الهم اخرجنی من ظلمات الوهم

واکرمنی بالنور الفهم

Obesity in Children & adolescence and "Nutrition"

Presented by:
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INTRODUCTION: CHILDHOOD OBESITY

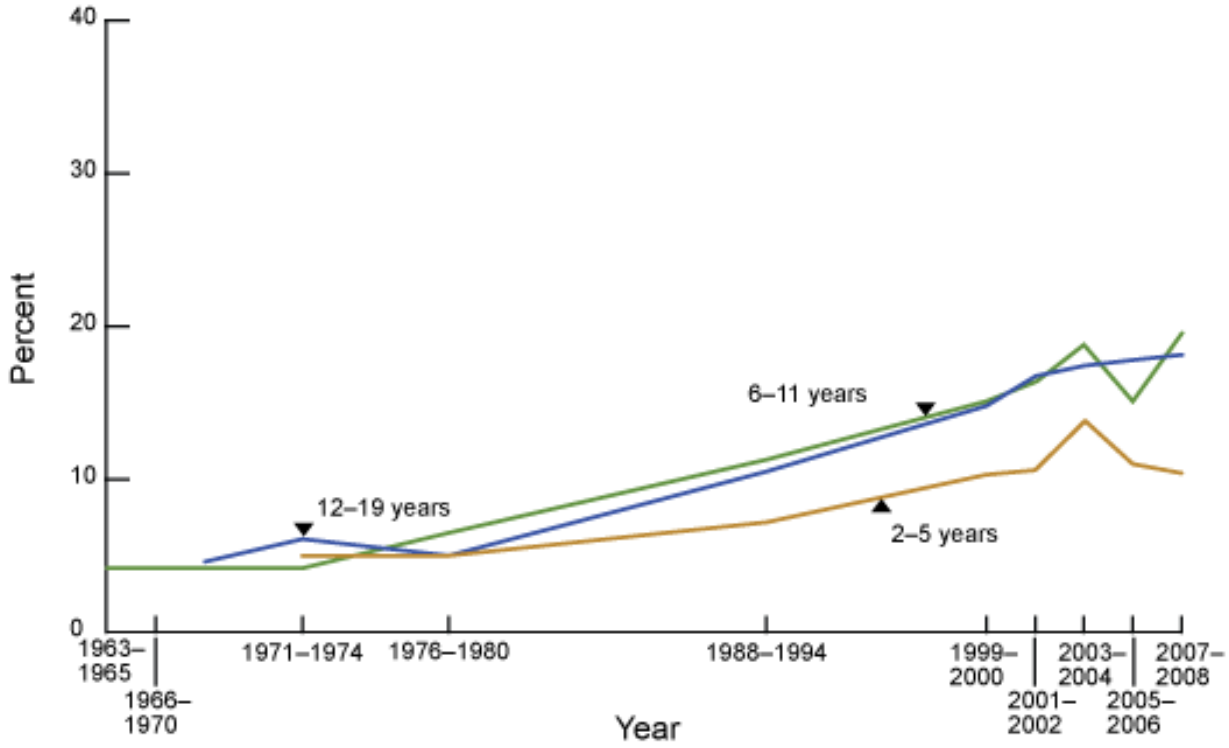
- **Epidemic** – Widespread in population (adolescence and children)
- **Progressive** – Childhood obesity becomes adult obesity

- **Alters Development** – Physically, emotionally, psychosocially (depressed, teased and bullied, Decreased quality of life, Diminished educational and job opportunities)

- **Chronic disease** – Lifelong morbidity accelerates "adult" disease into childhood

- **Increases morbidity/mortality** – First generation to have shorter lifespan than parents

Trends in Obesity Among Children and Adolescents: United States, 1963–2008



Note: Obesity is defined as body mass index (BMI) greater than or equal to sex- and age-specific 95th percentile from the 2000 CDC Growth Charts.

CDC/NCHS, National Health Examination Surveys II (ages 6–11), III (ages 12–17), and National Health and Nutrition Examination Surveys (NHANES) 1999–2000, 2001–2003, 2003–2004, 2005–2006, and 2007–2008.

PREVALENCE OF OBESITY

Almost: 32% of US children ages 2-19 are overweight.

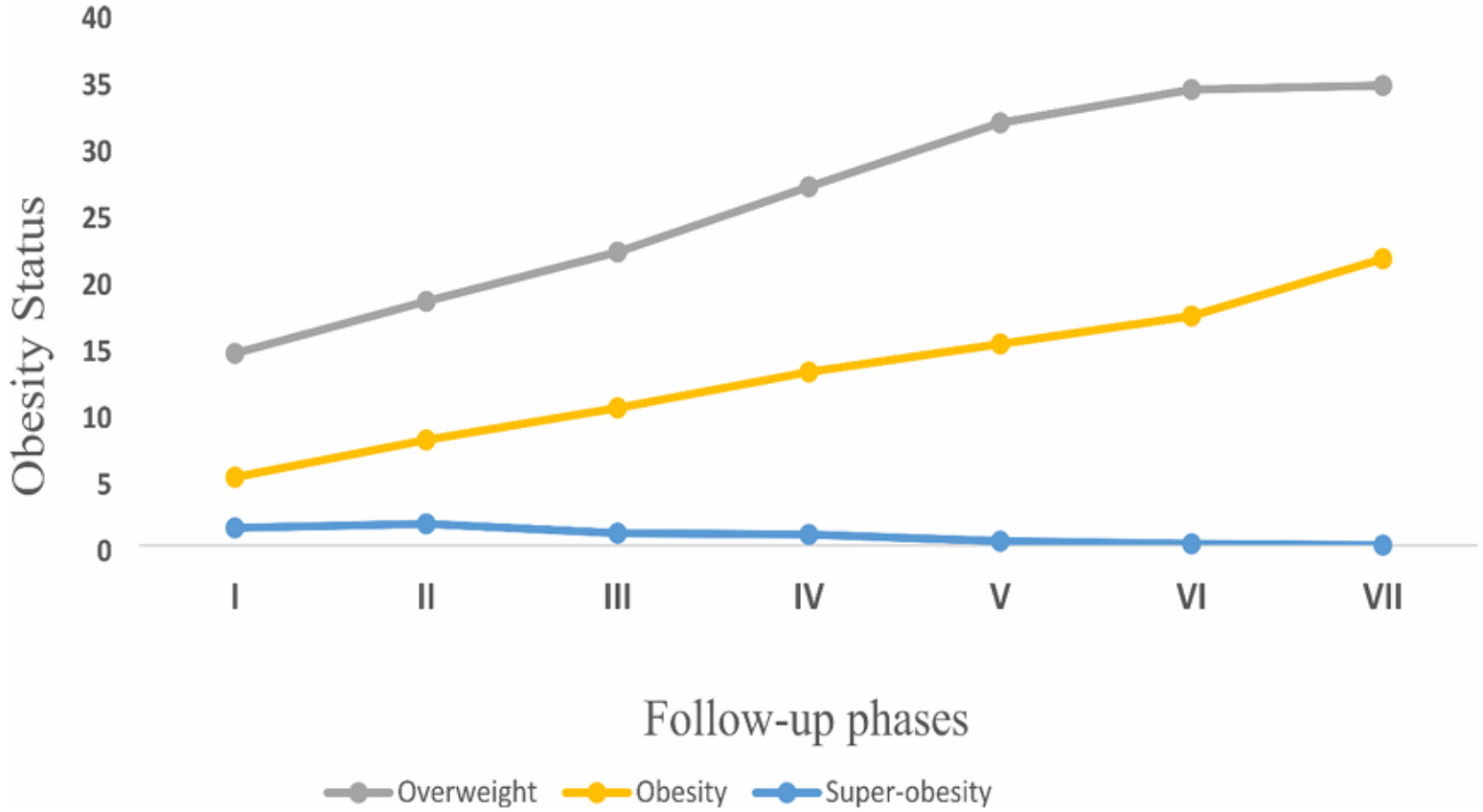
16.9 % of US children ages 2-19 are obese.

21.1 % of US children ages 2-5 are overweight.

10.4% of US children ages 2-5 are obese.

- Children with BMI > 85th ; six times more overweight later
- Growth failure and under nutrition in utero or in the early years of life; overweight in later childhood with subsequent risks of elevated blood pressure, lipid and glucose levels
- The timing of the adiposity rebound and excess fatness in adolescence are two critical factors in the development of obesity

Trend analysis, gender-specific patterns, and age dynamics of childhood and adolescent obesity: insights from the Tehran lipid and glucose study: 2024



Trend of obesity prevalence in different categories in study participants over 20 years of follow-up

PREVALENCE OF OBESITY IN IRAN

Children under 5 years old (2022–2023):

According to the Iranian Ministry of Health, the prevalence of obesity among children under 5 is approximately 0.8%, while overweight affects around 2% of this age group.

- School-aged children and adolescents (ages 7–18):

Based on the national CASPIAN-V study and recent reports from Iran University of Medical Sciences (2024), approximately 20% of Iranian adolescents are affected by overweight or obesity. Furthermore, abdominal obesity is present in 21%.

PROGRESS

- Children (age 12) with a BMI >99% followed into adulthood (age 27).
  - 100% BMI >30
  - 90% with BMI >35
  - 65% with BMI >40
- Children with a BMI >99% have a greater rate of cardiovascular risk factors.

Freedman DS, Mei Z, Srinivasan SR, et al. Cardiovascular Risk Factors and Excess Adiposity Among Overweight Children and Adolescents: The Bogalusa Heart Study. *J Pediatr*. 2007;150(1):12-17.

DEFINITIONS:

OBESITY: excess of fat

NOTE:

Methods used to directly measure body fat not available in daily practice.

Obesity is often assessed by means of indirect estimates of body fat

STANDARD MEASURES:

Body Mass Index *(BMI)*

Weight for Height: Useful for <2 years

Measurement of regional fat distribution

- Waist circumference
- Waist to hip ratio

Overall obesity *(BMI)* more accurate than body fat locations or ratios

- *BMI for age and sex*

The l-year-old toddler and the prepubescent child may weight more for developmental and physiologic reasons

کارت مراقبت کودک (تغذیه، واکسیناسیون، پایش رشد)

ویژه دختران

شماره پرونده: .....
نام و نام خانوادگی کودک: .....
نام مادر: ..... نام پدر: .....
تاریخ تولد: روز ..... ماه ..... سال .....

وزن هنگام تولد (بر حسب گرم) : .....
قد هنگام تولد (بر حسب سانتیمتر) : .....
دور سر هنگام تولد (بر حسب سانتیمتر) : .....
کودک چندمین فرزند زندهٔ مادر است؟ .....
فاصله کودک با فرزند زندهٔ قبلی مادر (بر حسب ماه) : .....
نوع زایمان: .....

☐ طبیعی ☐ سزارین ☐ چند قلویی ☐ ترم ☐ نارس

استان: ..... شهرستان: ..... روستا: .....
مرکز بهداشتی درمانی: ..... مطب: .....
خانه بهداشت: ..... تیم سیار: .....
نشانی منزل: .....
.....
تلفن منزل: .....
سایر نکات: .....

