

Pediatric Obesity Clinical Decision Support Chart



5210

- 5** Eat fruits and vegetables at least 5 or more times on most days.
- 2** Limit screen time unrelated to school to 2 hours *or less* daily.
- 1** Get 1 hour *or more* of moderate to vigorous physical activity every day and 20 minutes of vigorous activity at least 3 times a week.
- 0** Drink less sugar. Try water and low-fat milk instead of sugar-sweetened drinks.

Introduction

The *Pediatric Obesity Clinical Decision Support Chart* provides clinicians with practical, point-of-care guidance on the prevention and treatment of obesity. Adapted from the *keep ME healthy* flip chart developed by the Maine Center for Public Health and the Maine Chapter of the American Academy of Pediatrics, the chart also contains the latest information from “Expert Committee Recommendations on the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity” by Sarah E. Barlow, MD, MPH, and the Expert Committee.

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The recommendations in this publication do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

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Adapted from the *keep ME healthy* chart developed by the Maine Center for Public Health and the Maine Chapter of the American Academy of Pediatrics (copyright 2006 Maine Center for Public Health).

New obesity terminology, assessment, and treatment content from Barlow S, Expert Committee. Expert committee recommendations on the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. *Pediatrics*. 2007;120:S164–S192.

➡➡➡➡➡➡ Treatment Interventions for the Overweight Child

BMI Calculation and Classification of BMI Percentage Begins the Process of Evaluation

1. Tailor interventions

- Age appropriate
- Meet patient's and family's readiness to change

2. Key steps

- Start early
- Aim for long-term behavioral/lifestyle change
- Use small steps and gradual change
- Family support/praise
- Measurable goals ("if you can't count it, you can't change it")

3. Techniques

- Focus on successes not failures.
- Realize this is really hard work.
- Adherence from patients will vary; support return to the plan in a nonjudgmental way.
- Expect periods of relapse and be ready to troubleshoot with the patient and family.
- Identify potentially high-risk nutrition and activity behaviors.

4. Mental health

- Evaluate family stressors and comorbidities (eg, depression, anxiety, post-traumatic stress disorder).
- Assess need for mental health intervention (eg, family or individual counseling, medications).
- Consider mental health consult (eg, child psychology).

5. Healthy eating and nutrition education

- Assess patient and family's eating habits.
- Breastfeeding
 - Promote and support breastfeeding.
- Portions
 - Provide age-appropriate information on portion size.
- Structure
 - Encourage daily breakfast.
 - Family dinners with no TV at meals.
 - Limit fast food.

• Balance

- Advise diet with balanced food group emphasis.
- Limit refined sugars, substitute low-fat for whole milk, encourage healthy fats and proteins.
- Limit 100% fruit juice to 4 to 6 oz/d for 1- to 6-year-olds and 8 to 12 oz/d for 7- to 18-year-olds.
- "Parent provides, child decides."

- Aim for reasonable daily target for calorie reduction (eg, 200–300 kcal/d less).

6. Promote increased physical activity

- Assess patient's and family's physical activity habits.
- Advise physical activity of 60 minutes or more daily (including walking) and 20 minutes of vigorous aerobic activity at least 3 days a week. Emphasize outdoor physical activity.
- Encourage a decrease in physical inactivity: Advise family to limit total screen time to 2 hours or less per day (TV, computer, video games, etc).
- Advise no TV or computer in bedroom (and/or remove TV from bedroom).
- Refer to specific community physical activity program (eg, local YMCA/YWCA; Boys/Girls Club; before-/after-school physical activity program).
- Encourage development of family physical activity plan (eg, "move and improve").
- Provide resources on how to find low-cost or free pedometers with age-appropriate goal of daily steps for BOTH patient and parent.

7. Subspecialist referral for comorbidities

- Immediate referrals for orthopedics with hip/knee pain; neurology with headaches/pseudotumor cerebri.
- Pediatric endocrinology with persisting metabolic syndrome/type 2 diabetes; pediatric gastroenterology with progressive alanine transaminase elevation; pulmonology, polysomnography with persistent sleep disorder/daytime fatigue; psychology with persistent depression, anxiety, low self-esteem.

Feeding Guide for Children

Feeding Guide for Children^a

Food	Age, y						Comments
	2 to 3		4 to 6		7 to 12		
	Portion Size	Servings	Portion Size	Servings	Portion Size	Servings	
Milk and dairy	1/2 c (4 oz)	4–5 16–20 oz total	1/2–3/4 c (4–6 oz)	3–4 24–32 oz total	1/2–1 c (4–8 oz)	3–4 24–32 oz total	The following may be substituted for 1/2 c fluid milk: 1/2–3/4 oz cheese, 1/2 cup yogurt, 2 1/2 tbsp nonfat dry milk
Meat, fish, poultry, or equivalent	1–2 oz	2 2–4 oz total	1–2 oz	2 2–4 oz total	2 oz	3–4 6–8 oz total	The following may be substituted for 1 oz meat, fish, or poultry: 1 egg, 2 tbsp peanut butter, 4–5 tbsp cooked legumes
Vegetables and fruit		4–5		4–5		3–4	Include one green leafy or yellow vegetable for vitamin A, such as carrots, spinach, broccoli, winter squash, or greens
<i>Vegetables</i> Cooked Raw ^b	2–3 tbsp Few pieces		3–4 tbsp Few Pieces		1/4–1/2 c Several pieces		
<i>Fruit</i> Raw Canned Juice	1/2–1 small 2–4 tbsp 3–4 oz		1/2–1 small 4–6 tbsp 4 oz		1 medium 1/4–1/2 c 4 oz		Include one vitamin C-rich fruit, vegetable, or juice, such as citrus juices, orange, grapefruit, strawberries, melon, tomato, or broccoli
Grain products Whole grain or enriched bread Cooked cereal Dry cereal	1/2–1 slice 1/4–1/2 c 1/2–1 c	3–4	1 slice 1/2 c 1 c	3–4	1 slice 1/2–1 c 1 c	4–5	

^aAdapted from Lowenberg ME. Development of food patterns in young children. In: Pipes PL, Trahms CM, eds. *Nutrition: Infancy and Childhood*. 5th ed. St Louis, MO: Mosby-Year Book; 1993:168–169. With permission of Elsevier.

^bDo not give to young children until they can chew well.

Tips for Busy Clinicians

Treatment Interventions

Communication

- Deliver a set of consistent key messages—5210.
- Keep a list of good Web sites to give your patients. Have appropriate books and magazines available in your waiting room. Provide books, puzzles, and activity sheets—especially for children—that help promote healthy eating and active living.
- Display educational posters and create a bulletin board for community partners to update.
- Frame your discussions to expand the patient/family perception of what healthy lifestyle changes they can make. Keep goals small, simple, and concrete. Allow for personal choices. Selections a child enjoys will be more easily sustained.
- Have patients set specific behavioral goals and action plans and be sure to ask about these during the next visit or follow-up contact.
- Be aware of the cultural norms of the patient, significance of meals/eating for the family/community, beliefs about special foods, and feelings about body size.

