Clinical Practice Guideline for the Management of Obesity in Children and Adolescents

The prevalence of obesity is reaching epidemic proportions. Obesity is a risk factor for Type 2 diabetes mellitus, hypertension, dyslipidemia, coronary artery disease, cerebrovascular disease, and osteoarthritis. While obesity is related to a positive energy balance (intake > output), other factors contribute to the increasing prevalence (environmental, cultural, and genetic). After reaching the age of six, an obese patient has a 50% chance of being obese in adulthood.[4]

Assess all children for obesity at all well care visits 2-18 years:

- Physicians and allied health professional should perform, at a minimum, a yearly assessment.

Use Body Mass Index (BMI) to screen for obesity:

- Accurately measure height and weight
- Calculate BMI
- Plot BMI on BMI growth chart
- Not recommended: skinfold thickness, waist circumference

Make a weight category diagnosis using BMI percentile:

- Obesity - BMI is 95th-98th percentile
- Overweight - BMI is 85th - 94th percentile
- Healthy Weight - BMI is 5th to 84th percentile
- Underweight - BMI is < 5th percentile
- ≥ 99th percentile- not added at this time (until added to growth charts)

Measure blood pressure:

- Use a cuff large enough to cover 80% of the upper arm
- Measure pulse in the standard manner

Take a focused family history:

- Obesity
- Type 2 diabetes
- Cardiovascular disease(hypertension, cholesterol)
- Early deaths from heart disease or stroke

Assess behaviors and attitudes:

Diet Behaviors

- Sweetened-beverage consumption
- Fruit and vegetable consumption
- Frequency of eating out and family meals
- Consumption of excessive portion sized
- Daily breakfast consumption

Physical Activity Behaviors

- Amount of moderate physical activity
- Level of screen time and other sedentary activities

Attitudes

- Self-perception or concern about weight
- Readiness to change
- Successes, barriers and challenges

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Perform a thorough physical examination:

- Perform a thorough physical examination (See Table 3)

Order the appropriate laboratory tests:

BMI 85-94%ile Without Risk Factors

- Fasting Lipid Profile

BMI 85-94%oil Age 10 years & Older With Risk Factors

- Fasting Lipid Profile
- ALT and AST
- Fasting Glucose

BMI ≥ 95%ile Age 10 Years & Older

- Fasting Lipid Profile
- Readiness to change
- Successes, barriers and challenges

Give consistent evidence-based messages for all children regardless of weight:

- Limit sugar-sweetened beverages
- Eat at least 5 servings of fruits and vegetables
- Moderate to vigorous physical activity for at least 60 minutes a day
- Limit screen time to no more than 2 hours/day
- Remove television from children's bedrooms
- Eat breakfast every day
- Limit eating out, especially at fast food
- Have regular family meals
- Limit portion sizes

Use Empathize/Elicit-Provide-Elicit to improve the effectiveness of your counseling

Assess self-efficacy and readiness to change. Use Empathize/Elicit – Provide – Elicit to improve the effectiveness of your counseling.

Empathize/Elicit

- Reflect
- What is your understanding?
- What do you want to know?
- How ready are you to make a change (1-10 scale)?

Provide

- Advice or information
- Choices or options

Elicit

- What do you make of that?
- Where does that leave you?

Develop an office based approach for follow up of overweight and obese children:

A staged approach to treatment is recommended for ages 2-19 whose BMI is 85-94%ile with risk factors and all whose BMI is ≥ 95% ile.

In general, treatment begins with Stage 1 Prevention Plus (Table 4) and progresses to the next stage if there has been

no improvement in weight/BMI or velocity after 3-6 months and the family is willing/ready.
The recommended weight loss targets are shown in Table 5.

Stage 1 – Prevention Plus

- Family visits with physician or health professional who has had some training in pediatric weight management/behavioral counseling.
- Can be individual or group visits.
- Frequency – individualized to family needs and risk factors, consider monthly.

Behavioral Goals –

- Decrease screen time to 2 hr/day or fewer
- No sugar-sweetened beverages
- Consume at least 5 servings of fruits and vegetables daily
- Be physically active 1 hour or more daily
- Prepare more meals at home as a family (the goal is 5-6 times a week)
- Limit meals outside the home
- Eat a healthy breakfast daily
- Involve the whole family in lifestyle changes
- More focused attention to lifestyle changes and more frequent follow-up distinguishes Prevention Plus from Prevention Counseling

Weight Goal –

- Weight maintenance or a decrease in BMI velocity. The long term BMI goal is <85%ile although some children can be healthy with a BMI 85-94%ile.

Advance to Stage 2 (Structured Weight Management)

- If no improvement in weight/BMI or velocity in 3-6 months and family willing/ready to make changes.

Advocate for improved access to fresh fruits and vegetables and safe physical activity in your community and schools

The Expert Committee recommends that physicians, allied healthcare professionals, and professional organizations advocate for:

- The federal government to increase physical activity at school through intervention programs as early as grade 1 through the end of high school and college, and through creating school environments that support physical activity in general.
- Supporting efforts to preserve and enhance parks as areas for physical activity, informing local development initiatives regarding the inclusion of walking and bicycle paths, and promoting families' use of local physical activity options by making information and suggestions about physical activity alternatives available in doctors' offices.

Identify and promote community services which encourage healthy eating and physical activity

- Promote physical activity at school and in child care settings (including after school programs), by asking children and parents about activity in these settings during routine office visits.