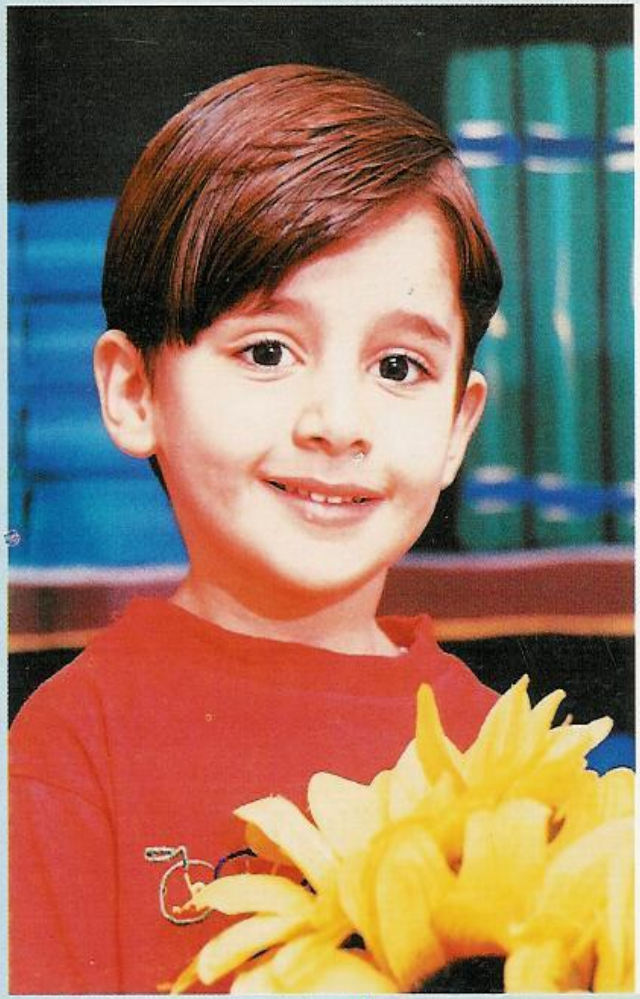
unicef
صندوق کودکان سازمان ملل متحد (یونیسف)

وزارت بهداشت، درمان و آموزش پزشکی،
معاونت سلامت، اداره بهبود تغذیه جامعه

در هر مراجعه به مرکز بهداشتی درمانی یا مطب کارت مراقبت کودک را همراه داشته باشید.

شیر مادر بتنهایی تا پایان ماه ششم زندگی و تداوم آن تا پایان سال دوم برای رشد طبیعی شیرخوار ضروری است.

کارت مراقبت کودک (تغذیه، واکسیناسیون، پایش رشد)



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ویژه پسران

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.....تلفن منزل: .....
سایر نکات: .....

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تغذیه شیرخوار و شروع غذای کمکی

غذای کمکی را از مقدار کم شروع و بتدریج متناسب با اشتهای کودک بیشتر کنید و غذاهای هر مرحله را به مرحله بعد اضافه کنید.

تمام ماه ششم
(شیر مادر برحسب تمایل شیرخوار)


شیر مادر


قطره مولتی‌ویتامین یا آ+د ۲۵ قطره


گوشت قرمز
گوشت مرغ
سبزیها (هویج، سیب زمینی جعفری، گشنیز)
رشته فرنگی یا ماکارونی
برنج
روغن یا کره


۱۵ قطره آهن


سوپ یا آش له شده


عدس و ماش به سوپ کودک اضافه شود


سوپ یا آش

ماه هفتم
(شیر مادر + یک وعده غذا شروع کنید و به سه وعده برسانید)


شیر جوشیده
بادام
شکر
آرد برنج


آب جوشیده سرد


فرنی یا حریره بادام و یا هر نوع حریره محلی


روغن یا کره
انواع کدو
سیب زمینی
هویج
شیر جوشیده


انواع پوره
پوره کدو، پوره هویج
پوره سیب زمینی


خرما

ماه هشتم
(شیر مادر + ۳ وعده غذا)


آب میوه طبیعی


ماست


زرده تخم‌مرغ پخته


انواع نان


سیب یا گلابی یا موز رنده شده

ماه نهم و دهم
(شیر مادر + ۴ تا ۵ وعده غذا)


سایر حبوبات و جوانه گندم


بیسکویت ساده


انواع ماهی


گوشت قرمز خورشتی یا چرخ‌کرده
مرغ
کته نرم با گوشت


انواع میوه

ماه یازدهم تا بیست و چهارم
(۵ وعده غذا + شیر مادر)


غذای خانواده

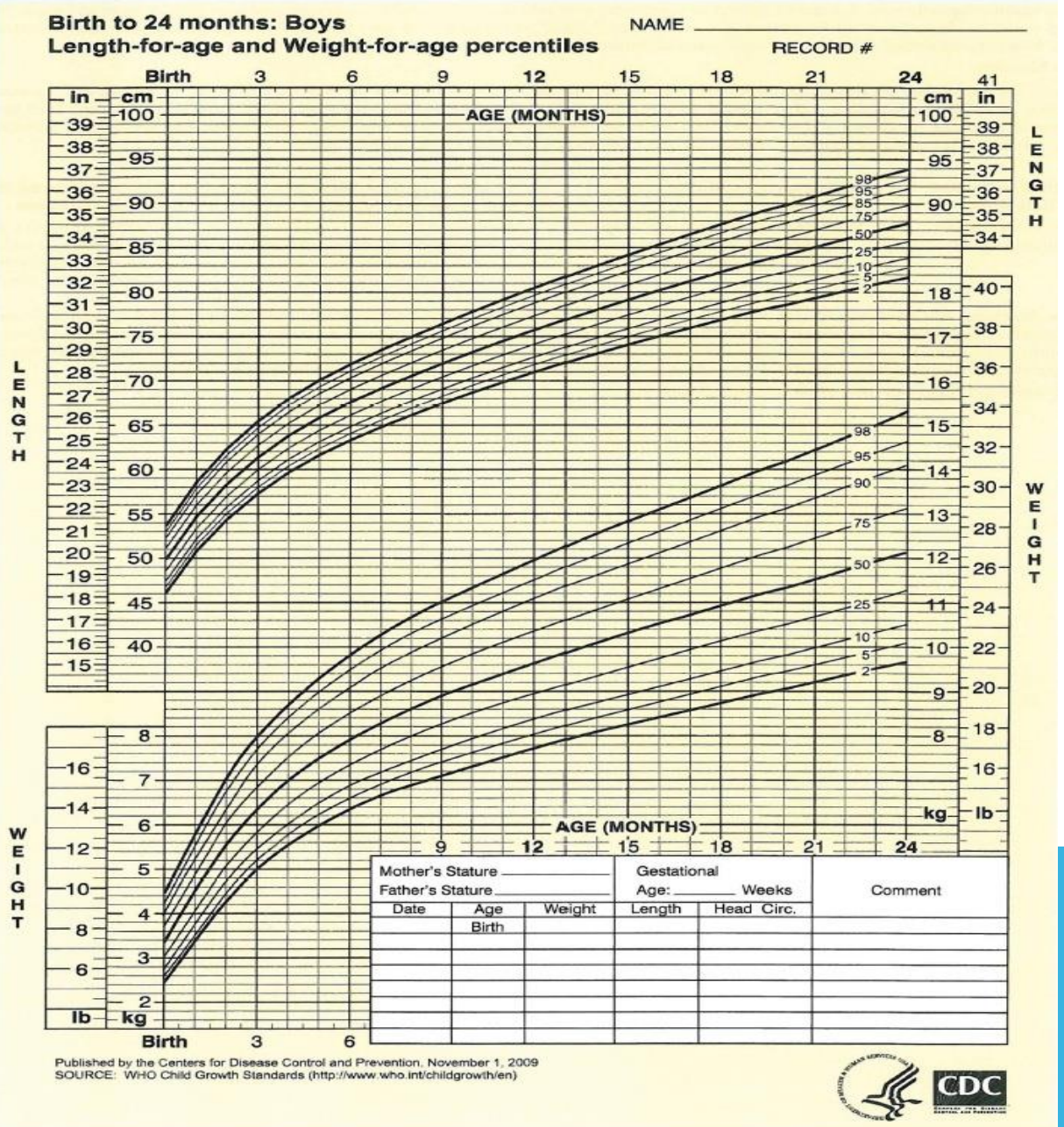

شیر جوشیده یا پاستوریزه
(برای کودکان محروم از شیر مادر)


پنیر پاستوریزه
بستنی پاستوریزه

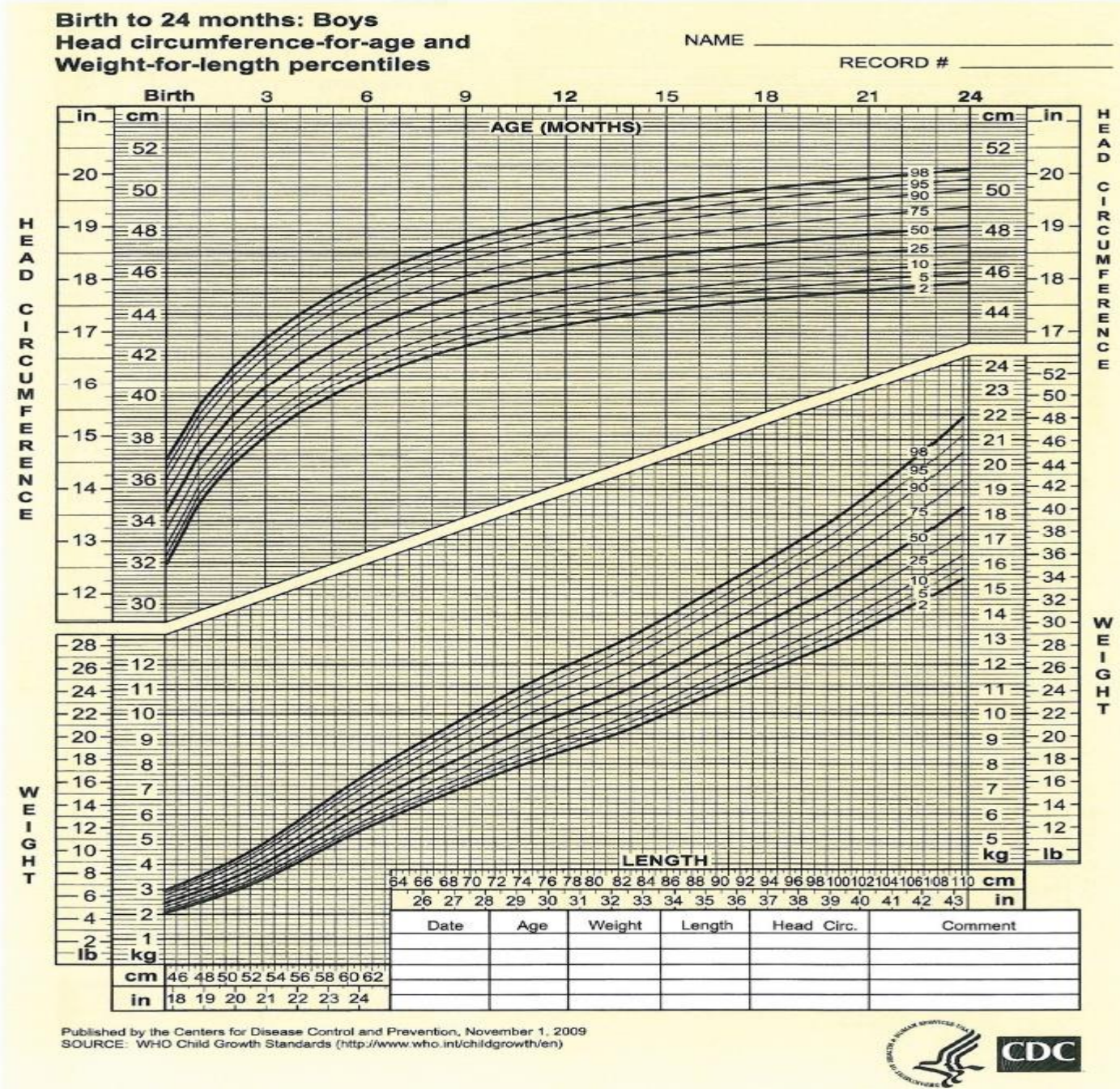

تخم مرغ آب‌پز

- کودکان به تعداد وعده‌های غذایی بیشتری نیاز دارند.
- دست‌های خود را قبل از تهیه و دادن غذا بشویید و از ظرف و قاشق تمیز برای کودک استفاده کنید.