Team Approach

- Be a good role model—be physically active every day and work to make healthy food choices.
- Involve the clinical team in planning and implementing treatment intervention.
- Know your community resources and refer patients to them. These will help support families once they leave your office.
- Behavior change is a long-term process and involving other qualified staff will help ensure success.
- Encourage involvement and change for the whole family and all caregivers.

ABCs of Counseling and Motivating Overweight Children and Families

Ask Open-Ended Questions

- How do you feel about us talking about your physical activity, TV watching, and eating today?
- How concerned are you about your child's weight? Why?
- What are some of the things you might like to change?

Body Language

- Put patient at ease.
- Use eye contact without barriers.
- Convey respect.
- Counsel in a private setting.

Care and Empathy

- Do not criticize.
- Acknowledge patient's feelings.
- Answer questions without sign of judgment.
- Use language that is nonjudgmental
 - “Healthier” food vs “bad” food
 - “Healthier” weight vs “ideal” weight

Resources

Website Resources

BMI Calculators and Information

2000 CDC Growth Charts

www.cdc.gov/growthcharts/

CDC Z Score Data Files

www.cdc.gov/nchs/about/major/nhanes/growthcharts/zscore/zscore.htm

Children's BMI Risk Category Dependent on Age

www.cdc.gov/nccdphp/dnpa/bmi/bmi-for-age.htm

Children's BMI Calculator including plot to graph (for parents)

www.kidsnutrition.org/bodycomp/bmiz2.html

Medscape: Using the BMI-for-Age Growth Charts

www.medscape.com/viewprogram/2640

BMI Adults National Heart, Lung, & Blood Institute

www.nhlbisupport.com/bmi

Free Download for Palm OS Handhelds

www.statcoder.com/growthcharts.htm

National Resources

American Academy of Pediatrics

www.aap.org/obesity

Bright Futures

www.brightfutures.aap.org/web/

Call to Action: Health School Nutrition Environments

www.fns.usda.gov/tn/healthy/calltoaction.html

Harvard Prevention Research Center

www.hsph.harvard.edu/prc/

National Initiative for Children's Healthcare Quality-

Childhood Obesity Action Network

www.nichq.org/NICHQ/Programs/ConferencesAndTraining/ChildhoodObesityActionNetwork.htm

Resources for Parents and Kids

Healthy eating and activities for kids & parents

www.kidnetic.com

KidsHealth

www.kidshealth.org

My Pyramid

www.mypyramid.gov

Overview of the VERB campaign

www.cdc.gov/youthcampaign/

VERB Tween interactive website

www.verbnow.com

Maine Resources

Action for Healthy Kids is about creating health-promoting schools that support sound nutrition and physical activity as part of a total learning environment.

www.healthymainekids.org

Health Policy Partners of Maine

www.mcd.org/HPP

Healthy Maine Partnerships Info & Contacts by Town

www.healthymainepartners.org

Healthy Maine Walks & Sites

www.healthymainewalks.org

Let's Go!

Maine information for kids, teens, parents, childcare, health care providers, schools, and workplaces.

www.letsgo.org

Maine Census Data

www.state.me.us/newsletter/may2001/maine_census_data.htm

Maine Center for Public Health

www.mcph.org

Maine Chapter of the American Academy of Pediatrics

www.maineaap.org

Maine Childrens Alliance/Maine Kids Count Data Book

www.mekids.org

Maine Department of Education

www.maine.gov/education

Maine Governor's Council on Physical Activity

www.mainephysicalactivity.org

Maine Harvard Prevention Research Center - Keep ME Healthy

www.mcph.org/Major_Activities/keepmehealthy.htm

MaineHealth Learning Resource Centers

www.mainehealth.org/lrc

Maine Nutrition Network

www.maine-nutrition.org

Maine Physical Activity & Nutrition [PAN] Program

www.maine.gov/dhhs/boh/hmp/pan/

Maine WIC Program

www.maine.gov/dhhs/wic/

➤➤➤ Obesity Assessment: Findings on Review of Systems and Possible Etiologies ◀◀◀

Symptom	Possible Etiologies
Anxiety, school avoidance, social isolation	Depression
Severe recurrent headaches	Pseudotumor cerebri
Shortness of breath, exercise intolerance	Asthma, lack of physical conditioning
Snoring, apnea, daytime sleepiness	Obstructive sleep apnea, obesity hypoventilation syndrome
Sleepiness or wakefulness	Depression
Abdominal pain	Gastroesophageal reflux disease, constipation, gall bladder disease, nonalcoholic fatty liver disease ^a
Hip pain, knee pain, walking pain	Slipped capital femoral epiphysis, Blount disease, musculoskeletal stress from weight (may be barrier to physical activity)
Foot pain	Musculoskeletal stress from weight (may be barrier to physical activity)
Irregular menses (<9 per year)	Polycystic ovary syndrome; may be normal if recent menarche
Primary amenorrhea	Polycystic ovary syndrome, Prader-Willi syndrome
Polyuria, polydipsia	Type 2 diabetes mellitus ^a
Unexpected weight loss	Type 2 diabetes mellitus ^a
Nocturnal enuresis	Obstructive sleep apnea
Tobacco use	Increased cardiovascular risk; may be as form of weight control

^aThese conditions are often asymptomatic.

Obesity Assessment

➤➤➤ Obesity Assessment: Physical Examination Findings and Possible Etiologies ◀◀◀

System	Findings	Possible Explanations
Anthropometry	<ul style="list-style-type: none"> • High body mass index percentile • Short stature 	<ul style="list-style-type: none"> • Overweight or obesity • Underlying endocrine or genetic condition
Vital signs	<ul style="list-style-type: none"> • Elevated blood pressure 	<ul style="list-style-type: none"> • Hypertension if systolic or diastolic blood pressure >95th percentile for age, gender, and height on ≥3 occasions
Skin	<ul style="list-style-type: none"> • Acanthosis nigricans • Hirsutism, acne • Irritation, inflammation • Violaceous striae 	<ul style="list-style-type: none"> • Common in obese children, especially when skin is dark; increased risk of insulin resistance • Polycystic ovary syndrome • Consequence of severe obesity • Cushing syndrome
Eyes	<ul style="list-style-type: none"> • Papilledema, cranial nerve VI paralysis 	<ul style="list-style-type: none"> • Pseudotumor cerebri
Throat	<ul style="list-style-type: none"> • Tonsillar hypertrophy 	<ul style="list-style-type: none"> • Obstructive sleep apnea
Neck	<ul style="list-style-type: none"> • Goiter 	<ul style="list-style-type: none"> • Hypothyroidism
Chest	<ul style="list-style-type: none"> • Wheezing 	<ul style="list-style-type: none"> • Asthma (may explain or contribute to exercise intolerance)
Abdomen	<ul style="list-style-type: none"> • Tenderness • Hepatomegaly 	<ul style="list-style-type: none"> • Gastroesophageal reflux disorder, gall bladder disease, nonalcoholic fatty liver disease (NAFLD)^a • NAFLD^a
Reproductive	<ul style="list-style-type: none"> • Tanner stage • Apparent micropenis • Undescended testis/micropenis 	<ul style="list-style-type: none"> • Premature puberty age <7 years in white girls, age <6 years in black girls, and age <9 years in boys • May be normal penis that is buried in fat • Prader-Willi syndrome
Extremities	<ul style="list-style-type: none"> • Abnormal gait, limited hip range of motion • Bowing of tibia • Small hands and feet, polydactyly 	<ul style="list-style-type: none"> • Slipped capital femoral epiphysis • Blount disease • Prader-Willi syndrome, Bardet-Biedl syndrome

^aThese conditions are usually without signs.



