Pediatric Healthy Weight Toolkit

A Toolkit for Health Professionals

Kids and Teens
Weight Management
Healthy Eating Habits
Physical Activity

BlueChoice® HealthPlan
South Carolina

Assessment

At a minimum, health care professionals should perform an annual assessment of weight status in all children under their care. Assessment should include these components:

Medical and Family History

- Identify familial risks (e.g., overweight/obesity, type 2 diabetes, high blood pressure, heart disease, high cholesterol).
- Identify underlying syndromes or secondary complications of overweight and obesity (e.g., hypothyroidism, polycystic ovarian syndrome, Prader-Willi syndrome, diabetes, sleep apnea).

BMI Assessment

Measure height and weight, calculate BMI and use the enclosed BMI wheel to document BMI percentile for age. You may also document BMI percentile by plotting the values on the grids found on page 19 and 20 of this toolkit and placing that information in the medical record.*

*Adolescents age 16 and older only require documentation of the standard BMI value of kg/m^2.

Physical Examination

- Measure blood pressure.
- Inspect and examine body systems to identify underlying syndromes or secondary complications of overweight and obesity (e.g., hirsutism, dysmorphic features, slipped capital femoral epiphysis, leg bowing, acanthosis nigricans).

Physical Activity and Nutrition Assessment

Document counseling for both nutrition and physical activity. Counseling may include one or more of these:

- Discussion of current nutrition and physical activity behaviors (eating habits, diets, sports, exercise routines, etc.)
- Checklist indicating both nutrition and physical activity was addressed
- Counseling or referral for both nutrition and physical activity education
- Providing educational materials on both nutrition and physical activity
- Anticipatory guidance for both nutrition and physical activity

Psychosocial Assessment

- Screen for depression, if indicated (e.g., Center for Epidemiological Studies Depression Scale for Children).
- Assess family support and readiness to change.

Laboratory Testing

Examples include, but are not limited to, fasting lipid profile, liver function tests, fasting plasma glucose and insulin levels, and are based on history or exam findings. If the BMI for age and sex is:

- 85th to 94th percentile (overweight) with no risk factors: Obtain fasting lipid profile.
- 85th to 94th percentile (overweight) with risk factors in history or physical examination: Obtain also aspartate aminotransferase, or AST; alanine aminotransferase, or ALT; and fasting glucose.
- Greater than the 95th percentile (obese), even in the absence of risk factors: Obtain all of the tests listed in second bullet point above, plus blood urea nitrogen, or BUN, creatinine and HbAIC (with presence of other risk factors for diabetes).

Hyperlipidemia Screening

AHA recommends targeting children over age 2 who meet these criteria:*

- Family history of dyslipidemia
- Unknown family history along with risk factors
- Premature cardiovascular disease
- Presence of overweight or obesity

*increased risk if male with HDL <45 or female with HDL <50

Reference Lab Values

Glucose testing	Normal	Impaired	Diabetes
Fasting Plasma Glucose	<100 mg/dl	100–125 mg/dl	≥ 126 mg/dl*
Two-hour modified OGTT (Perform test using a glucose load containing equivalent of 75g anhydrous glucose dissolved in water.) *(OGTT is not recommended for routine clinical use.)*	<140 mg/dl	140–199 mg/dl	≥ 200 mg/dl*

Diabetes Care 2006; 29 (Suppl.1):S47

***In absence of unequivocal hyperglycemia, confirm by repeat testing on a different day.**

Lipids	Cholesterol (mg/dl)			LDL (mg/dl)			HDL (mg/dl)
	Desirable	Borderline	High	Desirable	Borderline	High	Desirable
Child/adolescent	<170	170–199	>200	<110	110–129	>130	45

Johns Hopkins: *The Harriet Lane Handbook: A Manual for Pediatric House Officers*, 17th ed., Copyright © 2005 Mosby

	Percentile				
Total Triglycerides (mg/dl)	**5th**	**Mean**	**75th**	**90th**	**95th**
1–4 year					
Male	29	56	68	85	99
Female	34	64	74	95	112
5–9 year					
Male	28	52	58	70	85
Female	32	64	74	103	126
10–14 year					
Male	33	63	74	94	111
Female	39	72	85	104	120
15–19 year					
Male	38	78	88	125	143
Female	36	73	85	112	126

Reference Lab Values *continued*

Aspartate Aminotransferase (AST)	Normal Values
1–3 yr	20–60 U/L
4–6 yr	15–50 U/L
7–9 yr	15–40 U/L
10–11 yr	10–60 U/L
12–19 yr	15–45 U/L

Johns Hopkins: *The Harriet Lane Handbook: A Manual for Pediatric House Officers*, 17th ed., Copyright © 2005 Mosby

