

ANTHROPOMETRIC TRAINING MANUAL



Division of Women, Infants and Children (WIC)

June, 2010



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Anthropometric Training Manual

Part 1: Anthropometric Technique and Data Entry

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Introduction

Learner Objectives

The learner will be able to:

- Define anthropometry.
- State three standards which must be met for measurement to be useful.
- Identify sources of measurement errors.

Definition of Anthropometry

Anthropometry is the measurement of the size, weight, and proportions of the human body.

Measurement Standards

Standard procedures must be followed each time to ensure precise measurements. Precise measurements are crucial because:

- Measurements are used to monitor growth, assess nutrition status, and determine WIC eligibility.
- A small measurement error can result in a large error on the growth chart. For example, an error of $\frac{3}{4}$ of an inch can result in a 25%ile deviation on the chart.
- WIC measurements are tabulated by the WIC data system and used for Program evaluation.
- The Centers for Disease Control in Atlanta use WIC measurements as part of their surveillance program to monitor the health and nutrition status of populations in the U.S.

Measurements must be recorded over time.

- Growth problems (including growth retardation and obesity) can be detected early by careful measuring, recording, and plotting of growth measures at regular intervals.

Measurements must be part of a total health assessment.

- Growth measurements must be used as part of a total nutrition assessment that also includes biochemical, clinical, dietary, environment and other assessments (ABCDEO of *Value Enhanced Nutrition Assessment*). Interpretation of growth measurements must take all of these factors into consideration.

How to Avoid Measurement Errors

Make sure that measurements are accurate by:

- Using the correct equipment and checking it regularly for accuracy.
- Using the correct technique and always following standard procedures.

Frequent causes of errors in measurement due to *equipment*:

- Failure to use correct equipment. (Do not measure height with the rod on adult scales. Never use spring type scales.)
- Failure to maintain and calibrate equipment. (Keep weights at far right when scale is not in use.)

- Failure to properly install/maintain the equipment.

Frequent causes of errors in measurement due to *technique*:

- Failure to use a right angle headboard when measuring height.
- Failure to balance scales at zero before each use.
- Measuring height with shoes on, with feet away from wall or with barrettes, etc. in hair.
- Weighing in excess clothing and shoes.
- Measuring an infant unassisted.
- Uncooperative children. (Have distracting toys available. Note in the record if you question the accuracy of a measurement.)
- Not properly extending young children for length measurement. (Child's head may be turned away.)
- Not positioning the child correctly for length and height measurement.
- Failure to repeat the measuring procedure a second time. (Repeating the procedure is essential to obtain accurate measurements.)
- Misreading the scale or tape measure. (Most equipment also has metric values. It is easy to mistakenly read metric values.)
- If hand plotting, using the wrong growth chart.
- Inadvertently transposing digits when writing them down or entering into QuickWIC.
- Inadvertently entering the weight and height in the wrong fields in QuickWIC
- Getting interrupted before writing down the result.

Measurement Techniques

Learner Objectives

The learner will be able to:

- Determine the correct method for measuring stature.
- Use the appropriate equipment to measure length, height, weight, and head circumference.
- Weigh and measure the client in the correct amount of clothing and without shoes.
- Follow recommended procedures for measuring length, height, weight, and head circumference.
- Follow recommended sanitation procedures.

Weighing Children and Adults

Equipment

- Double beam floor model scale or electronic digital scale*.

Who to Weigh in Standing Position

- Adults
- Children who are able/willing to stand.

Preparation

1. Balance the scale at zero before each use:
Many **digital scales** are self-zeroing. However, you may have to push a button to zero it. For the **beam balance**, move both weights left to zero before each use. If the scale does not balance at the midpoint, adjust the counterweight until it does.
2. Weigh children and adults in light indoor clothing and without shoes.