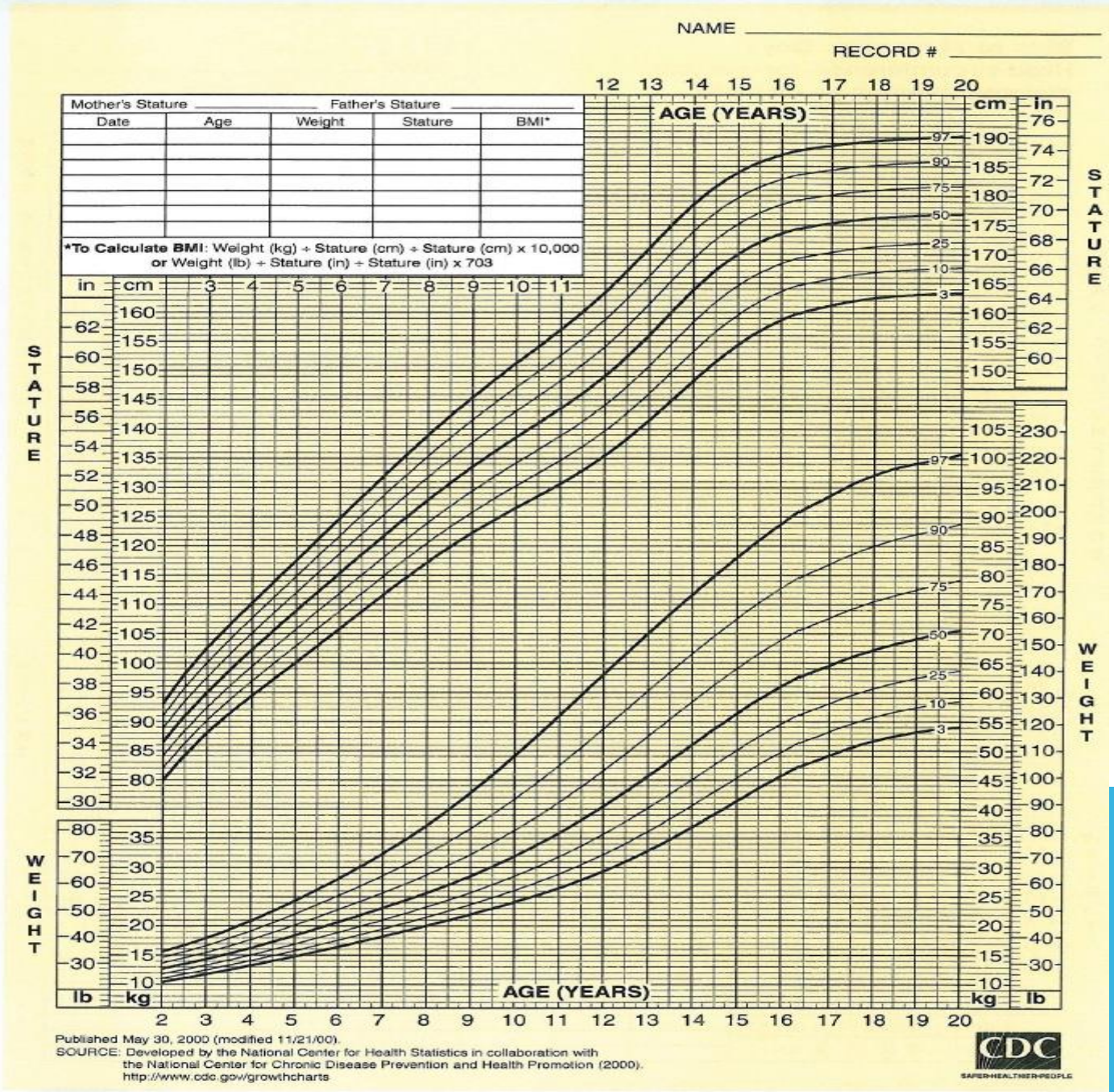
APPENDIX 9. Birth to 24 Months: Boys Length-for-Age and Weight-for-Age Percentiles



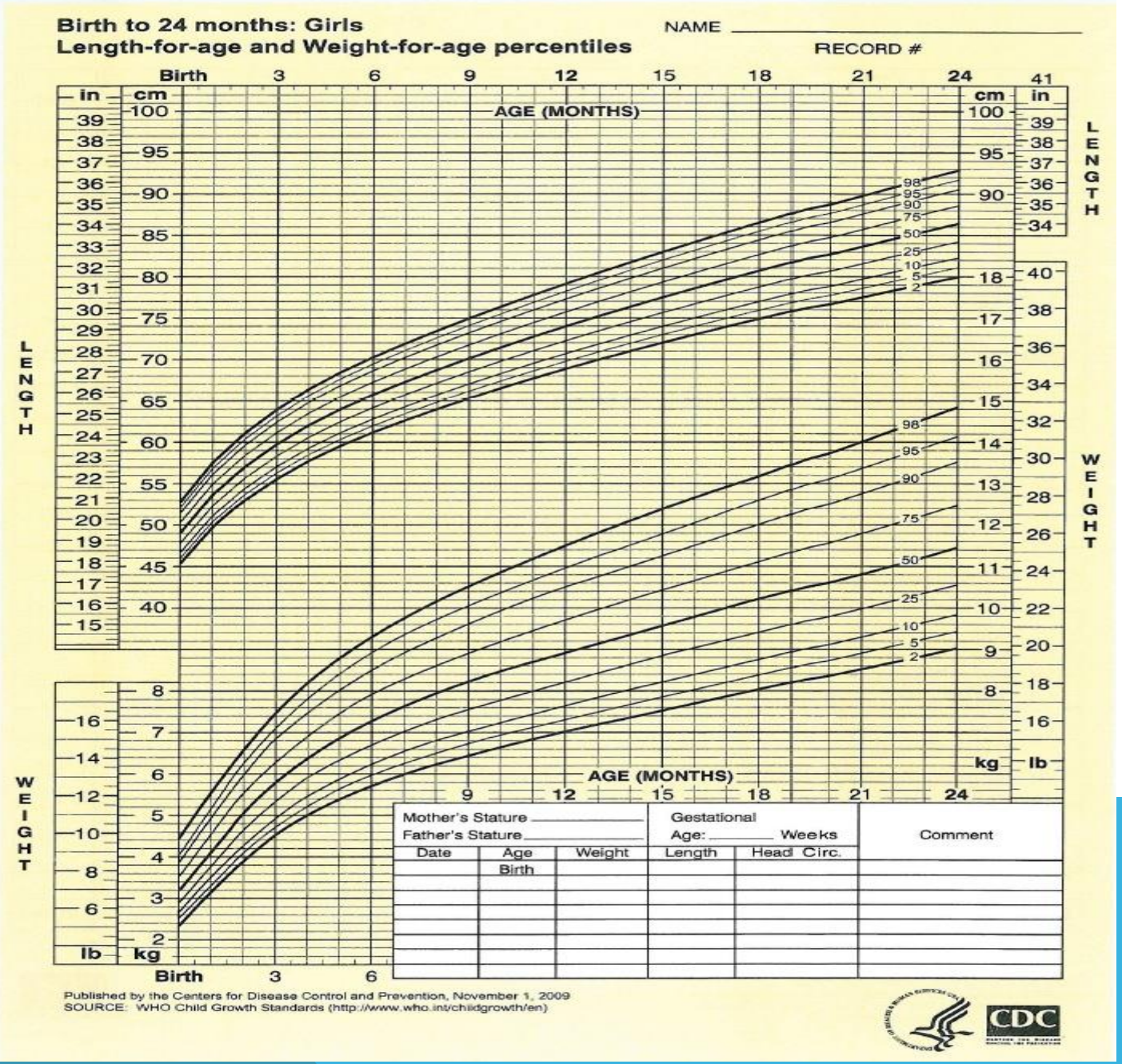
APPENDIX 10. Birth to 24 Months: Boys Head Circumference-for-Age and Weight-for-Length Percentiles



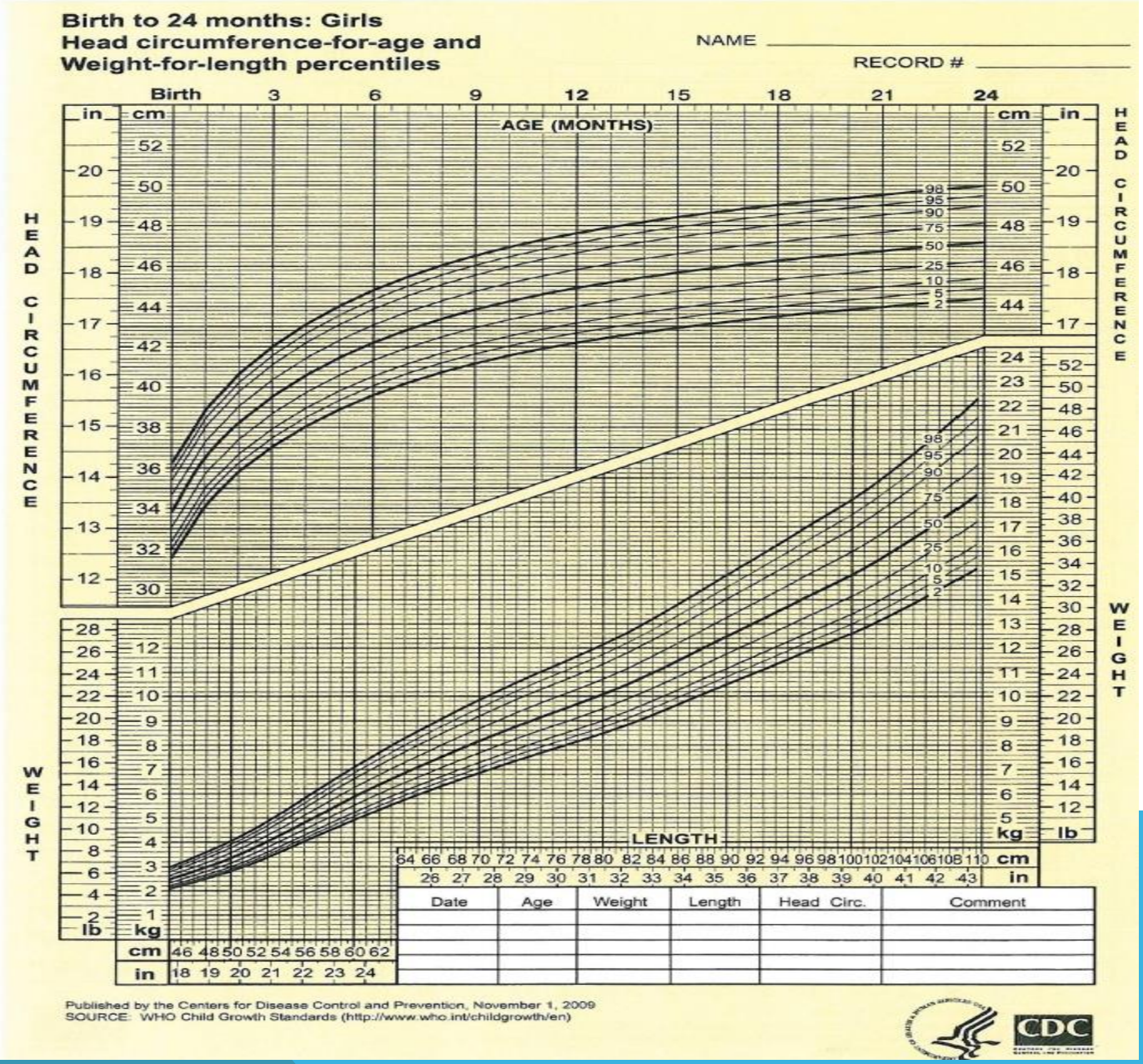
APPENDIX 11. 2 to 20 Years: Boys Stature-for-Age and Weight-for-Age Percentiles