Creatinine (Serum)	Normal Values
Child	0.3–0.7 mg/dl
Adolescent	0.5–1.0 mg/dl

Johns Hopkins: *The Harriet Lane Handbook: A Manual for Pediatric House Officers*, 17th ed., Copyright © 2005 Mosby

Blood Urea Nitrogen (BUN)	Normal Values
Infant/Child	5–18 mg/dl

Johns Hopkins: *The Harriet Lane Handbook: A Manual for Pediatric House Officers*, 17th ed., Copyright © 2005 Mosby

Strategies to Maintain Healthy Weight in Children

Adapted from the *AMA/CDC Recommendations on the Assessment, Prevention, and Treatment of Child and Adolescent Overweight and Obesity*. June 2007.

Recommendations

Physicians and allied health care professionals should provide the following guidance for children ages 2–18 whose BMI is ≥ the 5th percentile and ≤ the 84th percentile:

- Dietary intake:
  - Limit consumption of sugar-sweetened beverages and encourage consumption of diets with recommended quantities of fruits and vegetables.
  - Eat a diet rich in calcium.
  - Eat a diet high in fiber.
  - Eat a diet with balanced macronutrients (calories from fat, carbohydrates, and protein in proportions for age recommended by Dietary Intake References such as USDA Food Pyramid at **USDA.gov**).
- Physical activity:

  Children of healthy weight should participate in 60 minutes of moderate to vigorous physical activity daily, unless contraindicated.
  - The 60 minutes can be accumulated throughout the day.
  - Ideally, such activity should be enjoyable to the child.
  - Whereas some health and psychological benefits may be attained by achieving the 60-minute goal, greater duration should yield increased benefit.
- Screen Time:
  - Limit television and other screen time to 1 or 2 hours per day in children as young as age 5, as advised by the American Academy of Pediatrics, and remove television and computer screens from children's primary sleeping areas.

Strategies to Maintain Healthy Weight in Children *continued*

- Eating behaviors:
  - Eat breakfast daily.
  - Limit eating out at restaurants, particularly fast-food restaurants.
  - Encourage family meals in which parents and children eat together.
  - Limit portion size.
- Health care professionals who wish to support obesity prevention in clinical, school and community settings should:
  - Actively engage families with parental obesity or maternal diabetes, because these children are at increased risk for developing obesity even if they currently have normal BMI.
  - Encourage an authoritative* parenting style in support of increased physical activity and reduced sedentary behavior, providing tangible, motivational support for children.
  - Encourage parents to model healthy diets and portion sizes, physical activity and limited television time.
  - 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.

* Authoritative parents are both demanding and responsive. "They monitor and impart clear standards for their children's conduct. They are assertive, but not intrusive and restrictive. Their disciplinary methods are supportive, rather than punitive. They want their children to be assertive as well as socially responsible, and self-regulated as well as cooperative." (Baumrind, 1991, p. 62).

Treatment Recommendations for Overweight and Obese Children

(Includes strategies noted previously)

Adapted from the *AMA/CDC Recommendations on the Assessment, Prevention, and Treatment of Child and Adolescent Overweight and Obesity*. June 2007.

The treatment of overweight children should be approached in a staged method based upon the child's age, BMI, any related comorbidities, weight status of parents and progress in treatment; and the child's primary caregivers and families should be involved in the process.

Children 2–19 with BMI > 85th percentile:

Stage 1. Prevention Plus protocol: These recommendations can be implemented by the primary care physician or allied health care professional who has some training in pediatric weight management or behavioral counseling. Within this category, the goal should be weight maintenance with growth that results in a decreasing BMI as age increases. Stage 1 recommendations include:

- Dietary habits and physical activity:
  - Five or more servings of fruits and vegetables per day
  - Two hours or less of screen time per day, and no television in the room where the child sleeps
  - One hour or more of daily physical activity
  - No sugar-sweetened beverages
- Patients and families of the patient should be counseled to facilitate these eating behaviors:
  - Eating a daily breakfast
  - Limiting meals outside of the home
  - Family eating meals together at least five times per week
  - Allowing the child to self-regulate his or her meals and avoiding overly restrictive behaviors
- Follow-up: After 3–6 months, if there is no improvement in BMI or weight status, advance to Stage 2, based on patient and family readiness to change.

