Algorithm for the Assessment and Management of Childhood Obesity in Patients 2 Years and Older

This algorithm is based on the 2007 Expert Committee Recommendations,[1] new evidence and promising practices.

Assess Behaviors

Assess healthy eating and active living behaviors

Provide Prevention Counseling

5 (fruits & vegetables) **2** (hours or less of screen time) **1** (hour or more of physical activity) **0** (sugary drinks) every day!

Determine Weight Classification

Accurately determine weight and height, calculate and plot Body Mass Index (BMI) and determine BMI percentile.

Healthy Weight
(BMI 5-84%)

- Family History
- Review of Systems
- Physical Exam

Risk Factors Absent

Overweight
(BMI 85-94%)

Augmented (obesity-specific)[1]
- Family History
- Review of Systems
- Physical Exam

Obesity
(BMI ≥ 95%)

Augmented (obesity-specific)[1]
- Family History
- Review of Systems
- Physical Exam

Determine Health Risk Factors*

Risk Factors Present

Routine Care

- Provide ongoing positive reinforcement for healthy behaviors.
- For patients in the *healthy weight* category, screen for genetic dyslipidemia by obtaining a non-fasting lipid profile for all children between the ages of 9-11 and again between 18-21.[2]
- For patients in the *overweight* category, obtain a lipid profile.
- Maintain weight velocity:
  - Crossing 2 percentile lines is a risk for obesity[4]
  - Reassess annually
- Follow up at every well-child visit.

Lab Screening

- The 2007 Expert Committee Recommendations[1] state that a fasting glucose and fasting lipid profile along with ALT and AST should be obtained.
- Additionally, guidelines from the ADA and Endocrine Society recommend using A1C, fasting glucose or oral glucose tolerance to test for diabetes or pre-diabetes.[3]
- For patient convenience, some providers are obtaining non-fasting labs.
- Clinical judgment, local preferences and availability of testing should be used to help determine the timing of follow up of abnormal labs.
- Of note, some subspecialty clinics are screening for Vitamin D deficiency and insulin resistance by obtaining labs for Vitamin D and fasting insulin. The clinical utility and cost effectiveness of such testing is yet to be determined.
- Currently, there are no guidelines on when to start laboratory testing for patients with obesity. Based upon the patient's health risk, some experts may start screening patients at 2 years of age.

Obesity-related conditions: The following conditions are associated with obesity and should be considered for further work-up. Additional lab tests may be warranted if indicted by the patient's clinical condition.[5] In 2014, consensus statements from The Children's Hospital Association described the management of a number of these conditions.[6,7]

Dermatologic:
- Acanthosis nigricans
- Hirsutism
- Intertrigo

Endocrine:
- Polycystic ovarian syndrome (PCOS)
- Precocious puberty
- Prediabetes: Impaired fasting glucose and/or impaired glucose tolerance as demonstrated during a GTT
- Premature adrenarche
- Type 2 Diabetes

Gastrointestinal:
- Cholelithiasis
- Constipation
- GERD
- Nonalcoholic fatty liver disease or steatohepatitis

Neurologic:
- Pseudotumor cerebri

Orthopedic:
- Blount's Disease
- Slipped capital femoral epiphysis (SCFE)

Psychological/Behavioral Health:
- Anxiety
- Binge eating disorder
- Depression
- Teasing/bullying

*Based on behaviors, family history, review of systems, and physical exam, in addition to weight classification.

Move on to next page

Management and Treatment Stages for Patients with Overweight or Obesity

- Patients should start at the least intensive stage and advance through the stages based upon the response to treatment, age, BMI, health risks and motivation.
- An empathetic and empowering counseling style, such as motivational interviewing, should be employed to support patient and family behavior change.[8,9]
- Children age 2 – 5 who have obesity should not lose more than 1 pound/month; older children and adolescents with obesity should not lose more than an average of 2 pounds/week.

Stage 1 Prevention Plus

Where/By Whom: Primary Care Office/Primary Care Provider
What: Planned follow-up themed visits (15-20 min) focusing on behaviors that resonate with the patient, family and provider. Consider partnering with dietician, social worker, athletic trainer or physical therapist for added support and counseling.
Goals: Positive behavior change regardless of change in BMI. Weight maintenance or a decrease in BMI velocity.[4]
Follow-up: Tailor to the patient and family motivation. Many experts recommend at least monthly follow-up visits. After 3 – 6 months, if the BMI/weight status has not improved consider advancing to Stage 2.

Stage 2 Structured Weight Management

Where/By Whom: Primary Care Office/Primary Care Provider with appropriate training
What: Same intervention as Stage 1 while including more intense support and structure to achieve healthy behavior change.
Goals: Positive behavior change. Weight maintenance or a decrease in BMI velocity.
Follow-up: Every 2 - 4 weeks as determined by the patient, family and physician. After 3 – 6 months, if the BMI/weight status has not improved consider advancing to Stage 3.

Stage 3 Comprehensive Multi-disciplinary Intervention

Where/By Whom: Pediatric Weight Management Clinic/Multi-disciplinary Team
What: Increased intensity of behavior changes, frequency of visits, and specialists involved. Structured behavioral modification program, including food and activity monitoring, and development of short-term diet and physical activity goals.
Goals: Positive behavior change. Weight maintenance or a decrease in BMI velocity.
Follow-up: Weekly or at least every 2 – 4 weeks as determined by the patient, family, and physician. After 3 – 6 months, if the BMI/weight status has not improved consider advancing to Stage 4.

Stage 4 Tertiary Care Intervention

Where/By Whom: Pediatric Weight Management Center/Providers with expertise in treating childhood obesity
What: Recommended for children with BMI $\geq$ 95% and significant comorbidities if unsuccessful with Stages 1 - 3. Also recommended for children > 99% who have shown no improvement under Stage 3. Intensive diet and activity counseling with consideration of the use of medications and surgery.
Goals: Positive behavior change. Decrease in BMI.
Follow-up: Determine based upon patient's motivation and medical status.

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