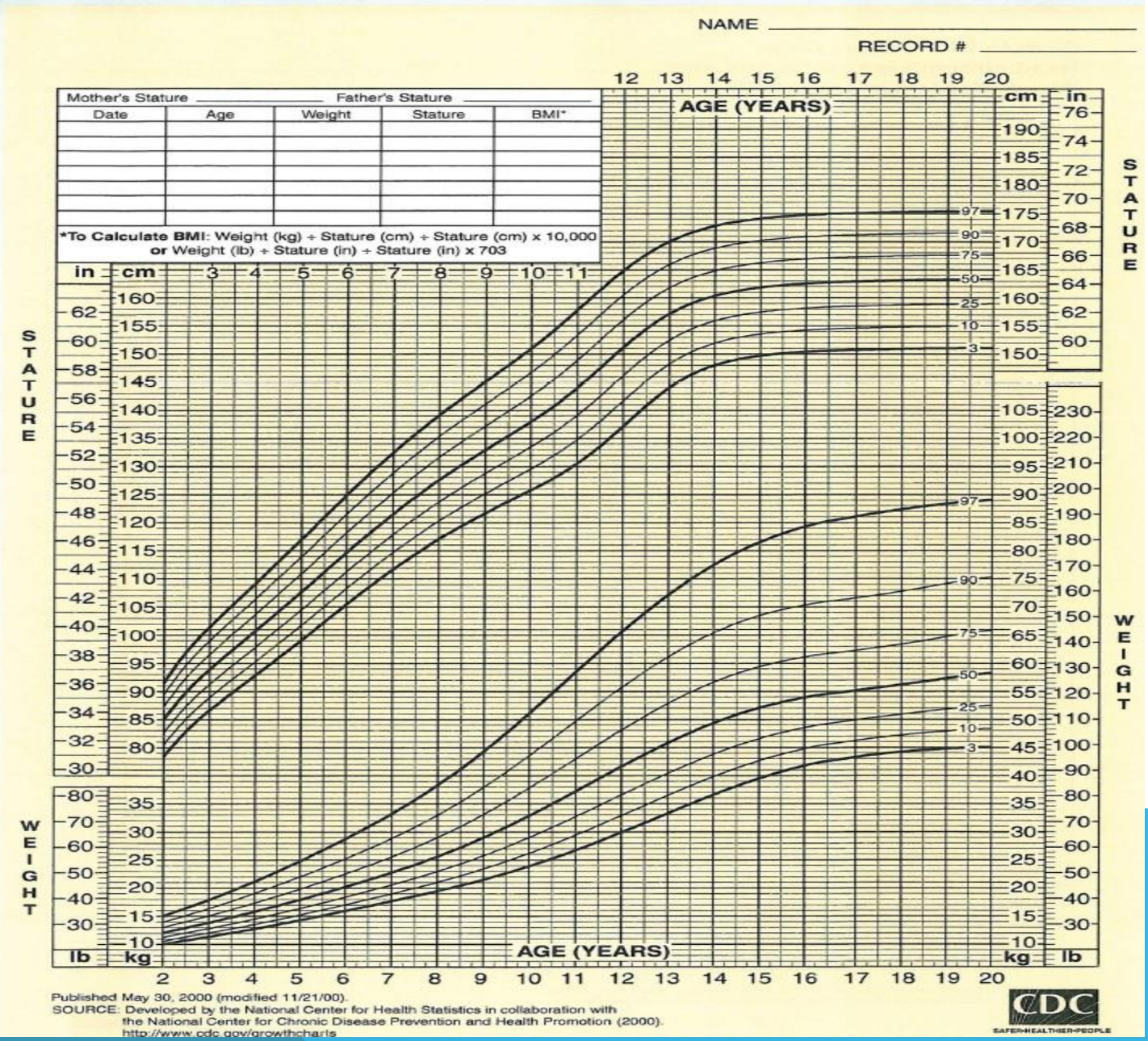
APPENDIX 13. Birth to 24 Months: Girls Length-for-Age and Weight-for-Age Percentil



APPENDIX 14. Birth to 24 Months: Girls Head Circumference-for-Age and Weight-for-Length Percentiles



APPENDIX 15. 2 to 20 Years: Girls Stature-for-Age and Weight-for-Age Percentiles



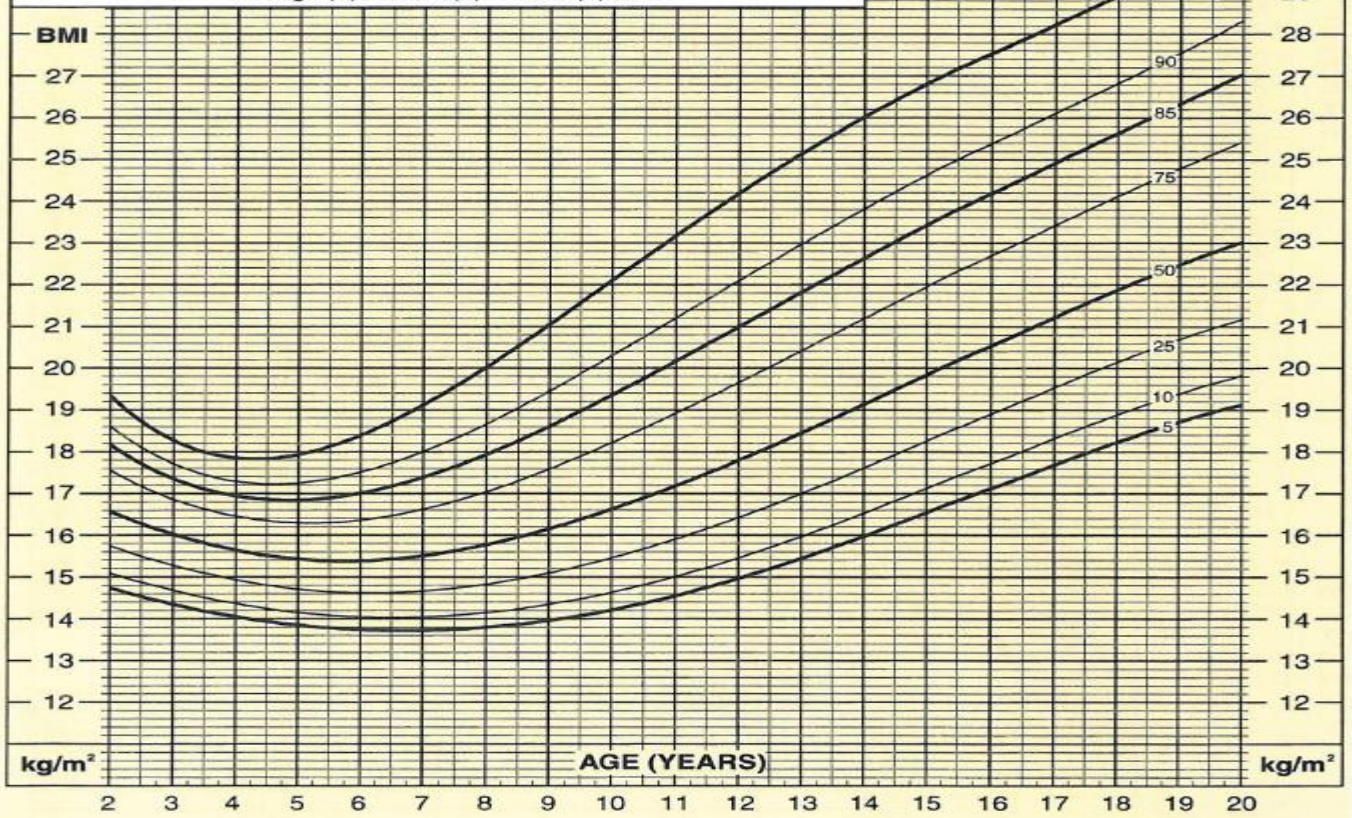
APPENDIX 12. Body Mass Index-for-Age Percentiles: Boys, 2 to 20 Years

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).
http://www.cdc.gov/growthcharts