Treatment Recommendations for Overweight and Obese Children *continued*

Stage 2. Structured Weight Management protocol: These recommendations can be implemented by a primary care physician or allied health care professional highly trained in weight management. Stage 2 recommendations include:

- Dietary and physical activity behaviors:
  - Development of a plan for using a balanced macronutrient diet emphasizing low amounts of energy-dense foods
  - Increased structured daily meals and snacks
  - Supervised active play of at least 60 minutes per day
  - Screen time of one hour or less per day
  - Increased monitoring (e.g., screen time, physical activity, dietary intake, restaurant logs) by health care professional, patient or family
- Within this category, goal should be weight maintenance that results in a decreasing BMI as age and height increases; however, weight loss should not exceed 1 pound per month in children 2–11 years, or an average of 2 pounds per week in older overweight or obese children and adolescents.
- If no improvement in BMI weight after 3–6 months, patient may be referred to a multidisciplinary obesity care team.

Effective Communication with Families

Scott Gee, M.D.; Sandra Roberts, R.N.; Amanda Howell. Adapted with permission from copyrighted material by Regional Health Education, Permanente Medical Group, Northern California.

With whom do you communicate?

Discuss issues with children in a manner appropriate to their developmental capacity and always include a parent or primary caregiver.

Children of Healthy Weight (BMI <85th percentile)

Lifestyle advice for well-child or urgent visit can be less than one minute.

Can you … every day?

- B Eat a healthy BREAKFAST
- 5 Eat at least FIVE or more fruits and vegetables
- 4 Drink FOUR glasses of water
- 3 Have THREE servings of dairy
- 2 Limit screen time (computer, TV, video games) to less than TWO hours
- 1 Be physically active for at least ONE hour
- 0 AVOID sweetened beverages

Source: South Carolina Institute for Childhood Obesity and Related Disorders

Children Who Are Overweight or Obese (BMI ≥85th percentile)

1 **Engage the Patient and Parent**

- ☐ Can we take a few minutes together to discuss your health and weight?
- ☐ How do you feel about your health and weight?

2 **Share Information**

- ☐ Your current weight puts you at risk for developing heart disease and diabetes.
- ☐ What do you make of this?
- ☐ What are your ideas for working toward a healthy weight?

3 **Make a Key Advice Statement**

Can you … every day?

- B Eat a healthy BREAKFAST
- 5 Eat at least FIVE or more fruits and vegetables
- 4 Drink FOUR glasses of water
- 3 Have THREE servings of dairy
- 2 Limit screen time (computer, TV, video games) to less than TWO hours
- 1 Be physically active for at least ONE hour
- 0 AVOID sweetened beverages

Use patient ideas on working toward a healthy weight from step 2 above.

Effective Communication with Families *continued*

4 Assess Readiness (optional)

☐ On a scale from 0 to 10, how ready are you to consider taking steps to achieve a healthy weight?
To explore answer, consider these types of questions:

☐ Straight question: *Why a 5?*

☐ Backward question: *Why a 5 and not a 3?*

☐ Forward question: *What would it take to move you from a 5 to a 7?*

Readiness Scale 0 1 2 3 4 5 6 7 8 9 10

Stage of Readiness	Recommended Approach	Key Questions
Not Ready 0–3	☐ Raise awareness ☐ Elicit change talk ☐ Advise and encourage	☐ Would you be interested in knowing more about reaching a healthy weight? ☐ How can I help? ☐ What might need to be different for you to consider a change in the future?
Unsure 4–6	☐ Evaluate ambivalence ☐ Elicit change talk ☐ Build readiness	☐ Where does that leave you now? ☐ What do you see as your next steps? ☐ What are you thinking and feeling at this point?
Ready 7–10	☐ Strengthen commitment ☐ Elicit change talk ☐ Facilitate action planning	☐ Why is this important to you now? ☐ What are your ideas for making this work? ☐ What might get in the way? How might you work around the barriers? ☐ How might you reward yourself along the way?

5 Explore Ambivalence (if relevant)

Step 1: Ask a pair of questions to help the patient explore the pros and cons of the issue you are discussing with the patient.

☐ What are the things you like about ____? **AND** What are the things you don't like about ____?
OR

☐ What are the advantages of keeping things the same? **AND** What are the advantages of making a change?

Step 2: Summarize ambivalence.

☐ Let me see if I understand what you've told me so far. (Begin with reasons for maintaining the status quo; end with reasons for making a change.)

☐ Ask: Did I get it all? Did I get it right?

6 Close the Encounter

☐ Summarize: Our time is almost up. Let's take a look at what you've worked through today.

☐ Show appreciation, acknowledge willingness to discuss change: Thank you for being willing to discuss your weight.

☐ Offer advice, emphasize choice, express confidence: I strongly encourage you to be more physically active. The choice to increase your activity, of course, is entirely yours. I am confident that if you decide to be more active you can be successful.

☐ Confirm next steps and arrange follow up.

Overweight and obese children are at increased risk of developing type 2 diabetes throughout their life span.