Procedure

1. Have the client stand in the center of the scale.
2. For beam balance:



- Move the larger weight to the right until the indicator arrow drops below the center.
 - Move the larger weight back to the left one segment to move the indicator arrow slightly above the midpoint.
 - Move the smaller weight to the right until the indicator arrow balances at the midpoint.
3. Read the measurement and record it to the nearest 1/4 lb. *(Be sure to read the indicator arrow on the beam scale at eye level. Avoid reading the indicator arrow at varying heights and distances.)*

*Note: Make sure your digital scale is electronic, not a spring balance scale. Spring balance scales are not as accurate. You can tell if a digital scale is a spring balance scale by asking the manufacturer and/or checking to see if the scale moves or jiggles when pressure is applied. Spring balance scales will move or jiggle when pressure is applied.

Weighing Infants

Equipment

- Double beam infant scale or electronic digital scale. (Make sure digital scale is electronic, not a spring scale)

Who to Weigh On Infant Scales

- Infants
- Children who won't stand on the adult scale and who weigh less than the maximum the scale supports.



Preparation

1. Cover scale with a clean paper drape.
2. Balance the scale at zero before each use:
Many **digital scales** are self-zeroing. However, you may have to push a button to zero it. For the **beam balance**, move both weights left to zero. If the scale does not balance at the midpoint, adjust the counterweight until it does.
3. Remove infant's clothing except for a dry diaper. If the room is cold, light indoor clothing without shoes may be worn.

Procedure

1. Place the infant laying or sitting in the center of the scale.
2. For the beam balance
 - With the small ounce weight at zero, move the large pound weight to the right until the indicator arrow drops below midpoint.
 - Move the pound weight back to the left one pound to raise the arrow just above the midpoint.
 - Move the ounce weight slowly to the right until the indicator arrow balances at the midpoint.
4. Read the measurement to the nearest ounce. (*Be sure to read indicator arrow on beam scale at eye level.*) Record the measurement in data system to the nearest $\frac{1}{4}$ pound.
5. If the infant is very active, it may help to give the infant a toy to hold. You must then weigh the toy separately and subtract the weight of the toy from the infant's measured weight. If an electronic scale is available, you can also try an alternative approach: Have the parent stand on the scale, reset it to zero and then have the parent hold the infant and read the infant weight.

Guidelines for Maintaining Scales

- Scales should be checked for accuracy and calibrated (adjusted) if necessary:
 - At time of purchase
 - Each time the scale is moved
 - At least annually
 - Other times that the manufacturer recommends

WIC staff should not try to adjust digital/electronic scales. If adjustment is necessary, contact the manufacturer.

- Floor scales should be installed on a firm, level surface. Infant scales should be stationed on a solid table or counter that does not rock or vibrate.
- Scale should be kept free from debris and away from drafts or motors that create air currents or vibration.
- Be sure you know the capacity of the scale. Overloading an electronic scale may cause damage.
- Maintain scales in a 'private' location.

Measuring Length

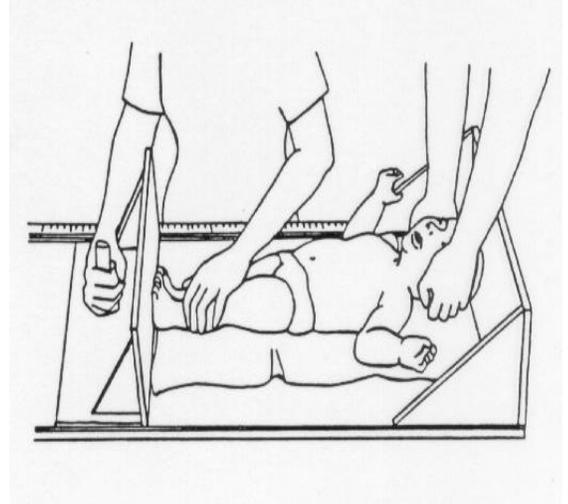
Equipment

- Infant measuring board with fixed headboard and adjustable foot board.