CDC
SAFER·HEALTHIER·PEOPLE

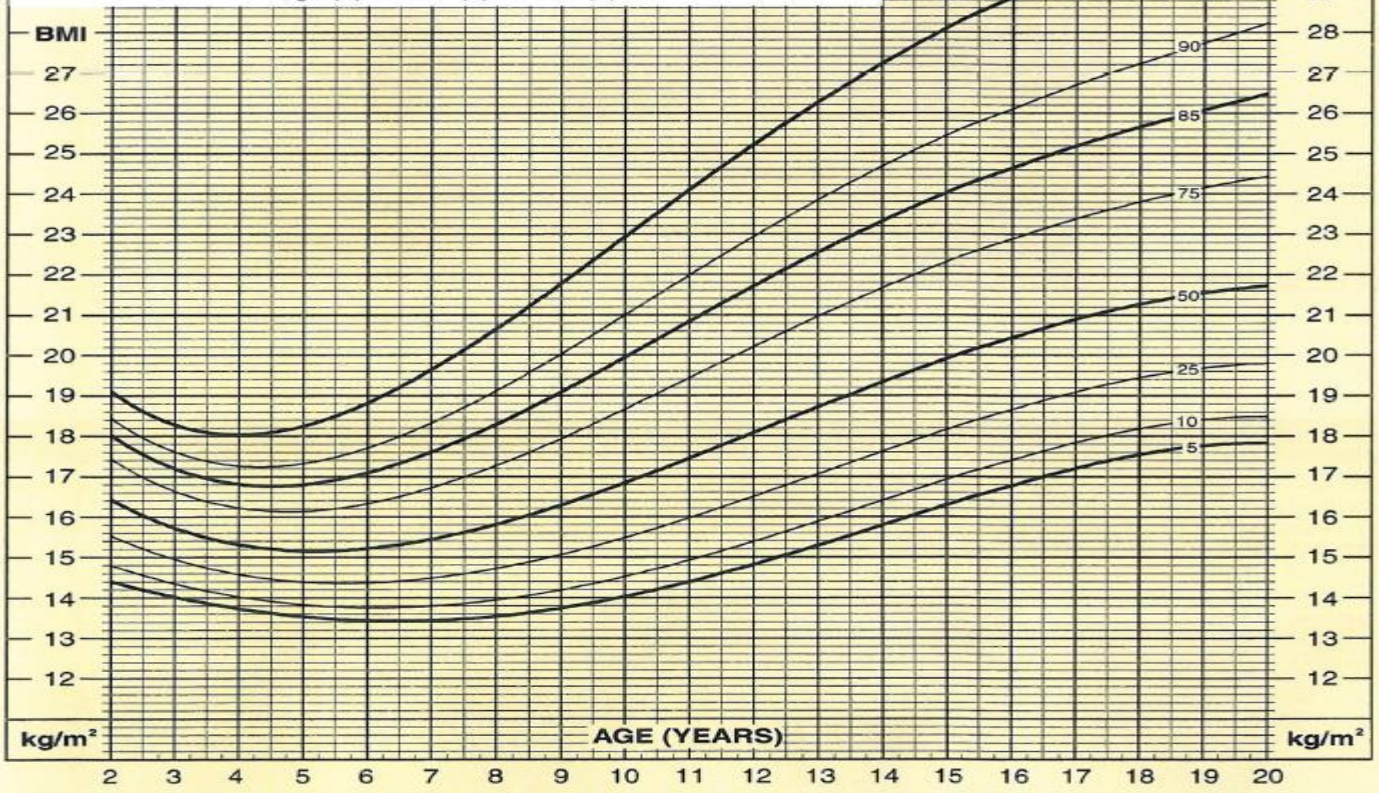
APPENDIX 16. Body Mass Index-for-Age Percentiles: Girls, 2 to 20 Years

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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SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).
http://www.cdc.gov/growthcharts

CDC
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BMI – CALCULATE, CHART, CLASSIFY

BMI is a screening measure, determines further evaluation

BMI based on age and gender and is a population based reference

Underweight BMI <5%

“Normal weight” BMI 5%–84%

At risk for overweight (overweight) BMI >85%–94%

overweight (Obese) BMI 95%–99%

Morbid (severe) obesity BMI >99%

BMI 99th Percentile Cut-Points (kg/m^2)

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

American Academy of Pediatrics. Pediatric Obesity Clinical Decision Support Chart. Elk Grove Village, IL: American Academy of Pediatrics; 2008.

ETIOLOGY:

Etiology - multi factorial

- Interaction of nutritional, psychological, familial, and physiological factors

- Imbalance between
  - energy **intake** (calories obtained from food) **&**
  - energy **output** (calories expended in the basal metabolic rate and physical activity)

ETIOLOGY:

Increasing Caloric intake:

- Eating unsupervised, lack of family meals
- Eating at multiple sites
- Beverages: soda and juice
- snack three times a day, with chips, candy, and other low-nutrient foods and calorically dense food
- ready access to eating and food establishments
- eating tied to sedentary leisure activities
- Children making more food and eating decisions
- larger portion sizes

Portion size :

Increased over the years
“Super sized”

- 3 year olds will eat what is appropriate despite how much is on the plate.
- >5 years children consume more if portion size is larger.

ETIOLOGY:

Decreased physical activity due to:

- Schools with less physical education
- Reduced after school programs
- Elevated safety concerns
- Increased convenience activities
- Increased sedentary activities: TV, computer, video games

ETIOLOGY: IMPACT OF REDUCED PHYSICAL ACTIVITY

TV / video games:

- More time spent watching TV, less time for physical activity: average 2.5 hours / day, 20%>5 hours / day
- BMI and obesity associated with higher amount of time spent watching TV
- Higher cholesterol levels associated with greater amount of time spent watching TV
- 40% of children 1-5 years have TV in their bedroom

ETIOLOGY: IMPACT OF GENETICS

- Plays a role; interacts with environment to produce obesity.
- 30-50% heritable factors responsible but most genetic polymorphisms not identified yet

- “Despite obesity having strong genetic determinants, the genetic composition of the population does not change rapidly. Therefore, the large increase in obesity must reflect major changes in non-genetic factors”.
- Obesity in childhood is not a benign condition, despite the popular belief that overweight children will outgrow their condition

ETIOLOGY…

lower prevalence of obesity among children who:

- regularly eating the evening meal as a family
- obtaining adequate night-time sleep
- having limited screen viewing time

Success is most likely to result from programs that include:

- family involvement (school)
- dietary modifications
- nutrition information
- physical activity
- behavioral strategies

PRINCIPLES OF DIET

- Determine calories needed
- Divided calories required based on the percentage of macronutrients
  - Carbohydrates (45% to 60%)
  - Proteins (10% to 35%)
  - Fat (25% to 40%)
- Prescribed Diet based on exchange list
- Lifestyle modification
  - Physical Activity
  - Modification of dietary habits

    Balance

    Variety

Estimated Energy Expenditure Prediction Equations at Four Physical Activity Levels—cont'd

Weight Maintenance TEE for Overweight and At-Risk for Overweight Boys 3-18 Years (BMI >85th Percentile for Overweight)

TEE = 114 − 50.9 × Age (yr) + PA × (19.5 × Weight [kg] + 1161.4 × Height [m])
in which
PA = Physical activity coefficient:
PA = 1 if PAL is estimated to be ≥ 1.0 < 1.4 (Sedentary)
PA = 1.12 if PAL is estimated to be ≥ 1.4 < 1.6 (Low active)
PA = 1.24 if PAL is estimated to be ≥ 1.6 < 1.9 (Active)
PA = 1.45 if PAL is estimated to be ≥ 1.9 < 2.5 (Very active)

Weight Maintenance TEE for Overweight and At-Risk for Overweight Girls 3-18 Years (BMI >85th Percentile for Overweight)

TEE = 389 − 41.2 × Age (yr) + PA × (15 × Weight [kg] + 701.6 × Height [m])
in which
PA = Physical activity coefficient:
PA = 1 if PAL is estimated to be ≥ 1 < 1.4 (Sedentary)
PA = 1.18 if PAL is estimated to be ≥ 1.4 < 1.6 (Low active)
PA = 1.35 if PAL is estimated to be ≥ 1.6 < 1.9 (Active)
PA = 1.60 if PAL is estimated to be ≥ 1.9 < 2.5 (Very active)

Overweight and Obese Men 19 Years and Older (BMI ≥25 kg/m²)

TEE = 1086 − 10.1 × Age (yr) + PA × (13.7 × Weight [kg] + 416 × Height [m])
in which
PA = Physical activity coefficient:
PA = 1 if PAL is estimated to be ≥ 1 < 1.4 (Sedentary)
PA = 1.12 if PAL is estimated to be ≥ 1.4 < 1.6 (Low active)
PA = 1.29 if PAL is estimated to be ≥ 1.6 < 1.9 (Active)
PA = 1.59 if PAL is estimated to be ≥ 1.9 < 2.5 (Very active)

Overweight and Obese Women 19 Years and Older (BMI ≥25 kg/m²)

TEE = 448 − 7.95 × Age (yr) + PA × (11.4 × Weight [kg] + 619 × Height [m])
where
PA = Physical activity coefficient:
PA = 1 if PAL is estimated to be ≥ 1 < 1.4 (Sedentary)
PA = 1.16 if PAL is estimated to be ≥ 1.4 < 1.6 (Low active)
PA = 1.27 if PAL is estimated to be ≥ 1.6 < 1.9 (Active)
PA = 1.44 if PAL is estimated to be ≥ 1.9 < 2.5 (Very active)

Normal and Overweight or Obese Men 19 Years and Older (BMI ≥18.5 kg/m²)

TEE = 864 − 9.72 × Age (yr) + PA × (14.2 × Weight [kg] + 503 × Height [m])
in which
PA = Physical activity coefficient:
PA = 1 if PAL is estimated to be ≥ 1 < 1.4 (Sedentary)
PA = 1.12 if PAL is estimated to be ≥ 1.4 < 1.6 (Low active)
PA = 1.27 if PAL is estimated to be ≥ 1.6 < 1.9 (Active)
PA = 1.54 if PAL is estimated to be ≥ 1.9 < 2.5 (Very active)

Normal and Overweight or Obese Women 19 Years and Older (BMI ≥18.5 kg/m²)

TEE = 387 − 7.31 × Age (yr) + PA × (10.9 × Weight [kg] + 660.7 × Height [m])
in which
PA = Physical activity coefficient:
PA = 1 if PAL is estimated to be ≥ 1 < 1.4 (Sedentary)
PA = 1.14 if PAL is estimated to be ≥ 1.4 < 1.6 (Low active)
PA = 1.27 if PAL is estimated to be ≥ 1.6 < 1.9 (Active)
PA = 1.45 if PAL is estimated to be ≥ 1.9 < 2.5 (Very active)

From Institute of Medicine, Food and Nutrition Board: Dietary reference intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein, and amino acids, Washington, DC, 2002, The National Academies Press, www.nap.edu.

BMI, Body mass index; *EER*, estimated energy requirement; *PA*, physical activity; *PAL*, physical activity level; *TEE*, total energy expenditure.

*EER is the average dietary energy intake that is predicted to maintain energy balance in a healthy adult of a defined age, gender, weight, height, and level of physical activity consistent with good health. In children and pregnant and lactating women, the EER includes the needs associated with the deposition of tissues or the secretion of milk at rates consistent with good health.

†PAL is the physical activity level that is the ratio of the total energy expenditure to the basal energy expenditure.

‡TEE is the sum of the resting energy expenditure, energy expended in physical activity, and the thermic effect of food.

§BMI is determined by dividing the weight (in kilograms) by the square of the height (in meters).

Estimated Energy Requirements for Adolescent Males

Age	Reference Weight (kg [lb])	Reference Height (m [in])	Estimated Energy Requirements (kcal/day)			
			Sedentary PAL*	Low Active PAL*	Active PAL*	Very Active PAL*
9	28.6 (63.0)	1.34 (52.8)	1505	1762	2018	2334
10	31.9 (70.3)	1.39 (54.7)	1601	1875	2149	2486
11	35.9 (79.1)	1.44 (56.7)	1691	1985	2279	2640
12	40.5 (89.2)	1.49 (58.7)	1798	2113	2428	2817
13	45.6 (100.4)	1.56 (61.4)	1935	2276	2618	3038
14	51.0 (112.3)	1.64 (64.6)	2090	2459	2829	3283
15	56.3 (124)	1.70 (66.9)	2223	2618	3013	3499
16	60.9 (134.1)	1.74 (68.5)	2320	2736	3152	3663
17	64.6 (142.3)	1.75 (68.9)	2366	2796	3226	3754
18	67.2 (148)	1.76 (69.3)	2383	2823	3263	3804

Data from Institute of Medicine, Food and Nutrition Board: Dietary reference intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein, and amino acids, Washington, DC, 2002, National Academies Press.

PAL, Physical activity level.