Risk Factors and Identification

- BMI > 85th percentile for age and sex, or weight >120 percent of ideal body weight
- Member of high-risk ethnic groups, such as African-Americans, American Indians, Hispanic or Latino Americans and some Asian or Pacific Islander Americans
- Family member who has type 2 diabetes
- Age > 10 years
- Having signs of insulin resistance, including acanthosis nigricans, high blood pressure and dyslipidemia
- Early-onset puberty

Diagnosing Diabetes[1,2]

- Random glucose level is >200 mg/dl
- Fasting glucose level is >126 mg/dl
- Two-hour postprandial glucose level is >200 mg/dl
- Elevated insulin and C-peptide levels with no autoantibodies to islet cells or insulin also indicates type 2 diabetes

At Diagnosis[3,4]

Diabetes care for children should be provided by a team that can address medical, educational, nutritional and behavioral issues. The team usually consists of a physician, diabetes educator, dietitian and a social worker or psychologist, along with the patient and family.

- Establish treatment regimen and goals.
- Check lipids in children with a significant family history. In children with no significant family history, check lipids at puberty and if normal, repeat profile every five years.
- Diabetes self-management education on:
  - Healthy eating habits
  - Daily physical activity
  - Insulin and medication administration
  - Self-monitoring of blood glucose levels, if appropriate
  - Routine dental care

The individual and family need a solid educational base so that they can become independent in managing their diabetes.

An individual experienced with the nutritional needs of the growing child and the behavioral issues that may impact adolescent diets should provide nutritional therapy.

For adolescents, the **HEADDSS** Psychosocial Interview for Adolescents (home/health, education/employment, activities, drugs, depression, safety, sexuality) is recommended.[5]

[1]Type 2 Diabetes in Children and Adolescents: Screening, Diagnosis, and Management. *Journal of the American Academy of Physician Assistants*, Vol 20 (3), March 2007.

[2]Type 2 Diabetes in Children and Adolescents. *Diabetes Care*, Vol 23(3), March 2000.

[3]Overview of Diabetes in Children and Adolescents. *National Diabetes Education Program*. August 2006.

[4]American Diabetes Association. Clinical Practice Recommendations – Standards of Medical Care in Diabetes. *Diabetes Care* 2005; 28(Suppl. 1): S4-36.

[5]Preventive Health Counseling for Adolescents. *American Family Physician*, 74(7), October 2006.

Ongoing Evaluation and Monitoring after Diagnosis: Physical Examination[6]

Physical Examination Component	Frequency
Weight	Initially every 3 months*
Height, BMI	Initially every 3 months*
Blood pressure	Initially every 3 months*
Injection sites	Every 3 months
Self-testing blood glucose records	Every 3 months
Skin (acanthosis nigricans, hirsutisum, tinea, acne)	Every 12 months
Examine feet (pedal pulses, neurological examination, nails)	Every 12 months but visual foot check every 3 months
Refer patient for nutrition therapy	At diagnosis; re-evaluate every 12 months
Conduct psychosocial assessment such as HEADDSS	At diagnosis and every three months (if needed)
Provide ophthalmologic examination	Annually (less often on the advice of an eye care professional) after 5 years of diabetes
Administer influenza vaccination	Annually

*May decrease to every 6 months if linear growth is complete and glucose is well controlled.

Ongoing Evaluation and Monitoring After Diagnosis: Laboratory Evaluation*[7]

Test	Frequency
Individualized self monitoring blood glucose	Fasting (and preprandial glucose daily)
Fasting plasma glucose test	Initially and ongoing
HbA1c	Every 3 months
Urinalysis	Every 12 months
Microalbuminuria to creatinine ratio	At diagnosis and then every 12 months after 5 years of diabetes
Creatinine	At diagnosis
Lipid profile (for children with significant family history)**	At diagnosis and every 1–2 years
LFTs (liver function test)	At diagnosis (before initiating oral hypoglycemic agents)

* A requirement for more frequent monitoring may be determined at diagnosis, during initiation of new treatment, and during metabolic changes (illness, stress, increased activity, and growth).

** In children with no significant family history, check lipids at puberty and if normal, repeat profile every five years.

[6]Overview of Diabetes in Children and Adolescents. *National Diabetes Education Program*. August 2006.

[7]Prevention and Treatment of Type 2 Diabetes Mellitus in Children, With Special Emphasis on American Indian and Alaska Native Children. *Pediatrics* 2003; 112

Treatment Strategies and Goals[8]

Treatment for type 2 diabetes in children should include nutrition management, regular physical activity, regular blood glucose checks and taking all medications as prescribed.

Nutrition plans may be developed in conjunction with a registered dietitian or diabetes educator. For more information, visit the American Dietetic Association Web site at **eatright.org**.

