):

Table 2. Risk Assessment

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Medical risks	• Determine existing or potential obesity-related medical comorbidities
Behavioral risks	• Assess dietary routines, physical activity, and sedentary activity

Environmental and socioeconomic risks	• Assess problems such as
	  • Limited availability of healthy, inexpensive foods in low income neighborhoods (sometimes referred to "food deserts")
	  • Safety issues which may interfere with children and families participating in outdoor exercise

Medical Assessment

Primary care providers should assume full responsibility for screening children for obesity-related medical comorbidities.

Medical History

- Parental obesity may be an indication that a child's weight problems will continue into adulthood.
- Family medical history is important in evaluating obesity-related comorbidities that can be familial, including type 2 diabetes mellitus or insulin resistance, hypertension, and

hyperlipidemia.

Physical Examination

- A routine pediatric examination will present concerns related to obesity.
- Document routine blood pressure, height, and weight at every visit.
- Assess specific conditions, such as elevated blood pressure, acanthosis nigricans, striae, enlarged tonsils, abnormal breathing, enlarged liver, heart murmur, gynecomastia, Blount disease or abnormal gait, and general body fat distribution.
- See Figure 1 in Resources for an example of a weight management intake form, which includes a comprehensive review of systems.

Laboratory and Other Tests

- Recommended laboratory tests include fasting lipid profile (total cholesterol, LDL, HDL, triglycerides), fasting glucose, hemoglobin A1c, ALT, and AST.
- Other tests that may be indicated include CBC/BMP (if hypertensive), sleep study, and polycystic ovary syndrome (PCOS) workup.
    - A sleep study is recommended for children with a BMI ≥ 85th percentile who have any indicative symptoms, such as snoring, sleep apnea, daytime sleepiness, or poor school performance.
    - A PCOS workup is indicated for any female with a BMI ≥ 85th percentile who has irregular periods (after two years of menarche) and/or signs of acne or hirsutism.

Medications

Drug classes that can potentially lead to weight gain include (but are not limited to) conventional and atypical antipsychotic agents, prednisone, selective serotonin reuptake inhibitors, conventional mood stabilizers, anticonvulsants/mood stabilizers, oral contraceptives, and tricyclic antidepressants.

Ethnic Backgrounds

American Indian, Hispanic, or non-Hispanic black races all have increased disposition to obesity compared to non-Hispanic white children.

Genetic Disorders

Rare disorders such as Prader-Willi syndrome, Alström syndrome, and Bardet-Biedl syndrome can lead to increased obesity.

Behavioral Assessment

Food Intake Assessment

- Traditional methods of dietary assessment include food records, 24-hour food recalls, and food-frequency questionnaires. Limitations of traditional methods include the following:
    - Reporting by the family is not always accurate.
    - Methods are too time intensive for the provider.
- Assessing the entire family's consumption of sweetened beverages, meal locations, restaurant food consumption, and meal environment can help provide information on energy intake.

The most effective method of assessing food intake is to identify the following eating behaviors:

- Excessive consumption of sugary drinks (eg, 100% fruit juice, soda, sports drinks, sweet tea, punch)
- Meal frequency and snacking patterns
- Breakfast consumption
- Low consumption of fruits and vegetables
- Excessive consumption of foods that are high in energy density

Physical Activity and Sedentary Behavior

- The most common method to assess physical activity is a self-report analysis of frequency, intensity, and duration of activities.
- The method of evaluating physical activity is based on age.
    - For children < 10 years of age, rely on parents to report activity levels.
    - For adolescents question the child directly, focusing on organized sports programs and unorganized outdoor play.
- Assess the length, regularity, and intensity of physical activity.
    - Children should perform moderate or vigorous activity for at least 60 minutes each day. Whether the activity is in small increments of burst activity or in longer periods, the daily total should add up to 60 minutes.
    - Parents can gauge the intensity of an activity by using strategies, such as the “sing test” (ie, for an activity of moderate intensity, the child should be able to talk but not sing.)
    - If an activity is not at an adequate intensity level, it will not be as beneficial to the weight loss efforts.
- A recommendation for changing sedentary behavior is to limit daily screen time to < 2 hours. Screen time includes watching television/DVDs, playing computer games, and using handheld devices.