Medical Screening by BMI Category^a



BMI Percentile	Medication Use	Review of Symptoms	Family History (1st and 2nd degree relatives)	Physical Examination	Laboratory Tests
5 th –84 th (healthy weight)	Medications that may affect weight gain (eg, neuropsychiatric)		Obesity, type 2 diabetes, hypertension, lipid, heart disease	BP (correct cuff)	
85 th –94 th (overweight)	Medications that may affect weight gain (eg, neuropsychiatric)	Snoring/sleep; abdominal pain; menstrual irregularities; hip, knee, or leg pain; polyuria; thirst; depression	Obesity, type 2 diabetes, hypertension, lipid, heart disease	BP (correct cuff), acanthosis nigricans, tonsils, goiter, tender abdomen, liver, bowing of legs, limited hip range of motion, optic discs if headaches, acne and hirsutism	<ul style="list-style-type: none"> • Fasting lipid profile • If other risk factors,^b fasting glucose, ALT, AST every 2 years
95 th –<99 th (obese)	Medications that may affect weight gain (eg, neuropsychiatric)	Snoring/sleep; abdominal pain, menstrual irregularities; hip, knee, or leg pain; urination; thirst; depression	Obesity, type 2 diabetes, hypertension, lipid, heart disease	BP (correct cuff), acanthosis nigricans, tonsils, goiter, tender abdomen, liver, bowing of legs, limited hip range of motion, optic discs if headaches, acne and hirsutism	<ul style="list-style-type: none"> • Fasting lipid profile • Fasting glucose, ALT, AST every 2 years
≥99 th	Medications that may affect weight gain (eg, neuropsychiatric)	Snoring/sleep; abdominal pain, menstrual irregularities; hip, knee, or leg pain; urination; thirst; depression	Obesity, type 2 diabetes, hypertension, lipid, heart disease	BP (correct cuff); acanthosis nigricans; tonsils; goiter; tender abdomen; liver; bowing of legs; limp, limited hip range of motion; optic discs if headaches; acne and hirsutism; skin inflammation	<ul style="list-style-type: none"> • Fasting lipid profile • Fasting glucose, ALT, AST every 2 years

Abbreviations: BMI, body mass index; BP, blood pressure; ALT, alanine transaminase; AST, aspartate transaminase; BUN, blood urea nitrogen.

^aBMI is a screening measure. The higher the BMI, the more likely it is to be correlated with excess fat.

^bRisk factors include family history of obesity-related diseases, including hypertension, early cardiovascular deaths, and strokes, elevated blood pressure (in the patient), hyperlipidemia, and tobacco use.

Reference Values

Reference Values

Plasma Glucose Criteria for the Diagnosis of Impaired Glucose Tolerance in Diabetes^a

Plasma Glucose	Normal, mg/dL	Impaired, mg/dL	Diabetes, mg/dL
Fasting	<100	100–125 (IFG)	≥126
Oral glucose-tolerance test, 2 h PG	<140	140–199 (IGT)	≥200
Random			≥200 + symptoms ^b

Abbreviations: IFG, impaired fasting glucose; 2 h PG, plasma glucose at 2 hours postingestion of glucose; IGT, impaired glucose.

^aFrom Hannon TS, Rao G, Arslanian SA. Childhood obesity and type 2 diabetes mellitus. *Pediatrics*. 2005;116:475.

^bPolyuria, polydipsia, weight loss.

Cholesterol^a

Category	Total Cholesterol, mg/dL	Low-Density Lipoprotein, mg/dL	High-Density Lipoprotein, mg/dL
Acceptable	<170	<110	>40
Borderline	170–199	110–129	
Abnormal	≥200	≥130	<40 is low

^aAdapted from American Academy of Pediatrics Committee on Nutrition. Cholesterol in children. *Pediatrics*. 1998;101:145.

Triglycerides^a

Age, y	Normal, mg/dL	
	Male	Female
8–9	25–90	30–115
10–11	30–105	35–130
12–15	35–130	40–125
16–19	40–145	40–125

^aFrom the *Third National Health and Nutrition Examination Survey (NHANES III)*, 1988–1994.

Note: Alanine transaminase, aspartate transaminase, blood urea nitrogen, and creatinine reference values vary by laboratory. Consult local laboratory values.

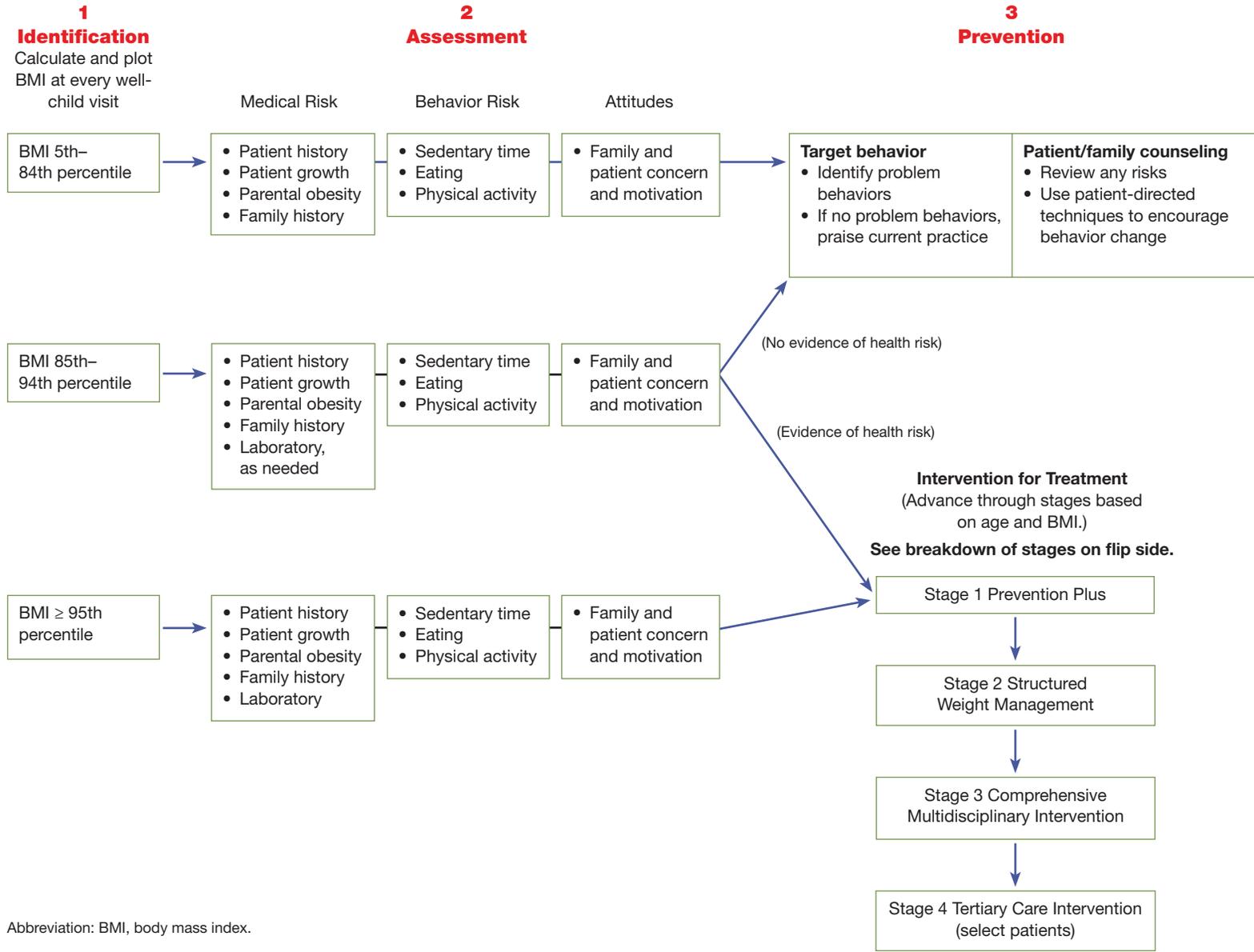
▶▶▶▶ 15-Minute Obesity Prevention Protocol ◀◀◀◀