Who to Measure in Recumbent Position

(Lying Down)

- Infants
- Children under 24 months
- Children 2 -3 years who:
 - cannot/will not stand and/or
 - measure less than 30 inches and/or
 - weigh less than 20 pounds.



Preparation

1. Cover board with a clean paper drape.
2. Remove child's shoes and outer clothing. Remove any hair ornaments and undo thick braids on top of head.

Procedure

1. Have the parent or an assistant lay the child on his back in the center of the board with the head touching the fixed headboard, the body straight in line with the board and the shoulders and buttocks flat against the surface.
2. Have assistant hold child's head gently against headboard with child's eyes looking straight up.
3. Gently, but firmly press the child's knees down with your left hand to fully extend both legs. With your right hand, slide the moveable foot board firmly against the feet. Make sure the toes point straight up.
4. Read the measurement to the nearest 1/8th inch and jot that figure down.
5. Remove the child and completely repeat the procedure. If the child is uncooperative, allow the parent to try to calm the child before trying to re-measure. Toys or mobiles can help distract children during the procedure.
6. Compare the two measurements. If they agree within 1/4 inch, record the second reading. If they do not agree within 1/4 inch, repeat procedure until two measurements agree.

7. Record the second measurement.
8. Document in QuickWIC whenever measurements are not accurate due to an uncooperative infant/child.

Measuring Height

Equipment

- Measuring board with tape and moveable headboard or a metal tape attached to a flat wall and a separate headboard (that is a solid right angle). The rod on the scales should not be used to measure height. It is not accurate.
- The wall should not have molding or baseboard and the floor should not have a plush carpet.

Who to Measure in Standing Position

- Adults
- Children who are 24 months and older who are able/willing to stand.

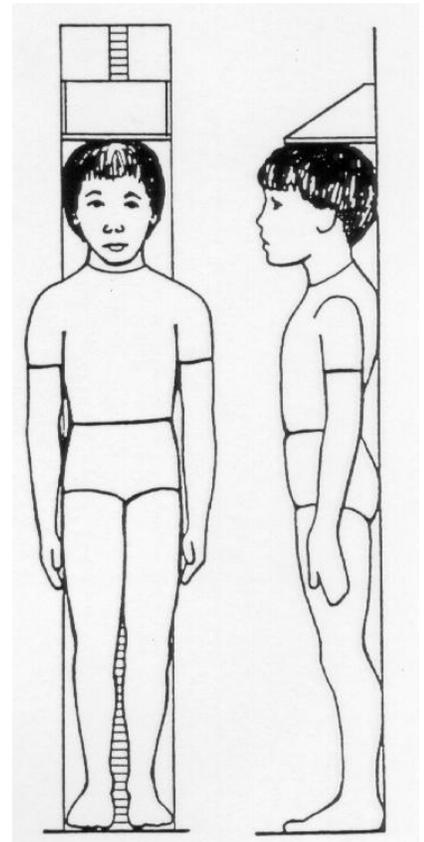
Note: Children 2 -3 years who cannot/will not stand and/or measure less than 30 inches and/or weigh less than 20 pounds *must* be measured in the recumbent position and plotted on the 0 - 36 month growth chart. Children who are measured standing *must* be plotted on the 2-20 charts. (It does not matter if these children are weighed on the infant or the adult scale.)

Preparation

1. Disinfect the headboard surface. Wash your hands.
2. Children should have thick socks, shoes, and jackets or any bulky clothing removed. Adults should remove coats, jackets, and shoes. Remove any hair ornaments or braids on top of head.

Procedure

1. Have the child or adult stand with back against the measuring surface with feet together flat on the floor, arms at side and knees and back straight. When possible, *head, heels, buttocks* and *shoulder blades* should touch the measuring surface. (Some individuals may not be able to maintain all four contact points.)
2. With the person looking straight ahead, slide the headboard gently down to the head, compressing the hair. Be sure that the headboard is level and at right angles to the



tape and that the heels are still flat against the floor.