Motivation Assessment

Readiness to Change

Assessing the patient’s and family’s attitude towards weight management is a critical step to successful outcome. The transtheoretical “readiness to change” model (Table 3) is a behavior theory often used in weight management programs. The model is comprised of the following 5 stages:

Table 3. Summary of the Transtheoretical “Readiness to Change” Model

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Stage	Description
	The patient and family are
1. Precontemplation	• not interested in changing the problematic behavior
2. Contemplation	• more aware of the need for change • assessing the pros and cons • not yet ready to take action
3. Preparation	• ready to start taking action soon • preparing to change the behavior
4. Action	• taking steps to change
5. Maintenance	• have successfully maintained the change for at least 6 months

Behavioral changes typically occur during the action stage when the patient and family understand the need for change, have the confidence to change, and are prepared for the change.

Goal Setting

One of the most influential methods to change behaviors leading to weight control is goal setting. Successful changes can be possible using the acronym SMART to encourage goals that are

- **S**pecific
- **M**easurable
- **A**ttainable
- **R**eliable
- **T**imely

Diagnosis

Body Mass Index

Use Body Mass Index (BMI) as a screening tool to identify possible weight problems in children. See Table 1 for definitions of healthy weight, overweight, and obese according to percentile.

Comorbidities

- In addition to the BMI the provider should conduct other assessments to determine if excess body fat percentage is a problem.
- Assess comorbidities by evaluating fasting laboratory tests and conducting a physical exam.
- Primary comorbidities include dyslipidemia, nonalcoholic fatty liver disease, Blount disease, joint pain, hypertension, PCOS, sleep apnea, and diabetes.

Diagnostic Terms

- When diagnosing obesity, avoid using terms such as *fat*, *obese*, or *extremely obese*. Alternate

terms such as *weight problem* or *unhealthy weight* are more encouraging to parents and help promote willingness to address changes in the child's lifestyle.
- Stigmatizing terms can be insulting to parents and can hinder cooperation in improving the child's weight and health.

Management and Treatment Recommendations

Overview

- The American Academy of Pediatrics (AAP) Expert Committee proposes a systematic approach to a staged treatment. This approach is an office-based intervention tailored to the severity of obesity, the motivation of the family, and the capabilities of the clinical office and practitioner.
- Providers' offices should prepare for implementation of staged treatment by identifying referral centers and providers to use when further assistance is needed. This includes dietitians, behavior therapists, and exercise specialists.
- For children with obesity-related comorbidities, referral to pediatric weight management programs are most appropriate.

Stages of Obesity Treatment

An effective management and treatment strategy for pediatric obesity is a stepwise approach according to the 4 stages described in Table 4.

Table 4. Stages of Obesity Treatment

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Stage 1: **Prevention Plus**	*Goal:* Lower BMI by counseling about healthy life styles
Recommendations for Patient and/or Family	**Implementation by Provider**
• Eat ≥ 5 servings of fruits and vegetables. • Limit sugar-sweetened drinks. • Decrease daily screen time to ≤ 2 hours. • Increase daily activity level to ≥ 1 hour. • Prepare more meals at home. • Eat family meals at the table at least 5 to 6 times each week. • Implement these recommendations for entire family. • Allow child to self-regulate meals (ie, avoid pressure to eat or restriction).	• **Setting:** Primary care provider office • **Providers:** Physicians, advanced practice nurses, physician assistants, office nurses • **Follow-up frequency:** Individualized for each family • **Next steps:** After 3 to 6 months with no improvement in weight, proceed to next stage.

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Stage 2: **Structured Weight Management**	*Goal:* Lower BMI through structured and specific goals for nutritional and behavioral changes
Recommendations for Patient and/or Family	**Implementation by Provider**

• Continue Stage 1: Prevention Plus initiatives.
• Follow daily dietary plan with proportioned macronutrients.
• Eat controlled meals and snacks.
• Decrease daily screen time to ≤ 1 hour.
• Participate in structured daily activities or active play for 60 minutes.
• Keep a daily record for monitoring behaviors.
	• **Setting:** Primary care provider office
	• **Providers:**
	  • Physicians, physician assistants, advanced practice nurses, office nurses
	  • Dietitian useful to create meal plan
	• **Follow-up frequency:** Monthly