Identify or develop more intensive weight management interventions for your families who do not respond to Prevention Plus

The Expert Committee recommends the following staged approach for children between the ages of 2 and 19 years whose BMI is 85-94%ile with risk factors and all whose BMI is ≥95%ile:

Stage 2 – Structured Weight Management

- Family visits with physician or health professional specifically trained in weight management. Monthly visits can be individual or group.

Stage 3 – Comprehensive, Multidisciplinary Intervention

- Multidisciplinary team with experience in childhood obesity. Frequency is often weekly for 8 – 12 weeks with follow up.

Stage 4 – Tertiary Care Intervention

- Medications – sibutramine, orlistat, Very-low-calorie diets, weight control surgery – gastric bypass or banding. Recommended for select patients only when provided by experienced programs with established clinical or research protocols. Gastric banding is in clinical trials and not currently FDA approved.

Table 1 – BMI 99%ile Cut-Points (kg/m²)

Age (Years)	Boys	Girls
5	20.1	21.5
6	21.3	23.0
7	23.6	24.6
8	25.6	26.4
9	27.6	28.2
10	29.3	29.9
11	30.7	31.5
12	31.8	33.1
13	32.6	34.6
14	33.2	36.0
15	33.6	37.5
16	33.9	39.1
17	34.4	40.8

Table 2 – Abbreviated NHLBI Blood Pressure Table
Blood Pressure 95% by Age, Sex and Height%

Age	Boys	Height%	Girls	Height %
	50%	90%	50%	90%
2 yr	106/61	109/63	105/63	108/65
5 yr	112/72	115/74	110/72	112/73
8 yr	116/78	119/79	115/76	118/78
11 yr	121/80	124/82	121/79	123/81
14 yr	128/82	132/84	126/82	129/84
17 yr	136/87	139/88	129/84	131/85

Table 3 – Symptoms and Signs of Conditions Associated with Obesity

Symptoms	Signs
► Anxiety, school avoidance, social isolation (Depression) ► Polyuria, polydipsia, weight loss (Type 2 diabetes mellitus) ► Headaches (Pseudotumor cerebri) ► Night breathing difficulties (Sleep apnea, hypoventilation syndrome, asthma) ► Daytime sleepiness (Sleep apnea, hypoventilation syndrome, depression) ► Abdominal pain (Gastroesophageal reflux, Gall bladder disease, Constipation) ► Hip or knee pain (Slipped capital femoral epiphysis) ► Oligomenorrhea or amenorrhea (Polycystic ovary syndrome)	► Poor linear growth (hypothyroidism, Cushing's, Prader-Willi syndrome) ► Dysmorphic features (Genetic disorders, including Prader- Willi syndrome) ► Acanthosis nigricans (NIDDM, insulin resistance) ► Hirsutism and Excessive Acne (Polycystic ovary syndrome) ► Violaceous striae (Cushing's syndrome) ► Papilledema, cranial nerve VI paralysis (Pseudotumor cerebri) ► Tonsillar hypertropohy (Sleep apnea) ► Abdominal tenderness (Gall bladder disease, GERD, NAFLD) ► Hepatomegaly (Nonalcoholic fatty liver disease (NAFLD) ► Undescended testicle (Prader-Willi syndrome) ► Limited hip range of motion (Slipped capital femoral epiphysis) ► Lower leg bowing (Blount's disease)

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Table 4 – A Staged Approach to Obesity Treatment

	BMI 85-94%ile No Risks	BMI 85-94%ile With Risks	BMI 95-98%ile	BMI>=99%ile
Age 2-5 years	Prevention Counseling	**Initial:** Stage 1 **Highest:** Stage 2	**Initial:** Stage 1 **Highest:** Stage3	**Initial:** Stage 1 **Highest:** Stage 3
Age 6-11 years	Prevention Counseling	**Initial:** Stage 1 **Highest:** Stage 2	**Initial:** Stage 1 **Highest:** Stage 3	**Initial:** Stage 1-3 **Highest:** Stage 3
Age 12-18 years	Prevention Counseling	**Initial:** Stage 1 **Highest:** Stage 3	**Initial:** Stage 1 **Highest:** Stage 4	**Initial:** Stage 1-3 **Highest:** Stage 4

Stage 1	**Prevention Plus**	Primary Care Office
Stage 2	**Structured Weight Management**	Primary Care Office with Support
Stage 3	**Comprehensive, Multidisciplinary Intervention**	Pediatric Weight Management Center
Stage 4	**Tertiary Care Intervention**	Tertiary Care Center

Table 5 – Weight Loss Targets

	BMI 85-94%ile No Risks	BMI 85-94%ile With Risks	BMI 95-98%ile	BMI>=99%ile
Age 2-5 years	Maintain weight velocity	Decrease weight velocity or weight maintenance	Weight Maintenance	Gradual weight loss of up to 1 pound a month if BMI is very high (>21 or 22 kg/m2)
Age 6-11 years	Maintain weight velocity	Decrease weight velocity or weight maintenance	Weight maintenance or gradual loss (1 lb per month)	Weight loss (average is 2 pounds per week)*
Age 12-18 years	Maintain weight velocity. After linear growth is complete, maintain weight	Decrease weight velocity or weight maintenance	Weight loss (average is 2 pounds per week)*	Weight loss (average is 2 pounds per week)*

*Excessive weight loss should be evaluated for high risk behaviors