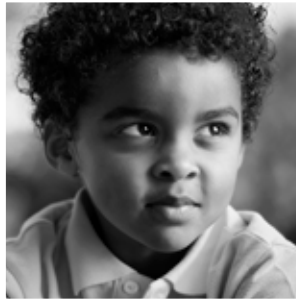
CENTER FOR HEALTHY WEIGHT AND NUTRITION



Primary Care Pocket Guide to Pediatric Obesity Management

NATIONWIDE CHILDREN'S

When your child needs a hospital, everything matters.℠

Introduction

The *Primary Care Pocket Guide to Pediatric Obesity Management* is intended to provide primary care physicians with practical guidance on the approach to the obese child. This guide is based upon the most recent literature contained in the "Expert Committee Recommendations on the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity". You may review the full supplement at http://pediatrics.aappublications.org/content/vol120/Supplement_4/index.shtml

The recommendations provided in this resource are not an exclusive standard of medical care. As always, medical judgment and variations based on clinical scenario may be appropriate.

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Prevention Counseling
Evidence Based Messages for Parents

- Support exclusive breastfeeding for 4-6 months
- Limit sugary beverages
- Eat breakfast daily
- Encourage family meals
- Decrease frequency of eating out
- Eat 5 servings of fruits and vegetables per day
- Limit portion sizes
- Get 60 minutes/day of moderate physical activity
- Maintain screen time of 2 hours/day or less
- Remove TV/computer from bedroom

Identification of Risk Factors

Assess Risk:

Assess Family History: (*parents, grandparents, siblings)*

- Ethnicity *(Highest Risk: African American, Hispanic, Native American, Pacific Islanders)*
- Family or Personal History of :
  - Cardiovascular Disease <55y men, <65y women
  - Dyslipidemia
  - Obesity
  - Diabetes
  - Hypertension

Assess Dietary Behaviors

- Excessive sweetened beverages
- Minimal fruit and vegetable consumption
- Frequency of eating out versus family meals
- Lack of daily breakfast, skipped meals
- Inappropriate portion sizes
- Snacking habits
- Emotional eating

Assess Physical Activity Behaviors

- Daily activity patterns
- Amount of moderate exercise
- Amount of screen time *(TV, computer, video games, etc)*

Assess Attitudes

- Perception of weight/Body image
- Readiness/Barriers to change

Example Questions:

- How do you feel about your weight or your child's weight?
- On a scale of 0-10 how ready are you to start making changes in nutrition and/or physical activity?

Targeted Review of Systems/Physical Exam

– Height (%), Weight (%), Pulse, Respirations, Blood Pressure

– BMI with BMI percentile for age and gender

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)* • **Day time 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 hypertrophy** *(Sleep apnea)* • **Abdominal tenderness** *(Gall bladder diseases, 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)*

Adapted from COAN Implementation Guide.

Calculate BMI and Classify

$$\text{BMI} = \frac{\text{Weight (lb)}}{\text{Height (in)} \times \text{Height (in)}} \times 703$$

$$\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height (cm)} \times \text{Height (cm)}} \times 10000$$

$$\text{e.g. BMI} = \frac{93\text{ kg}}{159\text{ cm} \times 159\text{ cm}} \times 10000 = 36.7$$

PERCENTILE	CLASSIFICATION
5-84%	HEALTHY WEIGHT
85-94%	OVERWEIGHT
95-98%	OBESE
≥99%	EXTREME OBESITY

Classification Adapted from the Expert Committee Recommendations Summary Report.

Refer to BMI percentile growth charts at www.cdc.gov.