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Stage 3: **Comprehensive Multidisciplinary Intervention**	*Goal:* Lower BMI by aggressive monitoring with a multispecialty team
Recommendations for Patient and/or Family	**Implementation by Provider**

• Follow structured program with food monitoring, short-term diet, and physical activity goal setting.
• Maintain a negative energy balance.
• Attend parental training for improving the home environment.
• Have evaluation of body measurements, food intake, and physical activity.
	• **Setting:** Pediatric weight management program
	• **Providers:**
	  • Multidisciplinary team, including a behavioral therapist, dietitian, exercise specialist, primary care provider
	  • Group visits may be effective during this phase.
	• **Follow up frequency**: Weekly for 8 to 12 visits

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Stage 4: **Tertiary Care Intervention**	*Goal:* Lower BMI by bariatric surgery and/or medications
Recommendations for Patient and/or Family	**Implementation by Provider**

• Take medications as prescribed.
• Follow diet as prescribed.
• Consider weight control surgery if recommended.
	• **Setting:**
	  • Pediatric weight management centers
	  • Location and insurance coverage can cause access problems to this stage of treatment.
	• **Providers:** Multidisciplinary team with experience in pediatric weight management
	• **Special considerations:**
	  • **Medications:** Sibutramine (≥ 16 years of age) and orlistat (≥ 12 years of age) have both shown modest effects on weight gain.
	  • **Diet:** No long-term outcome data has been reported for a very low-calorie diet.
	  • **Weight control surgery:** Gastric sleeve and gastric bypass are options which have demonstrated substantial weight loss and improvement in medical conditions.

Information from Barlow SE. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. *Pediatrics*. 2007;120 Suppl 4:S164-92 and Ross MM, Kolbash S, Cohen GM, Skelton JA. Multidisciplinary treatment of pediatric obesity: nutrition evaluation and management. *Nutr Clin Pract*. 2010;25(4):327-34.

Resources

Figure 1. Review of systems from Arkansas Children's Hospital Weight Management Clinic

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Past Medial History / Review of Systems

Has your child had any of the following?			If Yes, age it started and details:
Acne	❑ Yes	❑ No	_____
Allergies	❑ Yes	❑ No	_____
Asthma	❑ Yes	❑ No	_____
Bedwetting	❑ Yes	❑ No	_____
Behavior issues	❑ Yes	❑ No	_____
Blurred vision / glasses	❑ Yes	❑ No	_____
Chest pain	❑ Yes	❑ No	_____
Constipation	❑ Yes	❑ No	_____
Daytime sleepiness	❑ Yes	❑ No	_____
Depression	❑ Yes	❑ No	_____
Diarrhea	❑ Yes	❑ No	_____
Excess hair on skin	❑ Yes	❑ No	_____
Excessive thirst / urinating	❑ Yes	❑ No	_____
Fatigue	❑ Yes	❑ No	_____
Headaches	❑ Yes	❑ No	_____
Heart problems	❑ Yes	❑ No	_____
Heartburn / Relux	❑ Yes	❑ No	_____
Irregular period	❑ Yes	❑ No	_____
Joint / muscle pain	❑ Yes	❑ No	_____
Night time cough	❑ Yes	❑ No	_____
Surgeries	❑ Yes	❑ No	_____
Rash on skin	❑ Yes	❑ No	_____
Seizures	❑ Yes	❑ No	_____
Shortness of breath	❑ Yes	❑ No	_____
Snoring	❑ Yes	❑ No	_____
Sore throat	❑ Yes	❑ No	_____
Stomach pain	❑ Yes	❑ No	_____
Stretch marks	❑ Yes	❑ No	_____
Vomiting	❑ Yes	❑ No	_____
Monthly period started at age_____			

FAMILY HISTORY

Is there a family history of the following?	Mother's side	Father's side	Unknown or N/A
Overweight / obese	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No
Asthma	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No
Depression	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No
Diabetes	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No
High blood pressure	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No
High cholesterol	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No
Heart disease / attack			
Male 55 years or older	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No
Female 65 years or older	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No
Mental health disease	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No
Sleep Apnea	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No
Thyroid disease	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No
Stroke	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No
Weight Loss Surgery	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No

This guideline was developed to improve health care access in Arkansas and to aid health care providers in making decisions about appropriate patient care. The needs of the individual patient, resources available, and limitations unique to the institution or type of practice may warrant variations.

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