Steps	Sample Language									
STEP 1. ASSESSMENT										
Weight and height, convert to BMI. Provide BMI information.	We checked your child’s body mass index (BMI), which is a way of looking at weight and taking into consideration how tall someone is. Your child’s BMI is in the range where we start to be concerned about extra weight causing health problems.									
Elicit parent’s concern.	—What concerns, if any, do you have about your child’s weight? — <i>He did jump two sizes this year. Do you think he might get diabetes someday?</i>									
Reflect/probe.	So you’ve noticed a big change in his size and you are concerned about diabetes down the road. What makes you concerned about diabetes in particular? <i>Etc.</i>									
Sweetened beverages, fruits and vegetables, TV viewing and other sedentary behavior, frequency of fast-food or restaurant eating, consumption of breakfast, and others	(Use verbal questions or brief questionnaires to assess key behaviors.) Example: About how many times a day does your child drink soda, sports drinks, or powdered drinks like Kool-Aid?									
Provide positive feedback for behavior(s) in optimal range. Elicit response.	You are doing well with sugared drinks. <i>I know it’s not healthy. He used to drink a lot of soda, but now I try to give him water whenever possible. I think we are down to just a few soda’s a week.</i>									
Reflect/probe.	So you have been able to make a change without too much stress.									
Provide neutral feedback for behavior(s) NOT in optimal range. Elicit response.	Your child watches 4 hours of TV on school days. What do you think about that? <i>I know it’s a lot, but he gets bored otherwise and starts picking an argument with his little sister.</i>									
Reflect/probe	So watching TV keeps the household calm.									
STEP 2. AGENDA SETTING										
Query which, if any, of the target behaviors parent/child/adolescent may be interested in changing or might be easiest to change.	We’ve talked about eating too often at fast-food restaurants, and how TV viewing is more hours than you’d like. Which of these, if either of them, do you think you and your child could change? <i>Well, I think fast food is somewhere we could do better. I don’t know what he would do if he couldn’t watch TV. Maybe we could cut back on fast food to once a week.</i>									
Agree on possible target behavior.	That sounds like a good plan.									
STEP 3. ASSESS MOTIVATION AND CONFIDENCE										
3a: Willingness/Importance On a scale of 0 to 10, with 10 being very important, how important is it for you to reduce the amount of fast food he eats?										
0	1	2	3	4	5	6	7	8	9	10
Not at all			Somewhat				Very			

continued



Universal Assessment of Obesity Risk: Steps to Prevention and Treatment



Abbreviation: BMI, body mass index.

Universal Assessment of Obesity Risk

Universal Assessment of Obesity Risk: Steps to Prevention and Treatment, continued

Intervention for Treatment

(Advance through stages based on age and BMI.)

Stage 1 Prevention Plus 	Primary Care Provider Dietary habits and physical activity <ul style="list-style-type: none">5 Eat fruits and vegetables at least 5 or more times on most days.2 Limit screen time unrelated to school to 2 hours or less daily.1 Get 1 hour or more of moderate to vigorous physical activity every day and 20 minutes of vigorous activity at least 3 times a week.0 Drink less sugar. Try water and low-fat milk instead of sugar-sweetened drinks. Behavioral Counseling <ul style="list-style-type: none">• Eating a daily breakfast• Limiting meals outside the home• Family meals 5–6 times/week• Allow child to self-regulate at meals without overly restrictive behavior Goal <ul style="list-style-type: none">• Weight maintenance with growth resulting in decreased BMI Monthly follow-up assessment. After 3–6 months, if no improvement in BMI/weight status, advance to Stage 2.
Stage 2 Structured Weight Management 	Primary Care Provider with appropriate training Dietary habits and physical activity <ul style="list-style-type: none">• Develop plan for utilization of balanced macronutrient diet emphasizing low amounts of energy-dense foods• Increased structured daily meals and snacks• Supervised active play of at least 60 minutes/day• Screen time of 1 hour or less/day• Increased monitoring (eg, screen time, physical activity, dietary intake, restaurant logs) by provider, patient, and /or family Goal <ul style="list-style-type: none">• Weight maintenance resulting in a decreasing BMI with age and increasing height. Weight loss not to exceed 1lb/month in children 2–11 years or an average of 2 lb/week in older overweight/obese children and adolescents Monthly follow-up assessment. If no improvement in BMI/weight after 3–6 months, patient should be advanced to Stage 3.
Stage 3 Comprehensive Multidisciplinary Intervention 	Weight Management Clinic with multidisciplinary team Eating and Activity <ul style="list-style-type: none">• Same as Stage 2 Behavioral counseling <ul style="list-style-type: none">• Structured behavioral modification program, including food and activity monitoring and development of short-term diet and physical activity goals• Involvement of primary caregivers/families for behavioral modification in children younger than 12 years and training of primary caregivers/families for all children Goals <ul style="list-style-type: none">• Weight maintenance or gradual weight loss until BMI <85% not to exceed 1lb/month in children aged 2–5 years or 2 lbs/week in older obese children and adolescents
Stage 4 Tertiary Care Intervention (select patients)	Hospital Setting with expertise in childhood obesity Recommended for children with BMI >95% with significant comorbidities unsuccessful with Stages 1–3 and children with BMI >99% who have shown no improvement under Stage 3 <ul style="list-style-type: none">• Multidisciplinary team with expertise in childhood obesity operating under a designated protocol• Continued diet and activity counseling and consideration of such additions as meal replacement, very low calorie diet, medication, and surgery

▶▶▶ Definition of Hypertension^a ◀◀◀

- Hypertension is defined as average SBP and/or DBP that is ≥ 95 th percentile for gender, age, and height on ≥ 3 occasions.
- Prehypertension in children is defined as average SBP or DBP levels that are ≥ 90 th percentile but < 95 th percentile.
- As with adults, adolescents with BP levels 120/80 mm Hg should be considered prehypertensive.
- A patient with BP levels > 95 th percentile in a physician's office or clinic, who is normotensive outside a clinical setting, has "white-coat hypertension." ABPM is usually required to make this diagnosis.