BMI Percentile Cut Points

	85%		95%		99%	
Age (years)	Boys	Girls	Boys	Girls	Boys	Girls
2	18.2	18	19.3	19.1	–	–
3	17.3	17.2	18.2	18.3	–	–
4	16.9	16.8	17.8	18	–	–
5	16.8	16.8	17.9	19.3	20.1	21.5
6	17	17.1	18.4	18.8	21.6	23
7	17.4	17.6	19.2	19.7	23.6	24.6
8	18	18.3	20.1	20.7	25.6	26.4
9	18.6	19.1	21.1	21.8	27.6	28.2
10	19.4	20	22.2	23	29.3	29.9
11	20.2	20.9	23.2	24.1	30.7	31.5
12	21	21.7	24.2	25.3	31.8	33.1
13	21.9	22.6	25.2	26.3	32.6	34.6
14	22.7	23.3	26	27.3	33.2	36
15	23.5	24	26.8	28.1	33.6	37.5
16	24.2	24.7	27.6	28.9	33.9	39.1
17	24.9	25.2	28.3	29.6	34.4	40.8
18	25.7	25.7	29	30.3	34.4	40.8
19	26.4	26.1	29.7	31	34.4	40.8
20	27	26.5	30.6	31.8	34.4	40.8

Boys

Ages 3-5

Blood Pressure Levels for Boys by Age and Height Percentile*															
Age by year	BP %	Systolic BP (mmHg)							Diastolic BP (mmHg)						
		← Percentile of Height →							← Percentile of Height →						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
3	90th	100	101	103	105	107	106	109	59	59	60	61	62	63	63
	95th	104	105	107	109	110	112	113	63	63	64	65	66	67	67
	99th	111	112	114	116	118	119	120	71	71	72	73	74	75	75
4	90th	102	103	105	107	109	110	111	62	63	64	65	66	66	67
	95th	105	107	109	111	112	114	115	66	67	68	69	70	71	71
	99th	113	114	116	118	120	121	122	74	75	76	77	78	78	79
5	90th	104	105	106	106	110	111	112	65	66	67	68	69	69	70
	95th	106	109	110	112	114	115	116	69	70	71	72	73	74	74
	99th	115	116	118	120	121	123	123	77	78	79	80	81	81	82

Girls

Ages 3-5

Blood Pressure Levels for Girls by Age and Height Percentile*															
Age by year	BP %	Systolic BP (mmHg)							Diastolic BP (mmHg)						
		← Percentile of Height →							← Percentile of Height →						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
3	90th	100	100	102	103	104	106	106	61	62	62	63	64	64	65
	95th	104	104	105	107	108	109	110	65	66	66	67	68	68	69
	99th	111	111	113	114	115	116	117	73	73	74	74	75	76	76
4	90th	101	102	103	104	106	107	108	64	64	65	66	67	67	68
	95th	106	106	107	108	110	111	112	68	68	69	70	71	71	72
	99th	112	113	114	115	117	118	119	76	76	76	77	78	79	79
5	90th	103	103	105	106	107	109	109	66	67	67	68	69	69	70
	95th	107	107	108	110	111	112	113	70	71	71	72	73	73	74
	99th	114	114	116	117	118	120	78	78	78	79	79	80	81	81

Adapted from the Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents

Boys

Ages 6-11

Blood Pressure Levels for Boys by Age and Height Percentile*															
Age by year	BP %	Systolic BP (mmHg)							Diastolic BP (mmHg)						
		← Percentile of Height →							← Percentile of Height →						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
6	90th	105	106	108	110	111	113	113	68	68	69	70	71	72	72
	95th	109	110	112	114	115	117	117	72	72	73	74	75	76	76
	99th	116	117	119	121	123	124	125	80	80	81	82	83	84	84
7	90th	106	107	109	111	113	114	115	70	70	71	72	73	74	74
	95th	110	111	113	115	117	118	119	74	74	75	76	77	78	78
	99th	117	118	120	122	124	125	126	82	82	83	84	85	86	86
8	90th	107	109	110	112	114	115	116	71	72	72	73	74	75	76
	95th	111	112	114	116	118	119	120	75	76	77	78	79	79	80
	99th	119	120	122	123	125	127	127	83	84	85	86	87	87	88
9	90th	109	110	112	114	115	117	118	72	73	74	75	76	76	77
	95th	113	114	116	118	119	121	121	76	77	78	79	80	81	81
	99th	120	121	123	125	127	128	129	84	85	86	87	88	88	89
10	90th	111	112	114	115	117	119	119	73	73	74	75	76	77	78
	95th	115	116	117	119	121	122	123	77	78	79	80	81	81	82
	99th	122	123	125	127	128	130	130	85	86	86	88	88	89	90
11	90th	113	114	115	117	119	120	121	74	74	75	76	77	78	78
	95th	117	118	119	121	123	124	125	78	78	79	80	81	82	82
	99th	124	125	127	129	130	132	132	86	86	87	88	89	90	90