*PAL categories, which are based on walking per day at 2-4 mph, are as follows: sedentary, no additional activity; low active, 1.5-2.9 miles/day; active, 3-5.8 miles/day; and very active, 7.5-14 miles/day (see Table 2-3).

Estimated Energy Requirements for Adolescent Females

Age	Reference Weight (kg [lb])	Reference Height (m [in])	Estimated Energy Requirements (kcal/day)			
			Sedentary PAL*	Low Active PAL*	Active PAL*	Very Active PAL*
9	29.0 (63.9)	1.33 (52.4)	1390	1635	1865	2248
10	32.9 (72.5)	1.38 (54.3)	1470	1729	1972	2376
11	37.2 (81.9)	1.44 (56.7)	1538	1813	2071	2500
12	40.5 (89.2)	1.49 (58.7)	1798	2113	2428	2817
13	44.6 (91.6)	1.51 (59.4)	1617	1909	2183	3640
14	49.4 (108.8)	1.60 (63)	1718	2036	2334	3831
15	52.0 (114.5)	1.62 (63.8)	1731	2057	2362	2870
16	53.9 (118.7)	1.63 (64.2)	1729	2059	2368	2883
17	55.1 (121.4)	1.63 (64.2)	1710	2042	2353	2871
18	56.2 (123.8)	1.63 (64.2)	1690	2024	2336	2858

Data from Institute of Medicine, Food and Nutrition Board: Washington, DC, 2002, National Academies Press.

PAL, Physical activity level.

*PAL categories, which are based on walking per day at 2-4 mph are as follows: sedentary, no additional activity; low active, 1.5-2.9 miles/day; active, 3-5.8 miles/day; and very active, 7.5-14 miles/day (see Table 2-3).

Protein Dietary Reference Intakes (DRIs) for Children through Age 13 Years

		Protein
Age	**Grams/Day***	**Grams/Kilogram/Day**
1-3 yr	13 g/day	1.10 g/kg/day
4-8 yr	19 g/day	0.95 g/kg/day
9-13 yr	34 g/day	0.95 g/kg/day

Adapted from Feucht S: Dietary reference intakes (DRI) review: case studies illustrating energy and protein for children and adolescents with special needs, Nutr Focus Newsletter 20:1, 2005.

*Recommended dietary allowance for reference individual (g/day).

Mean Intakes of Select Nutrients Compared to DRIs: Adolescent Males

	Mean Intake	9-13 year old RDA/AI	14-18 year old RDA/AI
Vitamin A (mcg RAE)	651	600	700
Vitamin E (mg)	7.3	11	15
Thiamin (mg)	2.05	0.9	1.2
Riboflavin (mg)	2.65	0.9	1.3
Niacin (mg)	31.1	12	16
Vitamin B_6 (mg)	2.34	1	1.3
Folate (Ug DEF)	658	300	400
Vitamin B_{12} (mcg)	7.31	1.8	2.4
Vitamin C (mg)	96.9	45	75
Phosphorus (mg)	1586	1250	1250
Magnesium (mg)	287	240	410
Iron (mg)	19.6	8	11
Zinc (mg)	14.7	8	11
Calcium (mg)	1186	1300	1300
Sodium (mg)	4266	1500	1500
Fiber (g)	15.2	31	38

Data sources: U.S. Department of Agriculture, Agricultural Research Service. 2008. Nutrient Intakes from Food: Mean Amounts Consumed per Individual, One Day, 2005-2006. Available: www.ars.usda.gov/ba/bhnrc/fsrg. Accessed Jan 29, 2010.

AI, Adequate intake; *DRI*, dietary reference intake; *NA*, not available; *RDA*, recommended dietary allowance.

Mean Intakes of Select Nutrients Compared to DRIs: Adolescent Females

	Mean Intake	9- to 13-Year Old Female RDA/AI	14 to 18-year-ol females RDA/AI
Vitamin A (mcg RAE)	474	600	700
Vitamin E (mg)	6.1	11	15
Thiamin (mg)	1.38	0.9	1
Riboflavin (mg)	1.75	0.9	1
Niacin (mg)	19.3	12	14
Vitamin B_6 (mg)	1.52	1	1.2
Folate (Ug DEF)	482	300	400
Vitamin B_{12} (mcg)	3.96	1.8	2.4
Vitamin C (mg)	75.2	45	65
Phosphorus (mg)	1077	1250	1250
Magnesium (mg)	216	240	360
Iron (mg)	13.3	8	15
Zinc (mg)	9.6	8	9
Calcium (mg)	849	1300	1300
Sodium (mg)	2950	1500	1500
Fiber (g)	12.3	26	26

Data sources: U.S. Department of Agriculture, Agricultural Research Service. 2008. Nutrient Intakes from Food: Mean Amounts Consumed per Individual, One Day, 2005-2006. Available: www.ars.usda.gov/ba/bhnrc/fsrg. Accessed Jan 29, 2010.

AI, Adequate intake; *DRI*, dietary reference intake; *NA*, not available; *RDA*, recommended dietary allowance.

Feeding Guide for Children

Feeding Guide for Children[a]

Food	Age, y: 2 to 3 Portion Size	2 to 3 Servings	4 to 6 Portion Size	4 to 6 Servings	7 to 12 Portion Size	7 to 12 Servings	Comments
Milk and dairy	½ c (4 oz)	4–5 16–20 oz total	½–¾ c (4–6 oz)	3–4 24–32 oz total	½–1 c (4–8 oz)	3–4 24–32 oz total	The following may be substituted for ½ c fluid milk: ½–¾ oz cheese, ½ cup yogurt, 2½ 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 *Vegetables* Cooked Raw[b]		4–5 2–3 tbsp Few pieces		4–5 3–4 tbsp Few Pieces		3–4 ¼–½ c Several pieces	Include one green leafy or yellow vegetable for vitamin A, such as carrots, spinach, broccoli, winter squash, or greens
Fruit Raw Canned Juice	 ½–1 small 2–4 tbsp 3–4 oz		 ½–1 small 4–6 tbsp 4 oz		 1 medium ¼–½ 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		3–4 ½–1 slice ¼–½ c ½–1 c		3–4 1 slice ½ c 1 c		4–5 1 slice ½–1 c 1 c	The following may be substituted for 1 slice of bread: ½ c spaghetti, macaroni, noodles, or rice; 5 saltines; ½ English muffin or bagel; 1 tortilla; corn grits or posole

[a]Adapted 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.

[b]Do not give to young children until they can chew well.

Suggested Portion Sizes for Children*

These suggestions are not necessarily appropriate for all children (and may be inappropriate for some children with medical conditions that greatly affect nutrient needs). They are intended to serve as a general framework that can be individualized based on a child's condition and growth pattern.

	1- to 3-Year-Olds	4- to 6-Year-Olds	7- to 12-Year-Olds	Comments
Grain Products	Bread: ½ to 1 slice Rice, pasta, potatoes: ¼ to ½ cup Cooked cereal: ¼ to ½ cup Ready-to-eat cereal: ¼ to ½ cup Tortilla: ½ to 1	Bread: 1 slice Rice, pasta, potatoes: ½ cup Cooked cereal: ½ cup Ready-to-eat cereal: ¾ to 1 cup Tortilla: 1	Bread: 1 slice Rice, pasta, potatoes: ½ cup Cooked cereal: ½ cup Ready-to-eat cereal: 1 cup Tortilla: 1	Include whole grain foods and enriched grain products.
Vegetables	Cooked or pureed: 2 to 4 Tablespoons Raw: few pieces, if child can chew well	Cooked or pureed: 3 to 4 Tablespoons Raw: few pieces	Cooked or pureed: ½ cup Raw: ½ to 1 cup	Include one green leafy or yellow vegetable for vitamin A, such as spinach, carrots, broccoli, or winter squash.
Fruit	Raw (apple, banana, etc.): ½ to 1 small, if child can chew well Canned: 2 to 4 Tablespoons Juice: 3 to 4 ounces	Raw (apple, banana, etc.): ½ to 1 small, if child can chew well Canned: 4 to 8 Tablespoons Juice: 4 ounces	Raw (apple, banana, etc.): 1 small Canned: ¼ cup Juice: 5 ounces	Include one vitamin C–rich fruit, vegetable, or juice, such as citrus juices, an orange, grapefruit sections, strawberries, melon in season, a tomato, or broccoli.
Milk and Dairy Products	Milk, yogurt, pudding: 2 to 4 ounces Cheese: ¼ ounce	Milk, yogurt, pudding: ½ to ¾ cup Cheese: 1 ounce	Milk, yogurt, pudding: 1 cup Cheese: 1½ ounces	
Meat, Poultry, Fish, Other Protein	Meat, poultry, fish: 1 to 2 ounces Eggs: ½ to 1 Peanut butter: 1 Tablespoon Cooked dried beans: 4 to 5 Tablespoons	Meat, poultry, fish: 1 to 2 ounces Eggs: 1 to 2 Peanut butter: 2 Tablespoons Cooked dried beans: 4 to 8 Tablespoons	Meat, poultry, fish: 2 ounces Eggs: 2 Peanut butter: 3 Tablespoons Cooked dried beans: 1 cup	

Modified from Lowenberg ME: Development of food patterns in young children. In Trahms CM, Pipes P: Nutrition in infancy and childhood, ed 6, St Louis, 1997, WCB/McGraw-Hill and Harris AB, et al: *Nutrition strategies for children with special needs*, 1999, USC University Affiliated Program, Los Angeles.

*This is a guide to a basic diet. Fats, oils, sauces, desserts, and snack foods provide additional kilocalories to meet the needs of a growing child. Foods can be selected from this pattern for meals and snacks.

Recommended Number of Servings for Adolescents Ages 13 and 16 Years Based on Activity Level

	Grains (ounce)	Vegetables (cup)	Fruit (cup)	Milk (cup)	Meat or Beans (ounce)	Whole Grains (ounce)*
Males						
13 Years						
≤30 min physical activity/day	6	2.5	2	3	5.5	3
30-60 min physical activity/day	7	3	2	3	6	3.5
≥60 min physical activity/day	9	3.5	2	3	6.5	4.5
16 Years						
≤30 min physical activity/day	8	3	2	3	6.5	4
30-60 min physical activity/day	10	3.5	2.5	3	7	5
≥60 min physical activity/day	10	4	2.5	3	7	4
Females						
13 Years						
≤30 min physical activity/day	5	2	1.5	3	5	3
30-60 min physical activity/day	6	2.5	2	3	5.5	3
≥60 min physical activity/day	7	3	2	3	6	3.5
16 Years						
≤30 min physical activity/day	6	2.5	1.5	3	5	3
30-60 min physical activity/day	6	2.5	2	3	5.5	3
≥60 min physical activity/day	8	3	2	3	6.5	4

*Number of servings of whole grains are not in addition to but are included in the number of servings of grains.