Ideally, children with type 2 diabetes should engage in a total of 60 minutes of **physical activity** per day. Physical activity is critical because it helps to lower blood glucose levels and helps children manage their weight.

Young people with diabetes should know the acceptable range for their blood glucose level. Children using insulin should check blood glucose values on a regular basis with a blood glucose meter. In addition, parents, caregivers, and health professionals can help children learn how to take their medications as prescribed.

Treatment goals include adequate metabolic control (HbA1c concentration <7%) and prevention of microvascular and macrovascular complications. More specifically, treatment objectives include:

- Avoiding hypoglycemia and eliminating symptoms of hyperglycemia
- Assisting the patient in maintaining a reasonable body weight
- Decreasing cardiovascular risk factors and risk of early kidney disease
- Achieving overall improvement in the child's physical and emotional well-being

All treatment plans should be customized with the child's unique family and social circumstances in mind.

[8]National Diabetes Education Program. *Overview of Diabetes in Children and Adolescents*. August 2006.

Blood Glucose Goals

To control diabetes and prevent complications, blood glucose levels must be managed as close to a normal range as is safely possible (70 to 100 mg/dl before eating). Families should work with their health care team to set target blood glucose levels appropriate for the child.

The American Diabetes Association has developed recommendations for blood glucose goals for young people with type 1 diabetes. Although there is no unified national recommendation for children with type 2 diabetes, it may be reasonable to use the values in the following table as a guide.

Optimal plasma blood glucose and A1C goals for type 1 diabetes by age group[9]

Values by Age (Years)	Plasma Blood Glucose Goal Range (mg/dl)		A1C Percent	Rationale
	Before Meals	Bedtime/ Overnight		
Toddlers and preschoolers under age 6	100–180	110–200	≤8.5 but ≥7.5	High risk and vulnerability to hypoglycemia
Ages 6 to 12	90–180	100–180	<8	Risks of hypoglycemia and relatively low risk of complications prior to puberty
Adolescents and young adults, ages 13 to 19	90–130	90–150	<7.5*	Risk of hypoglycemia Developmental and psychological issues

* A lower goal (<7.0) is reasonable if it can be achieved without excessive hypoglycemia.

Key concepts in setting glycemic goals:

- Goals should be individualized and lower goals may be reasonable based on comparing the benefits to the risks.
- Blood glucose goals should be higher than those listed above in children with frequent hypoglycemia or hypoglycemia unawareness.
- Postprandial blood glucose values should be measured when there is a disparity between preprandial blood glucose values and A1C levels.

[9]National Diabetes Education Program. *Overview of Diabetes in Children and Adolescents*. August 2006.

Hypertension in Children: Definition and Evaluation

Definition of Hypertension

- Hypertension is defined as average systolic blood pressure or diastolic blood pressure >95th percentile for gender, age and height on ≥3 occasions.
- Prehypertension in children is defined as average SBP or DBP levels that are ≥90th percentile but <95th percentile; as with adults, adolescents with BP level ≥120/80 mm Hg should also be considered prehypertensive.

Clinical Evaluation of Confirmed Hypertension

Study or Procedure	Purpose	Target Population
Evaluation for identifiable causes		
Physical examination, history including sleep history, family history, risk factors, diet and habits such as smoking and drinking alcohol	History and physical examination help focus subsequent evaluation	All children with persistent BP ≥95th percentile
BUN, creatinine, electrolytes, urinalysis and urine culture	R/O renal disease and chronic pyelonephritis	All children with persistent BP ≥95th percentile
CBC	R/O anemia, consistent with chronic renal disease	All children with persistent BP ≥95th percentile
Renal U/S	R/O renal scar, congenital anomaly, or disparate renal size	All children with persistent BP ≥95th percentile
Evaluation for target-organ damage		
Echocardiogram	Identify LVH and other indications of cardiac involvement	Patients with comorbid risk factors* and BP 90th-94th percentile; all patients with BP ≥95th percentile
Retinal Exam	Identify retinal vascular changes	Patients with comorbid risk factors and BP 90th-94th percentile; all patients with BP ≥95th percentile