Adapted from the Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents

Girls

Ages 6-11

Blood Pressure Levels for Girls by Age and Height Percentile*															
Age by year	BP %	Systolic BP (mmHg)							Diastolic BP (mmHg)						
		← Percentile of Height →							← Percentile of Height →						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
6	90th	104	105	106	108	109	110	111	68	68	69	70	70	71	72
	95th	108	109	110	111	113	114	115	72	72	73	74	74	75	76
	99th	115	116	117	119	120	121	122	80	80	80	81	82	83	83
7	90th	106	107	108	109	111	112	113	69	70	70	71	72	72	73
	95th	110	111	112	113	115	116	116	73	74	74	75	76	76	77
	99th	117	118	119	120	122	123	124	81	81	82	82	83	84	84
8	90th	108	109	110	111	113	114	114	71	71	71	72	73	74	74
	95th	112	112	114	115	116	118	118	75	75	75	76	77	78	78
	99th	119	120	121	122	123	125	125	82	82	83	83	84	85	86
9	90th	110	110	112	113	114	116	116	72	72	72	73	74	75	75
	95th	114	114	115	117	118	119	120	76	76	76	77	78	79	79
	99th	121	121	123	124	125	127	127	83	83	84	84	85	86	87
10	90th	112	112	114	115	116	118	118	73	73	73	74	75	76	76
	95th	116	116	117	119	120	121	122	77	77	77	78	79	80	80
	99th	123	123	125	126	127	129	129	84	84	85	86	86	87	88
11	90th	114	114	116	117	118	119	120	74	74	74	75	76	77	77
	95th	118	118	119	121	122	123	124	78	78	78	79	80	81	81
	99th	125	125	126	128	129	130	131	85	85	86	87	87	88	89

Adapted from the Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents

Boys

Ages 12-18

Blood Pressure Levels for Boys by Age and Height Percentile*														
Age by year	BP %	Systolic BP (mmHg)							Diastolic BP (mmHg)					
		← Percentile of Height →							← Percentile of Height →					
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
12	90th	115	116	118	120	121	123	123	74	75	75	76	77	78	79
	95th	119	120	122	123	125	127	127	78	79	80	81	82	82	83
	99th	126	127	129	131	133	134	135	86	87	88	89	90	90	91
13	90th	117	118	120	122	124	125	126	75	75	76	77	78	79	79
	95th	121	122	124	126	128	129	130	79	79	80	81	82	83	83
	99th	128	130	131	133	135	136	137	87	87	88	89	90	91	91
14	90th	120	121	123	125	126	128	128	75	76	77	78	79	79	80
	95th	124	125	127	128	130	132	132	80	80	81	82	83	84	84
	99th	131	132	134	136	138	139	140	87	88	89	90	91	92	92
15	90th	122	124	125	127	129	130	131	76	77	78	79	80	80	81
	95th	126	127	129	131	133	134	135	81	81	82	83	84	85	85
	99th	134	135	136	138	140	142	142	88	89	90	91	92	93	93
16	90th	125	126	128	130	131	133	134	78	78	79	80	81	82	82
	95th	129	130	132	134	135	137	137	82	83	83	84	85	86	87
	99th	136	137	139	141	143	144	145	90	90	91	92	93	94	94
17-18	90th	127	128	130	132	134	135	136	80	80	81	82	83	84	84
	95th	131	132	134	136	138	139	140	84	85	86	87	87	88	89
	99th	139	140	141	143	145	146	147	92	93	93	94	95	96	97