USDA FOOD PYRAMID:

Be Physically Active Every Day

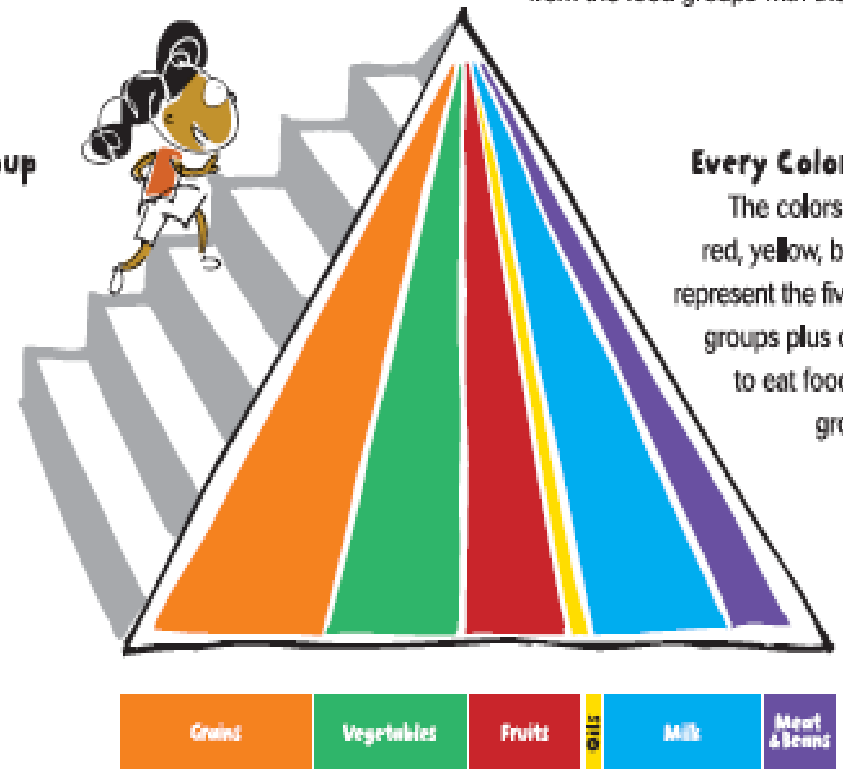
The person climbing the stairs reminds you to do something active every day, like running, walking the dog, playing, swimming, biking, or climbing lots of stairs.

Eat More From Some Food Groups Than Others

Did you notice that some of the color stripes are wider than others? The different sizes remind you to choose more foods from the food groups with the widest stripes.

Choose Healthier Foods From Each Group

Why are the colored stripes wider at the bottom of the pyramid? Every food group has foods that you should eat more often than others; these foods are at the bottom of the pyramid.



Every Color Every Day

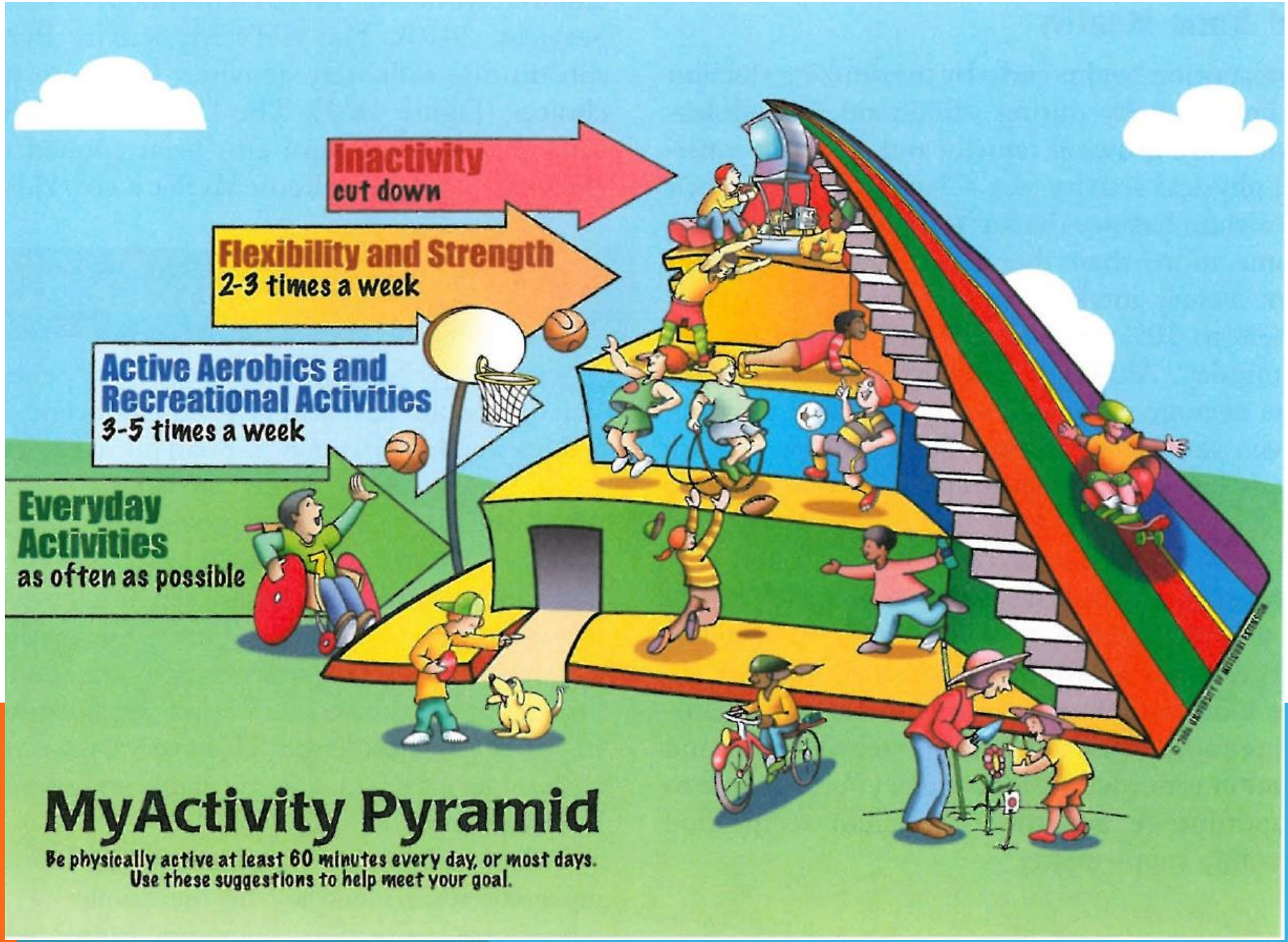
The colors orange, green, red, yellow, blue, and purple represent the five different food groups plus oils. Remember to eat foods from all food groups every day.

Make Choices That Are Right for You

MyPyramid.gov is a Web site that will give everyone in the family personal ideas on how to eat better and exercise more.

Take One Step at a Time

You do not need to change overnight what you eat and how you exercise. Just start with one new, good thing, and add a new one every day.


Inactivity
cut down
Flexibility and Strength
2-3 times a week
Active Aerobics and Recreational Activities
3-5 times a week
Everyday Activities
as often as possible
MyActivity Pyramid
Be physically active at least 60 minutes every day, or most days.
Use these suggestions to help meet your goal.

MyActivity Pyramid

Be physically active at least 60 minutes every day, or most days.
Use these suggestions to help meet your goal:

Everyday Activities

As often as possible

- Playing outside
- Helping with chores around the house or yard
- Taking the stairs instead of the elevator
- Picking up toys
- Walking

Active Aerobics and Recreational Activities

3-5 times a week

- Playing basketball
- Biking
- Playing baseball or softball
- Rollerblading
- Skateboarding
- Playing soccer
- Swimming
- Playground games
- Jumping rope

Flexibility and Strength

2-3 times a week

- Practicing martial arts
- Rope climbing
- Stretching
- Practicing yoga
- Doing push-ups and pull-ups

Inactivity

Cut down

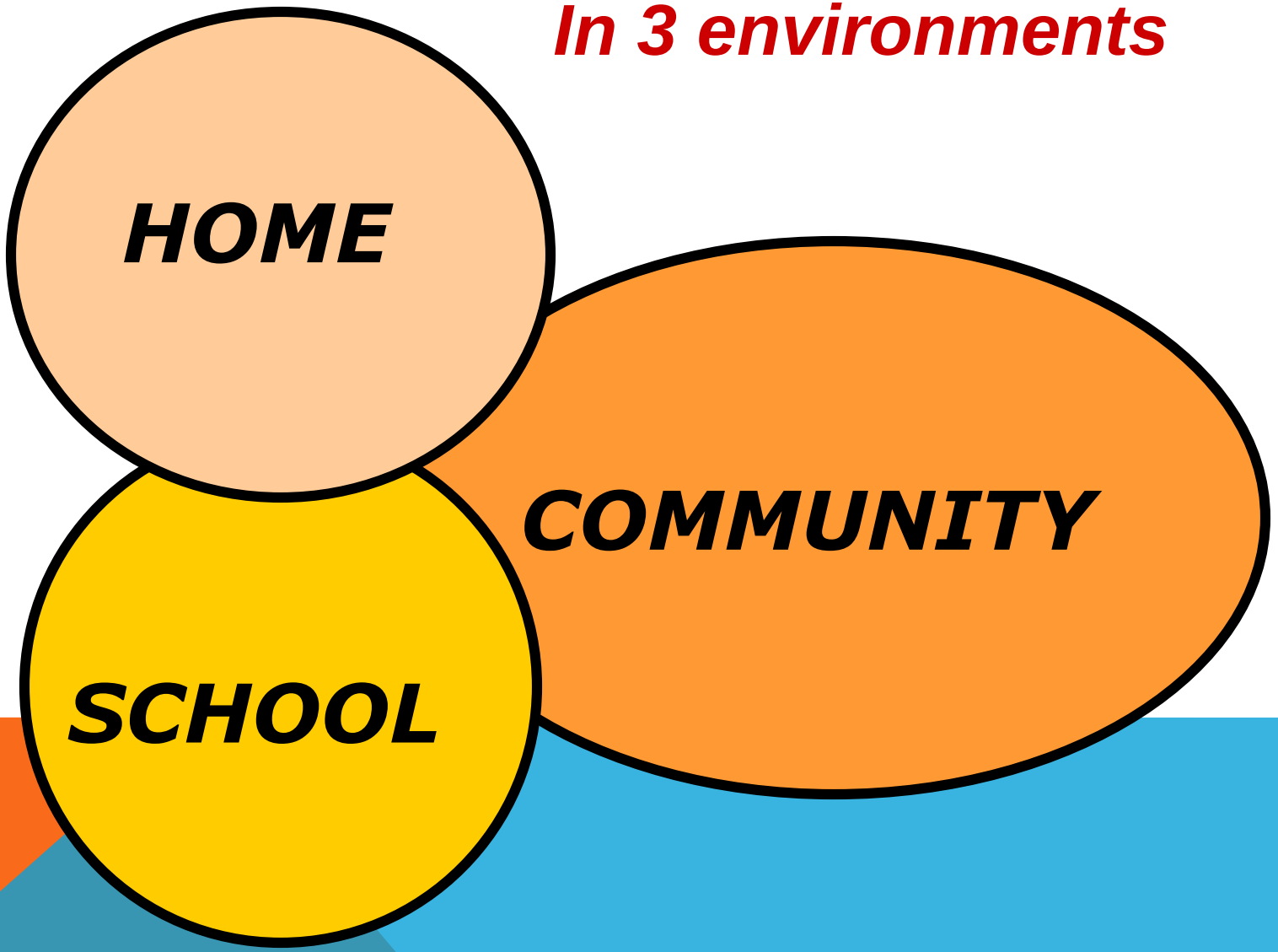
- Watching television
- Playing on the computer
- Sitting for too long
- Playing video games

Find your balance between food and fun:

- Move more. Aim for at least 60 minutes every day, or most days.
- Walk, dance, bike, rollerblade – it all counts. How great is that!