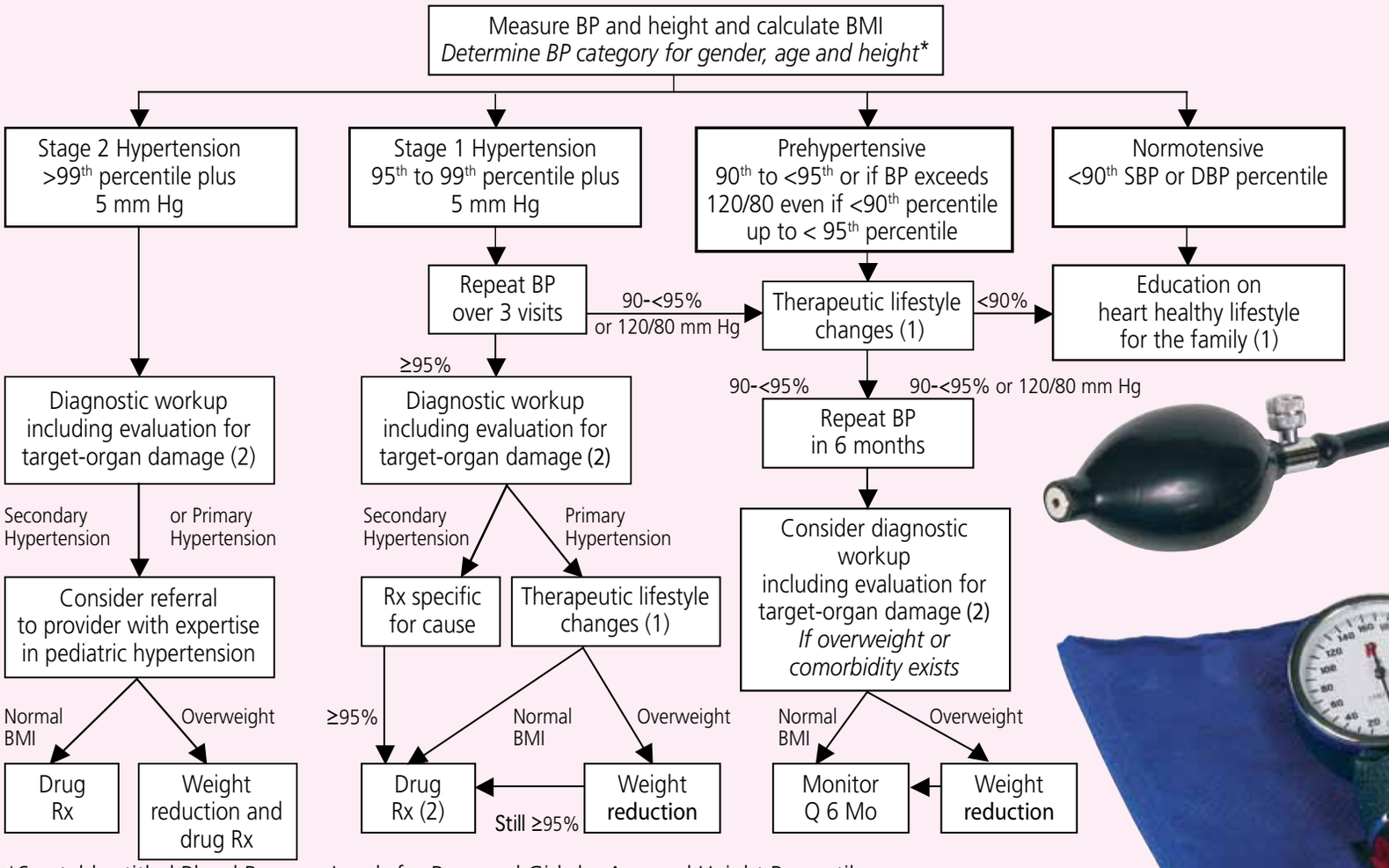
Selected excerpts from "The Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents," *Pediatrics*, Vol. 114, No. 2, August 2004

BUN, blood urea nitrogen; CBC, complete blood count; LVH, left ventricular hypertrophy; R/O rule out; U/S, ultrasound.

*Comorbid risk factors also includes diabetes mellitus and kidney disease.

(Hypertension Management Algorithm over)

Hypertension Management Algorithm



*See tables titled Blood Pressure Levels for Boys and Girls by Age and Height Percentile
(1) Therapeutic Lifestyle Changes (below)
(2) Especially if younger, very high BP, 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 BP.
- Regular physical activity and restriction of sedentary activity will improve efforts at weight management and may prevent an excess increase in BP over time.
- Dietary modification should be strongly encouraged in children and adolescents who have BP levels in the prehypertensive range as well as those with hypertension.
- Family-based intervention improves success.