Adapted from the Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents

Girls

Ages 12-18

Blood Pressure Levels for Girls by Age and Height Percentile*															
Age by year	BP %	Systolic BP (mmHg)							Diastolic BP (mmHg)						
		← Percentile of Height →							← Percentile of Height →						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
12	90th	116	116	117	119	120	121	122	75	75	75	76	77	78	78
	95th	119	120	121	123	124	125	126	79	79	79	80	81	82	82
	99th	127	127	128	130	131	132	133	86	86	87	88	88	89	90
13	90th	117	118	119	121	122	123	124	76	76	76	77	78	79	79
	95th	121	122	123	124	126	127	128	80	80	80	81	82	83	83
	99th	128	129	130	132	133	134	135	87	87	88	89	89	90	91
14	90th	119	120	121	122	124	125	125	77	77	77	78	79	80	80
	95th	123	123	125	126	127	129	129	81	81	81	82	83	84	84
	99th	130	131	132	133	135	136	136	88	88	89	90	90	91	92
15	90th	120	121	122	123	125	126	127	78	78	78	79	80	81	81
	95th	124	125	126	127	129	130	131	82	82	82	83	84	85	85
	99th	131	132	133	134	136	137	138	89	89	90	91	91	92	93
16	90th	121	122	123	124	126	127	128	78	78	79	80	81	81	82
	95th	125	126	127	128	130	131	132	82	82	83	84	85	85	86
	99th	132	133	134	135	137	138	139	90	90	90	91	92	93	93
17-18	90th	122	122	123	125	126	127	128	78	79	79	80	81	81	82
	95th	125	126	127	129	130	131	132	82	83	83	84	85	85	86
	99th	133	133	134	136	137	138	139	90	90	91	91	92	93	93

Adapted from the Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents

Blood Pressure Diagnosis *(refer to BP percentile charts)*

	SBP or DBP Percentile*	Frequency of BP Measurement
Normal	< 90th	Recheck at next scheduled physical examination.
Prehypertension	90th to < 95th or if BP exceeds 120/80 mmHg even if below 90th percentile†	Recheck in 6 months.
Stage 1 hypertension	95th percentile to the 99th percentile plus 5 mmHg	Recheck in 1-2 weeks or sooner if the patient is symptomatic; if persistently elevated on two additonal occasions, evaluate or refer to source of care within 1 month.
Stage 2 hypertension	> 99th percentile plus 5 mmHg	Evaluate or refer to source of care within 1 week or immediately if the patient is symptomatic.

Adapted from the "Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents."

Laboratory Workup

Risk Factors

- Ethnicity *(African American, Hispanic, Native American, Pacific Islanders)*
  - Family or Personal History of :
    - – Cardiovascular Disease <55y men, <65y women
    - – Dyslipidemia
    - – Obesity/Overweight
    - – Diabetes
    - – Hypertension
  - Diet Behaviors
  - Physical Activity Behaviors

INDICATION	LABS	RE-SCREEN
BMI 85-94% without risk factors or Family History Unknown	Fasting Lipid Profile (Chol, LDL, HDL,TG)	Every 2 years
BMI 85-94% With risk factors	Fasting Lipid Profile ALT, AST, Fasting glucose	Every 2 years
BMI ≥ 95%	Fasting Lipid Profile ALT, AST, Fasting glucose	Every 2 years

Consider Fasting Lipid Profile age ≥ 2 years, Additional hepatic function and fasting glucose should be considered at age ≥ 10 years. Clinical judgment may dictate additional labs in the younger child with higher risk.

Adapted from the Expert Committee Recommendations and the Lipid Screening and Cardiovascular Health in Childhood.