Clinical Evaluation of Confirmed Hypertension

Study or Procedure	Purpose	Target Population
Evaluation for identifiable causes		
History, including sleep history, family history, risk factors, diet, and habits such as smoking and drinking alcohol; physical examination	History and physical examination help focus subsequent evaluation	All children with persistent BP ≥ 95 th percentile
BUN, creatinine, electrolytes, urinalysis, and urine culture	R/O renal disease and chronic pyelonephritis	All children with persistent BP ≥ 95 th percentile
CBC	R/O anemia, consistent with chronic renal disease	All children with persistent BP ≥ 95 th percentile
Renal U/S	R/O renal scar, congenital anomaly, or disparate renal size	All children with persistent BP ≥ 95 th percentile
Evaluation for comorbidity		
Fasting lipid panel, fasting glucose	Identify hyperlipidemia, identify metabolic abnormalities	Overweight patients with BP at 90th–94th percentile; all patients with BP ≥ 95 th percentile; family history of hypertension or CVD; child with chronic renal disease
Drug screen	Identify substances that might cause hypertension	History suggestive of possible contribution by substances or drugs
Polysomnography	Identify sleep disorder in association with hypertension	History of loud, frequent snoring
Evaluation for target-organ damage		
Echocardiogram	Identify LVH and other indications of cardiac involvement	Patients with comorbid risk factors ^b and BP 90th–94th percentile; all patients with BP ≥ 95 th percentile
Retinal exam	Identify retinal vascular changes	Patients with comorbid risk factors and BP 90th–94th percentile; all patients with BP ≥ 95 th percentile
Additional evaluation as indicated		
ABPM	Identify white-coat hypertension, abnormal diurnal BP pattern, BP load	Patients in whom white-coat hypertension is suspected, and when other information on BP pattern is needed
Plasma renin determination	Identify low renin, suggesting mineralocorticoid-related disease	Young children with stage 1 hypertension and any child or adolescent with stage 2 hypertension
Renovascular imaging	Identify renovascular disease	Positive family history of severe hypertension Young children with stage 1 hypertension and any child or adolescent with stage 2 hypertension
Isotopic scintigraphy (renal scan)		
MRA		
Duplex Doppler flow studies		
3-Dimensional CT		
Arteriography: DSA or classic		
Plasma and urine steroid levels	Identify steroid-mediated hypertension	Young children with stage 1 hypertension and any child or adolescent with stage 2 hypertension
Plasma and urine catecholamines	Identify catecholamine-mediated hypertension	Young children with stage 1 hypertension and any child or adolescent with stage 2 hypertension

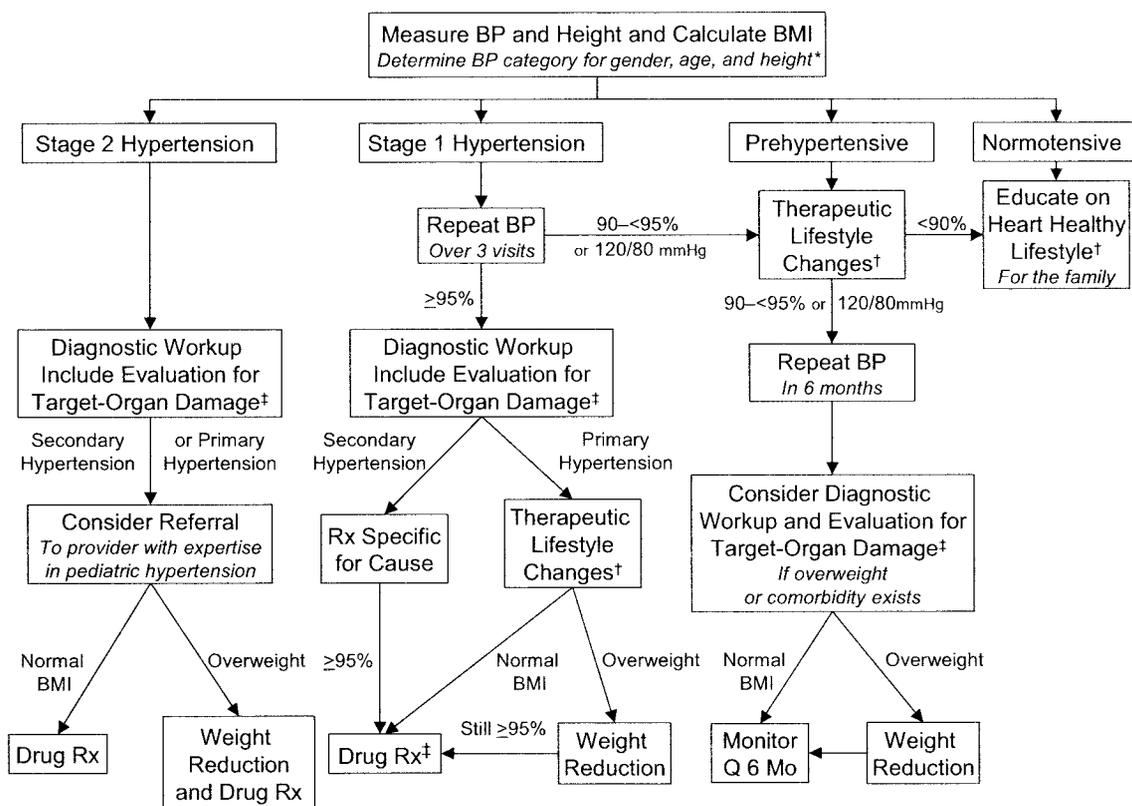
Abbreviations: SBP, systolic blood pressure; DBP, diastolic blood pressure; BP, blood pressure; ABPM, ambulatory blood pressure monitoring; BUN, blood urea nitrogen; R/O, rule out; CBC, complete blood count; U/S, ultrasound; CVD, cardiovascular disease; LVH, left ventricular hypertrophy; MRA, magnetic resonance angiography; CT, computed tomography; DSA, digital-subtraction angiography.