Indication for Antihypertensive Drug Therapy in Children

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

From "The Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents," *Pediatrics*, Vol. 114, No. 2, August 2004

Blood Pressure Levels for Girls by Age and Height Percentile

Age (Year)	BP Percentile	Systolic BP (mm Hg) Percentile of Height							Diastolic BP (mm Hg) Percentile of Height						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
2	90th	98	99	100	101	103	104	105	57	58	58	59	60	61	61
	95th	102	103	104	105	107	108	109	61	62	62	63	64	65	65
	99th	109	110	111	112	114	115	116	69	69	70	70	71	72	72
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	105	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	120	78	78	79	79	80	81	81
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
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	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

Blood Pressure Levels for Boys by Age and Height Percentile

Age (Year)	BP Percentile	Systolic BP (mm Hg) Percentile of Height							Diastolic BP (mm Hg) Percentile of Height						
		5th	10th	25th	50th	75th	90th	95th	5th	10th	25th	50th	75th	90th	95th
2	90th	97	99	100	102	104	105	106	54	55	56	57	58	58	59
	95th	101	102	104	106	108	109	110	59	59	60	61	62	63	63
	99th	109	110	111	113	115	117	117	66	67	68	69	70	71	71
3	90th	100	101	103	105	107	108	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	106	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	108	110	111	112	65	66	67	68	69	69	70
	95th	108	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
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
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	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

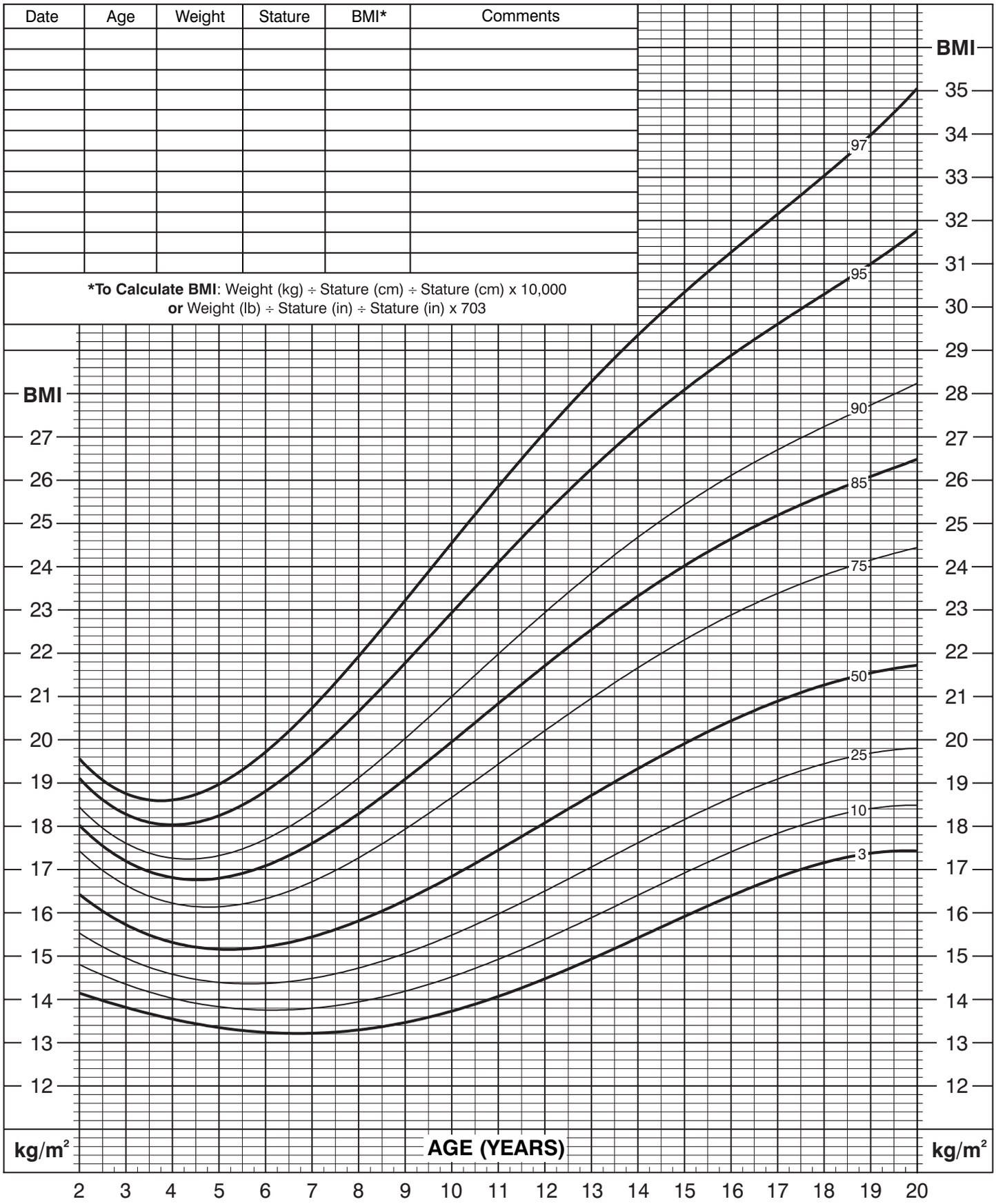
2 to 20 Years: Girls
Body Mass Index for Age Percentiles