Plasma Glucose Criteria

Plasma Glucose	Normal	Impaired	Diabetes
Fasting	<100	100-125	≥ 126
Oral gtt 2h PG	<140	140-199	≥ 200
Random			≥ 200 + symptoms

Abnormal values may warrant referral or consultation with Endocrinology specialist

Cholesterol

Category	Total Cholesterol *(mg/dL)*	LDL *(mg/dL)*	HDL *(mg/dL)*
Acceptable	<170	<110	>40
Borderline	170-199	110-129	
Abnormal	≥ 200	≥ 130	<40

Abnormal values may warrant referral or consultation with Cardiology or lipid specialist

Triglycerides

	Normal mg/dL	
Age (y)	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

Abnormal values may warrant referral or consultation with Cardiology or lipid specialist

AST and ALT values will vary by laboratory. Refer to local lab for normal values. Abnormal values may warrant referral or consultation with a gastroenterology specialist.

Adapted from the Expert Committee Recommendations Summary Report.

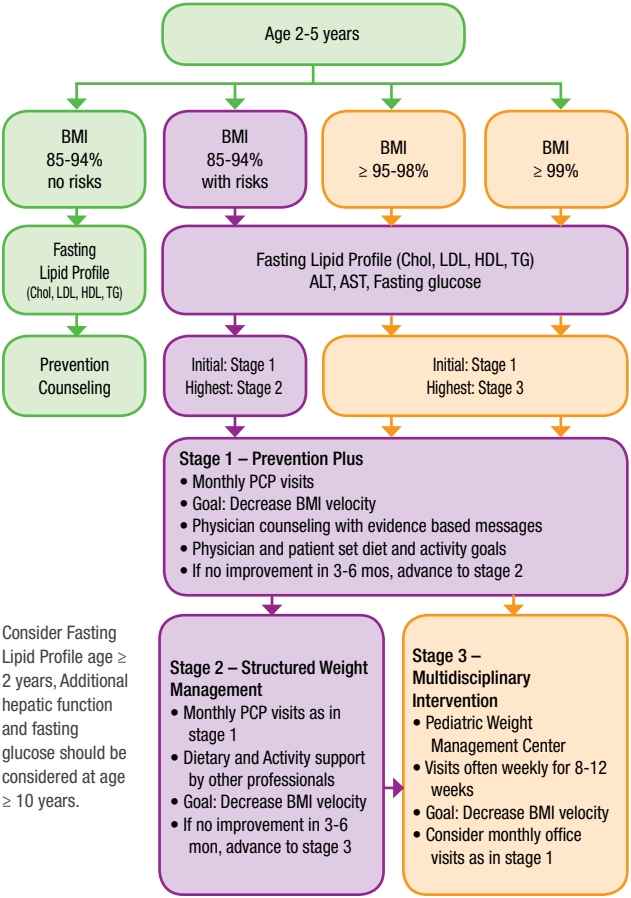
Consider Referral for Possible Pharmacologic Intervention