^aSelected excerpts from The fourth report on the diagnosis, evaluation, and treatment of high blood pressure in children and adolescents. *Pediatrics*. 2004;114:555–576.

^bComorbid risk factors also include diabetes mellitus and kidney disease.

Hypertension Management Algorithm

Hypertension Management Algorithm



Abbreviations and symbols: Rx, prescription; Q, every; †, diet modification and physical activity; ‡, especially if younger, very high blood pressure, little or no family history, diabetic, or other risk factors.

Therapeutic Lifestyle Changes

- Weight reduction is the primary therapy for obesity-related hypertension. Prevention of excess or abnormal weight gain will limit future increases in blood pressure.
- Regular physical activity and restriction of sedentary activity will improve efforts at weight management and may prevent an excess increase in blood pressure over time.
- Dietary modification should be strongly encouraged in children and adolescents who have blood pressure levels in the prehypertensive range as well as those with hypertension.
- Family-based intervention improves success.

Indications for Antihypertensive Drug Therapy in Children

Symptomatic hypertension
 Secondary hypertension
 Hypertensive target-organ damage
 Diabetes (types 1 and 2)
 Persistent hypertension despite nonpharmacologic measures

BLOOD PRESSURE LEVELS FOR THE 90TH AND 95TH PERCENTILES OF BLOOD PRESSURE FOR BOYS AGE 1 TO 17 YEARS BY PERCENTILES OF HEIGHT

Age	Height Percentiles* BP†	Systolic BP (mm Hg)							Diastolic BP (mm Hg)						
		→5%	10%	25%	50%	75%	90%	95%	5%	10%	25%	50%	75%	90%	95%
1	90th	94	95	97	98	100	102	102	50	51	52	53	54	54	55
	95th	98	99	101	102	104	106	106	55	55	56	57	58	59	59
2	90th	98	99	100	102	104	105	106	55	55	56	57	58	59	59
	95th	101	102	104	106	108	109	110	59	59	60	61	62	63	63
3	90th	100	101	103	105	107	108	109	59	59	60	61	62	63	63
	95th	104	105	107	109	111	112	113	63	63	64	65	66	67	67
4	90th	102	103	105	107	109	110	111	62	62	63	64	65	66	66
	95th	106	107	109	111	113	114	115	66	67	67	68	69	70	71
5	90th	104	105	106	108	110	112	112	65	65	66	67	68	69	69
	95th	108	109	110	112	114	115	116	69	70	70	71	72	73	74
6	90th	105	106	108	110	111	113	114	67	68	69	70	70	71	72
	95th	109	110	112	114	115	117	117	72	72	73	74	75	76	76
7	90th	106	107	109	111	113	114	115	69	70	71	72	72	73	74
	95th	110	111	113	115	116	118	119	74	74	75	76	77	78	78
8	90th	107	108	110	112	114	115	116	71	71	72	73	74	75	75
	95th	111	112	114	116	118	119	120	75	76	76	77	78	79	80
9	90th	109	110	112	113	115	117	117	72	73	73	74	75	76	77
	95th	113	114	116	117	119	121	121	76	77	78	79	80	80	81
10	90th	110	112	113	115	117	118	119	73	74	74	75	76	77	78
	95th	114	115	117	119	121	122	123	77	78	79	80	80	81	82
11	90th	112	113	115	117	119	120	121	74	74	75	76	77	78	78
	95th	116	117	119	121	123	124	125	78	79	79	80	81	82	83
12	90th	115	116	117	119	121	123	123	75	75	76	77	78	78	79
	95th	119	120	121	123	125	126	127	79	79	80	81	82	83	83
13	90th	117	118	120	122	124	125	126	75	76	76	77	78	79	80
	95th	121	122	124	126	128	129	130	79	80	81	82	83	83	84
14	90th	120	121	123	125	126	128	128	76	76	77	78	79	80	80
	95th	124	125	127	128	130	132	132	80	81	81	82	83	84	85
15	90th	123	124	125	127	129	131	131	77	77	78	79	80	81	81
	95th	127	128	129	131	133	134	135	81	82	83	83	84	85	86
16	90th	125	126	128	130	132	133	134	79	79	80	81	82	82	83
	95th	129	130	132	134	136	137	138	83	83	84	85	86	87	87
17	90th	128	129	131	133	134	136	136	81	81	82	83	84	85	85
	95th	132	133	135	136	138	140	140	85	85	86	87	88	89	89

*Height percentile determined by standard growth curves.

†Blood pressure percentile determined by a single measurement.

Blood Pressure Levels—Girls

BLOOD PRESSURE LEVELS FOR THE 90TH AND 95TH PERCENTILES OF BLOOD PRESSURE FOR GIRLS AGE 1 TO 17 YEARS BY PERCENTILES OF HEIGHT

Age	Height Percentiles* BP†	Systolic BP (mm Hg)							Diastolic BP (mm Hg)						
		→5%	10%	25%	50%	75%	90%	95%	5%	10%	25%	50%	75%	90%	95%
1	90th	97	98	99	100	102	103	104	53	53	53	54	55	56	56
	95th	101	102	103	104	105	107	107	57	57	57	58	59	60	60
2	90th	99	99	100	102	103	104	105	57	57	58	58	59	60	61
	95th	102	103	104	105	107	108	109	61	61	62	62	63	64	65
3	90th	100	100	102	103	104	105	106	61	61	61	62	63	63	64
	95th	104	104	105	107	108	109	110	65	65	65	66	67	67	68
4	90th	101	102	103	104	106	107	108	63	63	64	65	65	66	67
	95th	105	106	107	108	109	111	111	67	67	68	69	69	70	71
5	90th	103	103	104	106	107	108	109	65	66	66	67	68	68	69
	95th	107	107	108	110	111	112	113	69	70	70	71	72	72	73
6	90th	104	105	106	107	109	110	111	67	67	68	69	69	70	71
	95th	108	109	110	111	112	114	114	71	71	72	73	73	74	75
7	90th	106	107	108	109	110	112	112	69	69	69	70	71	72	72
	95th	110	110	112	113	114	115	116	73	73	73	74	75	76	76
8	90th	108	109	110	111	112	113	114	70	70	71	71	72	73	74
	95th	112	112	113	115	116	117	118	74	74	75	75	76	77	78
9	90th	110	110	112	113	114	115	116	71	72	72	73	74	74	75
	95th	114	114	115	117	118	119	120	75	76	76	77	78	78	79
10	90th	112	112	114	115	116	117	118	73	73	73	74	75	76	76
	95th	116	116	117	119	120	121	122	77	77	77	78	79	80	80
11	90th	114	114	116	117	118	119	120	74	74	75	75	76	77	77
	95th	118	118	119	121	122	123	124	78	78	79	79	80	81	81
12	90th	116	116	118	119	120	121	122	75	75	76	76	77	78	78
	95th	120	120	121	123	124	125	126	79	79	80	80	81	82	82
13	90th	118	118	119	121	122	123	124	76	76	77	78	78	79	80
	95th	121	122	123	125	126	127	128	80	80	81	82	82	83	84
14	90th	119	120	121	122	124	125	126	77	77	78	79	79	80	81
	95th	123	124	125	126	128	129	130	81	81	82	83	83	84	85
15	90th	121	121	122	124	125	126	127	78	78	79	79	80	81	82
	95th	124	125	126	128	129	130	131	82	82	83	83	84	85	86
16	90th	122	122	123	125	126	127	128	79	79	79	80	81	82	82
	95th	125	126	127	128	130	131	132	83	83	83	84	85	86	86
17	90th	122	123	124	125	126	128	128	79	79	79	80	81	82	82
	95th	126	126	127	129	130	131	132	83	83	83	84	85	86	86

*Height percentile determined by standard growth curves.