NAME _____

RECORD # _____

Date	Age	Weight	Stature	BMI*	Comments

***To Calculate BMI**: Weight (kg) ÷ Stature (cm) ÷ Stature (cm) x 10,000
or Weight (lb) ÷ Stature (in) ÷ Stature (in) x 703



Published May 30, 2000 (modified 10/16/00).
SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).
cdc.gov/growthcharts

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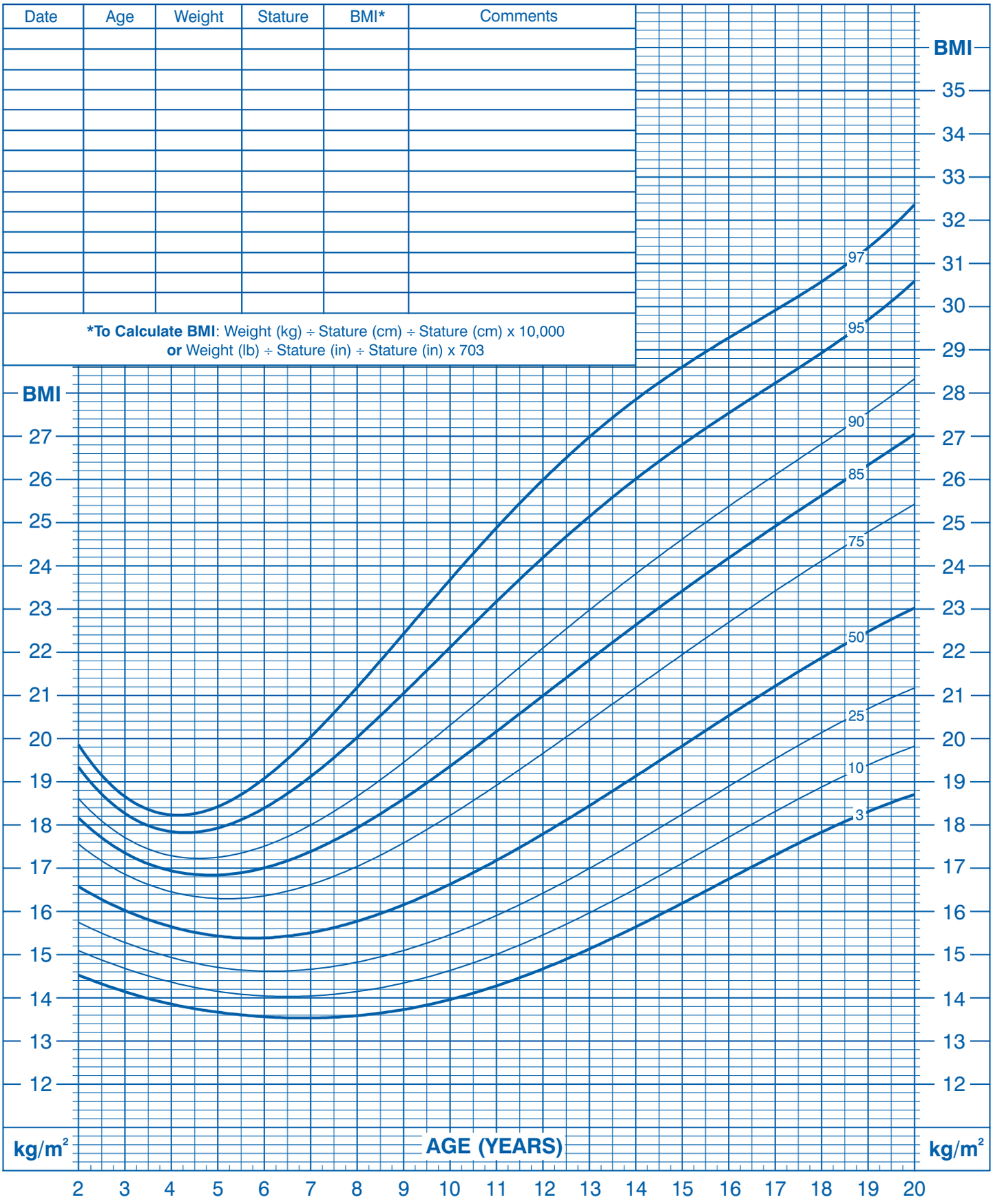
2 to 20 Years: Boys
Body Mass Index for Age Percentiles

NAME _____

RECORD # _____

Date	Age	Weight	Stature	BMI*	Comments

***To Calculate BMI**: Weight (kg) ÷ Stature (cm) ÷ Stature (cm) x 10,000
or Weight (lb) ÷ Stature (in) ÷ Stature (in) x 703



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