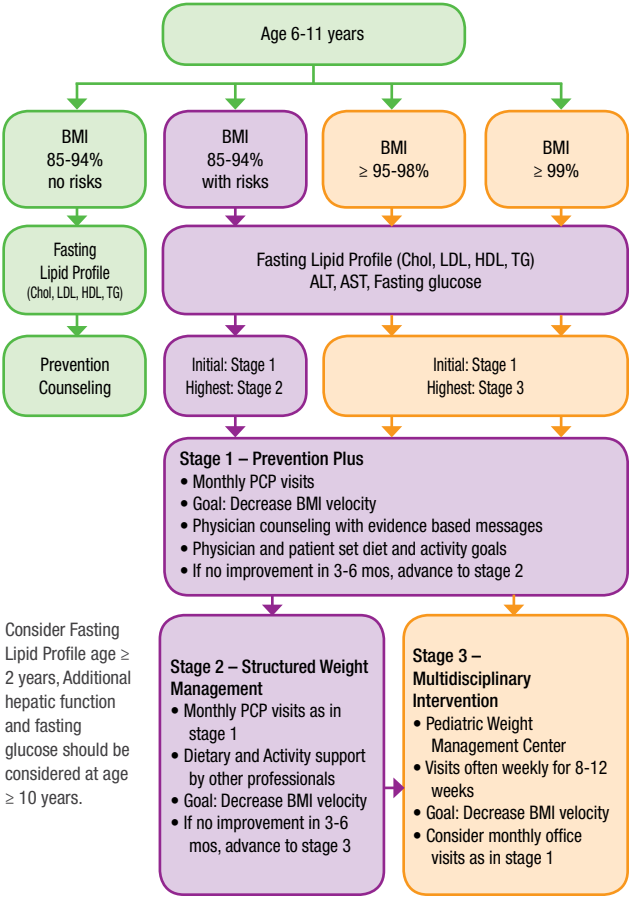
8+ years with the following

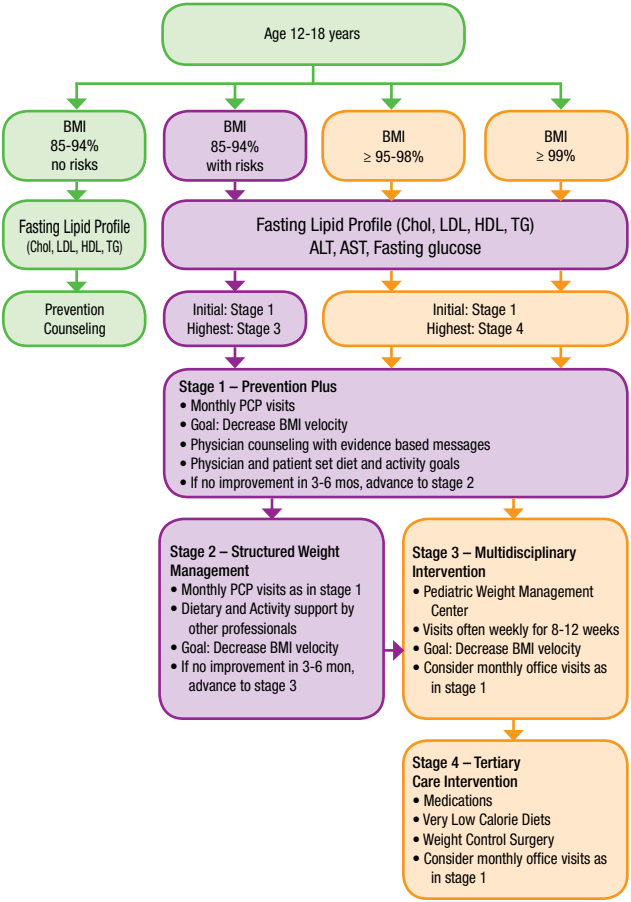
- LDL ≥ 190
- LDL ≥ 160 with family history of early heart disease
- LDL ≥ 160 with > 2 other risk factors
- LDL ≥ 130 with Diabetes Mellitus

Lipid recommendations extracted from "Lipid Screening and Cardiovascular Health in Childhood"

Pharmacologic intervention is still controversial.


Age 2-5 years
BMI 85-94% no risks
BMI 85-94% with risks
BMI ≥ 95-98%
BMI ≥ 99%
Fasting Lipid Profile (Chol, LDL, HDL, TG)
Prevention Counseling
Fasting Lipid Profile (Chol, LDL, HDL, TG) ALT, AST, Fasting glucose
Initial: Stage 1 Highest: Stage 2
Initial: Stage 1 Highest: Stage 3
Stage 1 – Prevention Plus
• Monthly PCP visits
• Goal: Decrease BMI velocity
• Physician counseling with evidence based messages
• Physician and patient set diet and activity goals
• If no improvement in 3-6 mos, advance to stage 2
Stage 2 – Structured Weight Management
• Monthly PCP visits as in stage 1
• Dietary and Activity support by other professionals
• Goal: Decrease BMI velocity
• If no improvement in 3-6 mon, advance to stage 3
Stage 3 – Multidisciplinary Intervention
• Pediatric Weight Management Center
• Visits often weekly for 8-12 weeks
• Goal: Decrease BMI velocity
• Consider monthly office visits as in stage 1
Consider Fasting Lipid Profile age ≥ 2 years, Additional hepatic function and fasting glucose should be considered at age ≥ 10 years.