3. With your eyes level with the indicator, read the height to the nearest 1/8 inch and jot this figure down. If necessary, use a footstool to read the tape at eye level.
4. Have the person step away, and then repeat the procedure completely.
5. Compare the two measurements. If they agree within 1/4 inch, record the second reading. If they do not agree within 1/4 inch, repeat the procedure until two measurements agree.
6. Record the second measurement.
7. Document in QuickWIC whenever measurements are not accurate due to an uncooperative infant/child.

Measuring Head Circumference

Equipment

- Flexible, non-stretchable, narrow plastic or paper tape measure.

Who to Measure

- Infants.

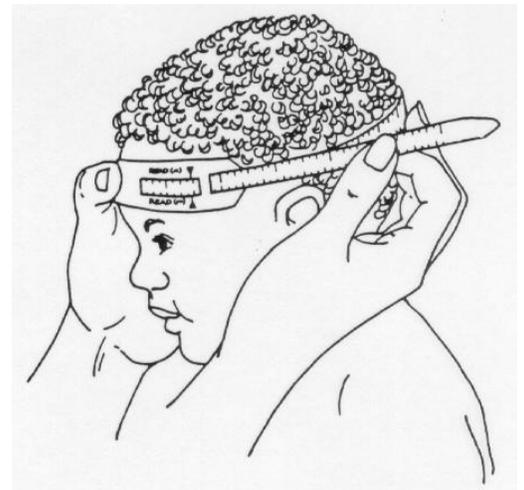
Note: Deviations from the norm in head circumference are usually related to disease, genetic abnormalities, or prenatal nutrition. Infants with abnormal measurements should be referred to a health care provider.

Preparation

1. Remove hair ornaments.
2. The infant should sit upright in the caregiver's arms.

Procedure

1. Place the tape measure around the largest part of the head.
2. Position the lower edge of the tape just above the eyebrows and ears, and around the biggest part of the back of the head.
3. Pull the tape snug to compress the hair.



4. Read the measurement to the nearest 1/8th inch, and jot that figure down.
5. Remove the measuring tape. Repeat the procedure.
6. Compare the two measurements. If they agree within 1/4 inch, record the second reading. If they do not agree, repeat procedure until two measurements agree.
7. Record the second measurement.

Summary of Guidelines for Measuring Stature and Weight

	Age	They should wear	Measure to nearest	Until agreement within
Recumbent Length	Infants/children: 0 to 24 mths. and 2-3 yrs. who: cannot stand and /or measure < 30” and/or weigh < 20#.	light clothing, no shoes	1/8 inch	1/4 inch
	Height	Children 2-18 years who measure at least 30” and weigh at least 20#.	clothed, no shoes	1/8 inch
	Adults:	clothed, no shoes	1/8 inch	1/4 inch
Weight	Infants/children (unable to stand, up to infant scale maximum.)	dry diaper ** or light clothing, no shoes	ounce (round to nearest 1/4 lb on PDF)	N/A
	Children: Able to stand.	light clothing, no shoes	1/4 lb	N/A
	Adults	light clothing, no shoes	1/4 lb	N/A

**New infants should be weighed in a dry diaper only, unless the room is too cold.

Recording Weights and Measures in Quick WIC

Record birth weight in pounds and ounces.

Example:

Birth Weight	Record in Quick WIC as
8 pounds 3 ounces	0 8 3/16 lbs.

Record all other weights by first rounding the value to the *nearest 1/4 lb.* This is not a problem when using an adult beam balance which is already graduated according to 1/4 lb increments. However, when using an infant beam balance (which reads in ounces) or a digital scale, you must make some conversions.