†Blood pressure percentile determined by a single measurement.

➤➤➤ Coding for Obesity and Related Comorbidities ◀◀◀

While coding for the care of children with obesity and related comorbidities is relatively straightforward, ensuring that appropriate reimbursement is received for such services is a more complicated matter. Many insurance carriers will deny claims submitted with “obesity” codes (eg, 278.00), essentially carving out obesity-related care from the scope of benefits. Therefore, coding for obesity services is fundamentally a two-tiered system, in which the first tier requires health care professionals to submit claims using appropriate codes and the second tier involves the practice-level issues of denial management and contract negotiation.

The following is a guide to coding for obesity-related health care services taken from “Obesity and Related Comorbidities Coding Fact Sheet for Primary Care Pediatricians.” For strategies for pediatric practices to handle carrier denials and contractual issues, see “Obesity and Related Comorbidities Coding Fact Sheet for Primary Care Pediatricians” (www.aap.org/obesity/Obesity%20CodingFactSheetAugust07.pdf).

Procedure Codes (Current Procedural Terminology [CPT®] Codes)

Body Fat Composition Testing

There is no separate *Current Procedural Terminology (CPT®)* code for body fat composition testing. This service would be included in the examination component of the evaluation and management (E/M) code reported.

Calorimetry

94690 Oxygen uptake, expired gas analysis; rest, indirect (separate procedure)

or

94799 Unlisted pulmonary service or procedure

[Note: Special report required.]

Glucose Monitoring

95250 Glucose monitoring for up to 72 hours by continuous recording and storage of glucose values from interstitial tissue fluid via a subcutaneous sensor (includes hookup, calibration, patient initiation and training, recording, disconnection, downloading with printout of data)

Routine Venipuncture

36415 Collection of venous blood by venipuncture

36416 Collection of capillary blood specimen (eg, finger, heel, ear stick)

Venipuncture Necessitating Physician’s Skill

36406 Venipuncture, younger than 3 years, necessitating physician’s skill, not to be used for routine venipuncture; other vein

36410 Venipuncture, 3 years or older, necessitating physician’s skill (separate procedure), for diagnostic or therapeutic purposes (not to be used for routine venipuncture)

Digestive System Surgery Codes

43644 Laparoscopy, surgical, gastric restrictive procedure; with gastric bypass and Roux-en-Y gastroenterostomy (Roux limb 150 cm or less)

43645 Laparoscopy, surgical, gastric restrictive procedure; with gastric bypass and small intestine reconstruction to limit absorption

43770 Laparoscopy, surgical, gastric restrictive procedure; placement of adjustable gastric band (gastric band and subcutaneous port components)

43771 Laparoscopy, surgical, gastric restrictive procedure; revision of adjustable gastric band component only

43772 Laparoscopy, surgical, gastric restrictive procedure; removal of adjustable gastric band component only

43773 Laparoscopy, surgical, gastric restrictive procedure; removal and replacement of adjustable gastric band component only

43774 Laparoscopy, surgical, gastric restrictive procedure; removal of adjustable gastric band and subcutaneous port components

43842 Gastric restrictive procedure, without gastric bypass, for morbid obesity; vertical-banded gastroplasty

43843 Gastric restrictive procedure, without gastric bypass, for morbid obesity; other than vertical-banded gastroplasty

43845 Gastric restrictive procedure with partial gastrectomy, pylorus-preserving duodenoileostomy and ileoileostomy (50 to 100 cm common channel) to limit absorption (biliopancreatic diversion with duodenal switch)

43846 Gastric restrictive procedure, with gastric bypass for morbid obesity; with short limb (150 cm or less) Roux-en-Y gastroenterostomy

43847 Gastric restrictive procedure, with gastric bypass for morbid obesity; with small intestine reconstruction to limit absorption

43848 Revision of gastric restrictive procedure for morbid obesity; other than adjustable gastric band (separate procedure)

Healthcare Common Procedure Coding System (HCPCS) Level II Procedure and Supply Codes

CPT codes are also known as Healthcare Common Procedure Coding System (HCPCS) Level I codes. HCPCS also contains Level II codes.

Level II codes (commonly referred to as HCPCS [“hick-picks”] codes) are national codes that are included as part of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) standard procedural transaction coding set along with *CPT* codes.

HCPCS Level II codes were developed to fill gaps in the *CPT* nomenclature. While they are reported in the same way as *CPT* codes, they consist of 1 alphabetic character (A–V) followed by 4 digits. In the past, insurance carriers did not uniformly recognize HCPCS Level II codes. However, with the implementation of HIPAA, carrier software systems must now be able to recognize all HCPCS Level I (*CPT*) and Level II codes.

HCPCS Education and Counseling Codes

S9445 Patient education, not otherwise classified, nonphysician provider, individual, per session

S9446 Patient education, not otherwise classified, nonphysician provider, group, per session

S9449 Weight management classes, nonphysician provider, per session

S9451 Exercise class, nonphysician provider, per session

S9452 Nutrition class, nonphysician provider, per session

S9454 Stress management class, nonphysician provider, per session

S9455 Diabetic management program, group session

S9460 Diabetic management program, nurse visit

S9465 Diabetic management program, dietitian visit

S9470 Nutritional counseling, dietitian visit

Diagnosis Codes (International Classification of Diseases, Ninth Revision, Clinical Modification [ICD-9-CM] Codes)

Circulatory System

401.9 Essential hypertension; unspecified

429.3 Cardiomegaly

Congenital Anomalies

758.0 Down syndrome

759.81 Prader-Willi syndrome

759.83 Fragile X syndrome

759.89 Other specified anomalies (Laurence-Moon syndrome)

Coding for Obesity and Related Comorbidities

Diagnosis Codes (*International Classification of Diseases, Ninth Revision, Clinical Modification [ICD-9-CM] Codes*), continued