Age 6-11 years
BMI 85-94% no risks
BMI 85-94% with risks
BMI ≥ 95-98%
BMI ≥ 99%
Fasting Lipid Profile (Chol, LDL, HDL, TG)
Prevention Counseling
Fasting Lipid Profile (Chol, LDL, HDL, TG)
ALT, AST, Fasting glucose
Initial: Stage 1
Highest: Stage 2
Initial: Stage 1
Highest: Stage 3
Stage 1 – Prevention Plus
• Monthly PCP visits
• Goal: Decrease BMI velocity
• Physician counseling with evidence based messages
• Physician and patient set diet and activity goals
• If no improvement in 3-6 mos, advance to stage 2
Consider Fasting Lipid Profile age ≥ 2 years, Additional hepatic function and fasting glucose should be considered at age ≥ 10 years.
Stage 2 – Structured Weight Management
• Monthly PCP visits as in stage 1
• Dietary and Activity support by other professionals
• Goal: Decrease BMI velocity
• If no improvement in 3-6 mos, advance to stage 3
Stage 3 – Multidisciplinary Intervention
• Pediatric Weight Management Center
• Visits often weekly for 8-12 weeks
• Goal: Decrease BMI velocity
• Consider monthly office visits as in stage 1


Age 12-18 years
BMI 85-94% no risks
BMI 85-94% with risks
BMI ≥ 95-98%
BMI ≥ 99%
Fasting Lipid Profile (Chol, LDL, HDL, TG)
Prevention Counseling
Fasting Lipid Profile (Chol, LDL, HDL, TG) ALT, AST, Fasting glucose
Initial: Stage 1 Highest: Stage 3
Initial: Stage 1 Highest: Stage 4
Stage 1 – Prevention Plus
• Monthly PCP visits
• Goal: Decrease BMI velocity
• Physician counseling with evidence based messages
• Physician and patient set diet and activity goals
• If no improvement in 3-6 mos, advance to stage 2
Stage 2 – Structured Weight Management
• Monthly PCP visits as in stage 1
• Dietary and Activity support by other professionals
• Goal: Decrease BMI velocity
• If no improvement in 3-6 mon, advance to stage 3
Stage 3 – Multidisciplinary Intervention
• Pediatric Weight Management Center
• Visits often weekly for 8-12 weeks
• Goal: Decrease BMI velocity
• Consider monthly office visits as in stage 1
Stage 4 – Tertiary Care Intervention
• Medications
• Very Low Calorie Diets
• Weight Control Surgery
• Consider monthly office visits as in stage 1

Coding

Frequently Used Diagnosis Codes:

Abnormal Weight Gain.....783.1

Obesity 278.0

Morbid Obesity 278.01

Type II Diabetes, unspecified.....250

Type II Diabetes, uncontrolled 250.02

Glucose Intolerance 271.3

Urinary Frequency.....788.41

Polydipsia 783.5

Polyphagia.....783.6

Other abnormal glucose.....790.29

Headache 784.0

Pseudotumor Cerebri 348.2

Abdominal Pain.....789.0

Constipation 564.00

Dyslipidemia.....272.4

Fatty Liver.....571.8

GER 530.81

Joint Pain.....719.4

Back Pain, unspecified.....724.5

Irregular Menstrual Cycle 626.4

Polycystic Ovarian Syndrome 256.4

Acanthosis Nigricans 701.2

Acne.....706.1

Striae.....701.3

Blount's Disease 732.4

Unspecified Sleep Apnea.....780.57

Elevated Blood Pressure 796.2

Essential Hypertension.....401

Other malaise and fatigue.....780.79

Anxiety Disorder NOS.....300.00

Bipolar Disorder NOS 296.8

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Notes:

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NationwideChildrens.org/HealthyWeight

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