How to convert the ounce readings on an infant beam balance to the nearest 1/4 lb:

<u>Ounces</u>	<u>Nearest 1/4 pound</u>
0-2	0/4
3-5	1/4
6-9	1/2
10-13	3/4
14 -15	+1 0/4 (next higher pound)

Examples:

<u>Weight</u>	<u>Converted to nearest 1/4 lb.</u>	<u>Record in Quick WIC</u>
8 pounds 3 ounces	8 1/4 pounds	008 1/4 lbs
16 pounds 13 ounces	16 3/4 pounds	016 3/4 lbs

Conversions when using digital scales:

Caution must be used when reading digital scales:

- *Most Infant digital scales* are graduated according to ounce increments. Thus, a reading of '7.1' means 7 lbs. 1 oz. A reading of '7.2' means 7 lbs. 2 oz., etc. (*Check with manufacturer to be sure*) The ounce readings must then be rounded to the nearest 1/4 lb as explained above.
- *Most Adult digital scales* are graduated to read by .1 lb. increments. Thus a reading of 35.1 lbs. means 35.1 lbs, *not* 35 lbs. 1 oz. The decimal increments must be converted into 1/4 lb. fractions using the following scale.

<u>Decimal</u>	<u>Nearest 1/4 pound</u>
.1	0/4
.2 - .3	1/4
.4 - .6	1/2
.7 - .8	3/4
.9	+1 0/4 (next higher pound)

Record stature measurements in inches to the nearest 1/8 inch:

Examples: 18", 18 1/8", 18 1/4", 18 3/8", 18 1/2 "etc.

Metric measures:

Metric measures are entered in Quick WIC as decimals. Record weight in kilograms and height or length in centimeters. *Note: 1 kilogram = 1000 grams 1 meter = 100 centimeters*

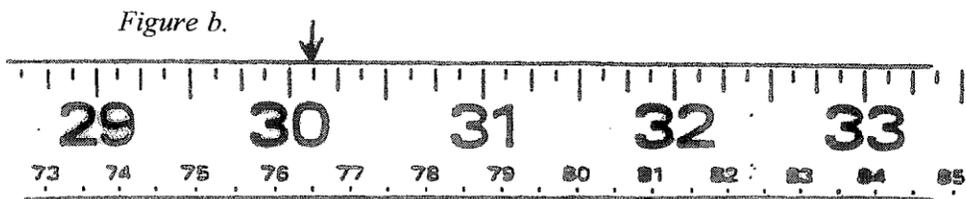
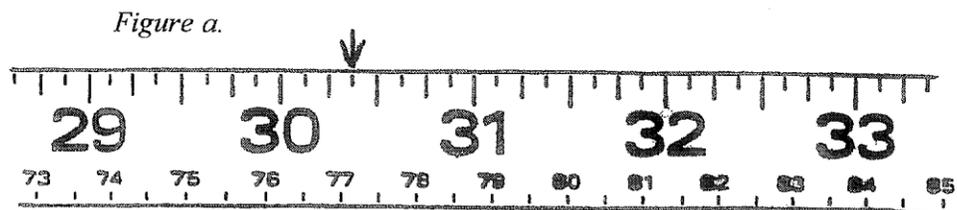
Examples:

Weight	Record in QuickWIC	Height	Record in QuickWIC
3450 grams	3.45 kg.	59 cm.	59.0 cm.
3 kg.	3.0 kg.	.99 meters	99.0 cm.

Learning Exercises on Weighing and Measuring

Joey is 14 months old. His length was measured in clinic today. The first time he was measured, the measurement was read at the arrow indicated under figure a below. The procedure was repeated. The second measurement is shown under figure b below.

1. What does the first measurement at *Figure a*. read?
2. What does the second measurement at *Figure b*. read?
3. Which measurement would you record?



Robert is 28 months old and 29 inches tall.

4. What growth chart should Robert be plotted on? How must he be measured?

Find a partner and measure her/his height.

5. Record the first reading.

Measure her/him a second time.

6. Record the second reading.
7. Do the two measurements agree within 1/4 inch?
8. If the two measurements do not agree, remeasure until you have two measurements that agree within 1/4 inch.

Learning Exercises on Weighing and Measuring--Answers

Joey is 14 months old. His length was measured in clinic today. The first time he was measured, the measurement was read at the arrow indicated under figure a below. The procedure was repeated. The second measurement is shown under figure b below.