Prevention

Children grow up In 3 environments

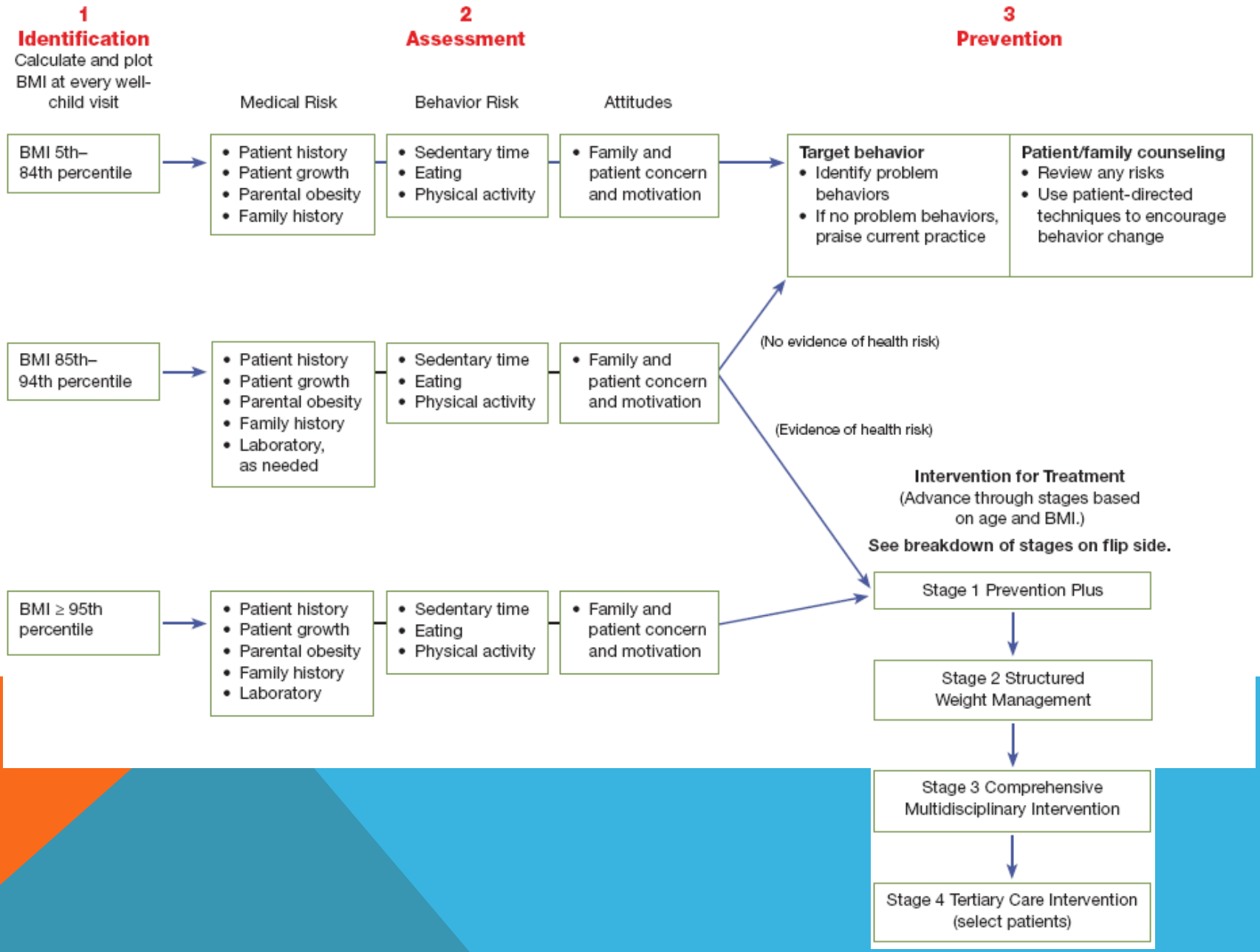


Prevention:

Prevention of childhood obesity:

- families
- schools (improved nutritional quality of food sold and served, increased physical activity, wellness education)
- industry (improved nutrition information for consumers clear media messages)
- health care professionals (tracking BMI, providing counseling for children and families)
- communities and government (better access to healthy foods, improved physical activity opportunities)

Universal Assessment of Obesity Risk: Steps to Prevention and Treatment



Medical Screening by BMI Category[a]

BMI Percentile	Medication Use	Review of Symptoms	Family History (1st and 2nd degree relatives)	Physical Examination	Laboratory Tests
5th–84th (healthy weight)	Medications that may affect weight gain (eg, neuropsychiatric)		Obesity, type 2 diabetes, hypertension, lipid, heart disease	BP (correct cuff)	
85th–94th (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	• Fasting lipid profile • If other risk factors,[b] fasting glucose, ALT, AST every 2 years
95th–<99th (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	• Fasting lipid profile • Fasting glucose, ALT, AST every 2 years
≥99th	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	• 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.

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

[b]Risk 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.

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

[a]These conditions are often asymptomatic.

Obesity Assessment

Obesity Assessment: Physical Examination Findings and Possible Etiologies

System	Findings	Possible Explanations
Anthropometry	• High body mass index percentile • Short stature	• Overweight or obesity • Underlying endocrine or genetic condition
Vital signs	• Elevated blood pressure	• Hypertension if systolic or diastolic blood pressure >95th percentile for age, gender, and height on ≥3 occasions
Skin	• Acanthosis nigricans • Hirsutism, acne • Irritation, inflammation • Violaceous striae	• Common in obese children, especially when skin is dark; increased risk of insulin resistance • Polycystic ovary syndrome • Consequence of severe obesity • Cushing syndrome
Eyes	• Papilledema, cranial nerve VI paralysis	• Pseudotumor cerebri
Throat	• Tonsillar hypertrophy	• Obstructive sleep apnea
Neck	• Goiter	• Hypothyroidism
Chest	• Wheezing	• Asthma (may explain or contribute to exercise intolerance)
Abdomen	• Tenderness • Hepatomegaly	• Gastroesophageal reflux disorder, gall bladder disease, nonalcoholic fatty liver disease (NAFLD)[a] • NAFLD[a]
Reproductive	• Tanner stage • Apparent micropenis • Undescended testis/micropenis	• 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	• Abnormal gait, limited hip range of motion • Bowing of tibia • Small hands and feet, polydactyly	• Slipped capital femoral epiphysis • Blount disease • Prader-Willi syndrome, Bardet-Biedl syndrome

*These conditions are usually without signs.

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.
[a]From Hannon TS, Rao G, Arslanian SA. Childhood obesity and type 2 diabetes mellitus. *Pediatrics*. 2005;116:475.
[b]Polyuria, 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

[a]Adapted from American Academy of Pediatrics Committee on Nutrition. Cholesterol in children. *Pediatrics*. 1998;101:145.

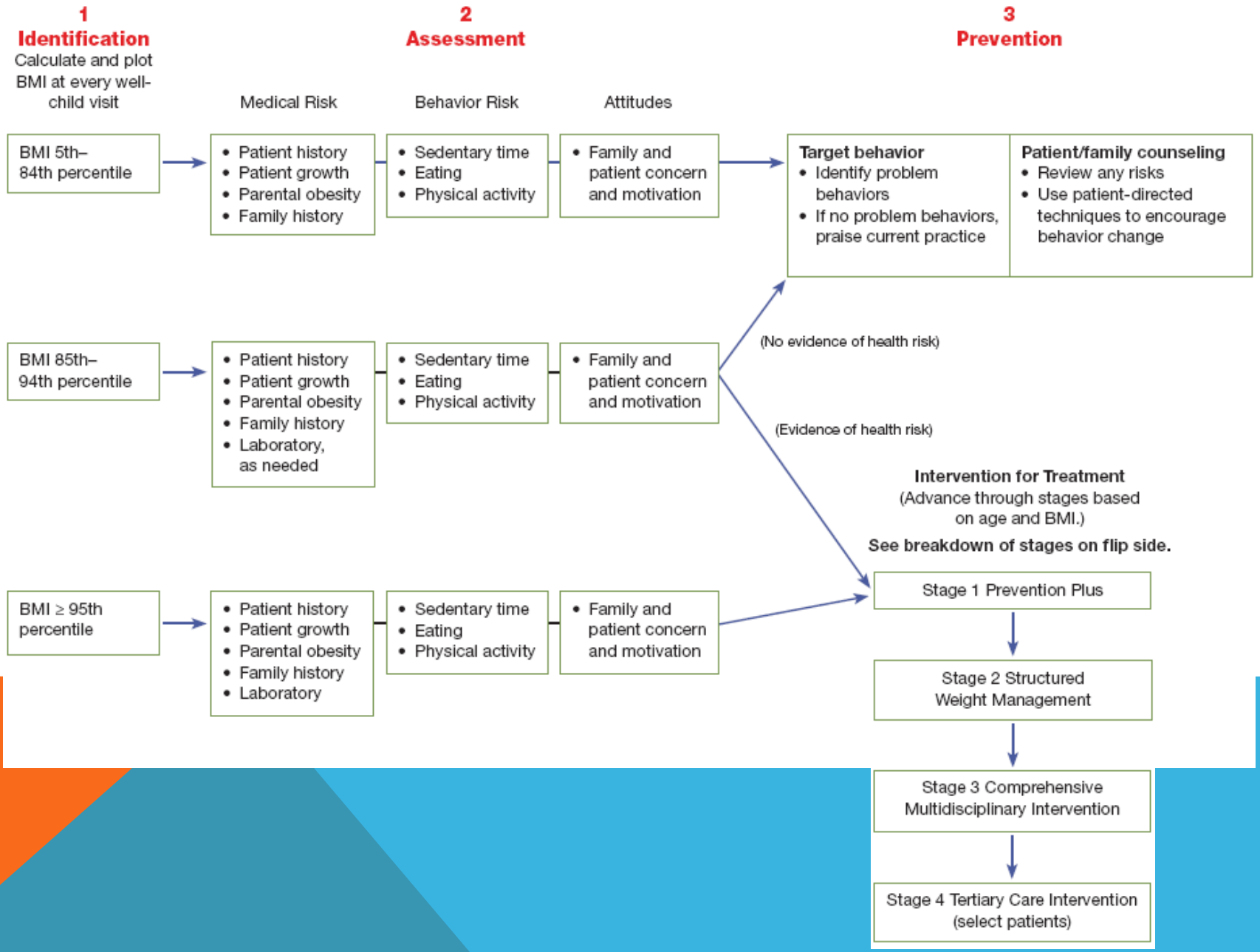
Triglycerides[a]

	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

[a] From 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.

Universal Assessment of Obesity Risk: Steps to Prevention and Treatment



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

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

- 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

- 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.

Pediatric Obesity Clinical Decision Support Chart

Clinical Guidelines

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.

Stage 2 Structured Weight Management

Primary Care Provider with appropriate training

Dietary habits and physical activity

- 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

- 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** • Same as Stage 2 **Behavioral counseling** • 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** • 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 • 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

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.
[a]If greater loss is noted, monitor for causes of excessive weight loss.


Thanks for your attention