Digestive System

- 530.81 Esophageal reflux
 - 564.00 Constipation, unspecified
 - 571.8 Other chronic nonalcoholic liver disease
- Endocrine, Nutritional, Metabolic
- 244.8 Other specified acquired hypothyroidism
 - 244.9 Unspecified hypothyroidism
 - 250.00 Diabetes mellitus without mention of complication, type 2 or unspecified type, not stated as uncontrolled
 - 250.02 Diabetes mellitus without mention of complication, type 2 or unspecified type, uncontrolled
 - 253.8 Other disorders of the pituitary and other syndromes of diencephalohypophysial origin
 - 255.8 Other specified disorders of adrenal glands
 - 256.4 Polycystic ovaries
 - 259.1 Precocious sexual development and puberty, not elsewhere specified
 - 259.9 Unspecified endocrine disorder
 - 272.0 Pure hypercholesterolemia
 - 272.1 Pure hyperglyceridemia
 - 272.2 Mixed hyperlipidemia
 - 272.4 Other and unspecified hyperlipidemia
 - 272.9 Unspecified disorder of lipid metabolism
 - 277.7 Dysmetabolic syndrome X/metabolic syndrome
 - 278.00 Obesity, unspecified
 - 278.01 Morbid obesity
 - 278.02 Overweight
 - 278.1 Localized adiposity
 - 278.8 Other hyperalimentation

Genitourinary System

- 611.1 Hypertrophy of the breast

Mental Disorders

- 300.00 Anxiety state, unspecified
- 300.02 Generalized anxiety disorder
- 300.4 Dysthymic disorder
- 307.50 Eating disorder, unspecified
- 307.51 Bulimia nervosa
- 307.59 Other and unspecified disorders of eating
- 308.3 Other acute reactions to stress
- 308.9 Unspecified acute reaction to stress
- 311 Depressive disorder, not elsewhere classified
- 313.1 Misery and unhappiness disorder
- 313.81 Oppositional defiant disorder

Musculoskeletal System and Connective Tissue

- 732.4 Juvenile osteochondrosis of lower extremity, excluding foot

Nervous System and Sense Organs

- 327.23 Obstructive sleep apnea (adult) (pediatric)
- 327.26 Sleep-related hypoventilation/hypoxemia in conditions classifiable elsewhere
- 327.29 Other organic sleep apnea
- 348.2 Benign intracranial hypertension

Skin and Subcutaneous Tissue

- 701.2 Acquired acanthosis nigricans

Symptoms, Signs, and Ill-Defined Conditions

- 780.51 Insomnia with sleep apnea, unspecified
- 780.52 Insomnia, unspecified
- 780.53 Hypersomnia with sleep apnea, unspecified
- 780.54 Hypersomnia, unspecified
- 780.57 Unspecified sleep apnea
- 780.71 Chronic fatigue syndrome
- 780.79 Other malaise and fatigue
- 783.1 Abnormal weight gain
- 783.3 Feeding difficulties and mismanagement
- 783.40 Lack of normal physiological development, unspecified
- 783.43 Short stature
- 783.5 Polydipsia
- 783.6 Polyphagia
- 783.9 Other symptoms concerning nutrition, metabolism, and development
- 786.05 Shortness of breath
- 789.1 Hepatomegaly
- 790.22 Impaired glucose tolerance test (oral)
- 790.29 Other abnormal glucose; prediabetes not otherwise specified
- 790.4 Nonspecific elevation of levels of transaminase or lactate dehydrogenase (LDH)
- 790.6 Other abnormal blood chemistry (hyperglycemia)

Other

NOTE: The *ICD-9-CM* codes that follow are used to deal with occasions in which circumstances other than a disease or injury are recorded as diagnoses or problems. Some carriers may request supporting documentation for the reporting of V codes.

- V18.0 Family history of diabetes mellitus
- V18.1 Family history of endocrine and metabolic diseases
- V49.89 Other specified conditions influencing health status
- V58.67 Long-term (current) use of insulin
- V58.69 Long-term (current) use of other medications
- V61.0 Family disruption
- V61.20 Counseling for parent-child problem, unspecified
- V61.29 Parent-child problems; other
- V61.49 Health problems with family; other
- V61.8 Health problems within family; other specified family circumstances
- V61.9 Health problems within family; unspecified family circumstances
- V62.81 Interpersonal problems, not elsewhere classified
- V62.89 Other psychological or physical stress not elsewhere classified; other
- V62.9 Unspecified psychosocial circumstance
- V65.19 Other person consulting on behalf of another person
- V65.3 Dietary surveillance and counseling
- V65.41 Exercise counseling
- V65.49 Other specified counseling
- V69.0 Lack of physical exercise
- V69.1 Inappropriate diet and eating habits
- V69.8 Other problems relating to lifestyle; self-damaging behavior
- V69.9 Problem related to lifestyle, unspecified
- V85.51 Body mass index, pediatric, less than 5th percentile for age
- V85.52 Body mass index, pediatric, 5th percentile to less than 85th percentile for age
- V85.53 Body mass index, pediatric, 85th percentile to less than 95th percentile for age
- V85.54 Body mass index, pediatric, greater than or equal to 95th percentile for age



Body Mass Index 99th Percentile Cut-Points (kg/m²)



Age, y	Boys	Girls
5	20.1	21.5
6	21.6	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



Weight Loss Targets



Age, y	BMI 85th–94th Percentile No Risks	BMI 85th–94th Percentile With Risks	BMI 95–98th Percentile	BMI ≥99th Percentile
2–5	Maintain weight velocity	Decrease weight velocity or weight maintenance	Weight maintenance	Gradual weight loss of up to 1 lb/mo if BMI is very high (>21 or 22 kg/m ²)
6–11	Maintain weight velocity	Decrease weight velocity or weight maintenance	Weight maintenance or gradual loss (1 lb/mo)	Weight loss not to exceed an average of 2 lb/wk ^a
12–18	Maintain weight velocity. After linear growth is complete, maintain weight.	Decrease weight velocity or weight maintenance	Weight loss not to exceed an average of 2 lb/wk ^a	Weight loss not to exceed an average of 2 lb/wk ^a

Abbreviation: BMI, body mass index.

^aIf greater loss is noted, monitor for causes of excessive weight loss.

The *Pediatric Obesity Clinical Decision Support Chart* offers the latest tools and practice recommendations you need to tackle childhood obesity.

- Step-by-step prevention, assessment, and treatment interventions developed by the CDC for the child who is overweight or obese
- 15-minute obesity prevention protocol
- Hypertension evaluation and management algorithms
- Growth charts spanning birth to age 2 years, including body mass index-for-age percentiles
- Blood pressure levels for boys and girls
- Coding information for obesity-related health services
- ***And more!***

This flipchart was initially developed by the Maine Youth Overweight Collaborative (MYOC), a joint initiative of the Maine Center for Public Health, the Maine-Harvard Prevention Research Center, and the Maine Chapter of the American Academy of Pediatrics. By providing the tools and resources included, MYOC seeks to provide practical support and guidance to health care practices to help improve the prevention, identification, treatment, and outcomes for overweight youth and their families.

These tools are a result of the hard work and support of many individuals associated with MYOC who are dedicated to promoting healthy lifestyles for Maine families. We would like to extend special thanks to the National American Academy of Pediatrics for their willingness to partner to improve and market the Pediatric Obesity Clinical Decision Support Chart.

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