1. What does the first measurement at *Figure a.* read? 30 3/8 inches
2. What does the second measurement at *Figure b.* read? 30 1/8 inches
3. Which measurement would you record? 30 1/8 inches

Robert is 28 months old and 29 inches tall.

4. What growth chart should Robert be plotted on?

Because his height is 29 inches, he must be plotted in the 0 - 36 month growth chart.

How should he be measured?

Robert must be measured lying down and plotted on the 0-36 months chart. He is too short to fit on the 2-20 charts.

Learning Exercises on Recording in Quick WIC

Convert the following current weight measurements as you would in Quick WIC.

13 lbs. 6 ounces (beam balance)	___ ___ ___ / ___ lbs.
4650 gr. (referral data)	_____ kgs.
15 lbs. 11 oz.(beam balance)	___ ___ ___ / ___ lbs.
72.4 lbs. (adult digital)	___ ___ ___ / ___ lbs.
7.1 lbs. (infant digital)	___ ___ ___ / ___ lbs.
7 lbs. 14 oz (beam balance)	___ ___ ___ / ___ lbs.
10 lbs. 3 oz.(beam balance)	___ ___ ___ / ___ lbs.
96.5 lbs. (digital)	___ ___ ___ / ___ lbs.
100 ¼ lbs. (beam balance)	___ ___ ___ / ___ lbs.
99.75 lbs. (referral data)	___ ___ ___ / ___ lbs.

Indicate how you would enter these birth weights in the Birth Weight field in Quick WIC.

7 ½ lbs.	___ ___ ___ / ___ lbs.
7 lbs. 6 oz.	___ ___ ___ / ___ lbs.
3300 gms.	_____ kgs.

Convert the following stature measurements as you would in Quick WIC.

63"	___ ___ ___ / ___ in.
5 ' 0"	___ ___ ___ / ___ in.
20 3/8"	___ ___ ___ / ___ in.
32.25"	___ ___ ___ / ___ in.
36.5"	___ ___ ___ / ___ in.
18 3/4"	___ ___ ___ / ___ in.
60.5"	___ ___ ___ / ___ in.
5' 3"	___ ___ ___ / ___ in.
6' 1"	___ ___ ___ / ___ in.
5' 4 ½"	___ ___ ___ / ___ in.
4' 8 ½"	___ ___ ___ / ___ in..

Learning Exercises on Recording in Quick WIC--Answers

Convert the following current weight measurements as you would into Quick WIC.

13 lbs. 6 ounces (beam balance)	<u>13 1/2 lbs.</u>
4650 gr.(referral data)	4.65 kgs.
15 lbs. 11 oz.(beam balance)	15 3/4 lbs.
72.4 lbs. (adult digital)	72 1/2 lbs.
7.1 lbs. (infant digital)	7 0/4 lbs.
7 lbs. 14 oz (beam balance)	8 0/4 lbs.
10 lbs. 3 oz.(beam balance)	10 1/4 lbs.
96.5 lbs. (digital)	96 1/2 lbs.
100 1/4 lbs. (beam balance)	100 1/4 lbs.
99.75 lbs. (referral data)	99 3/4 lbs.

Indicate how you would enter these **birth weights** in the **Birth Weight** field in Quick WIC.

7 1/2 lbs.	7 8/16 lbs.
7 lbs. 6 oz.	7 6/16 lbs.
3300 gms.	3.3 kgs.

Convert the following stature measurements as you would in Quick WIC.

63"	63 0/8 in.
5 ' 0"	60 0/8 in.
20 3/8"	20 3/8 in.
32.25"	32 1/4 in.
36.5"	36 1/2 in.
18 3/4"	18 3/4 in.
60.5"	60 1/2 in.
5' 3"	63 0/8 in.
6' 1"	73 0/8 in.
5' 4 1/2"	64 1/2 in.
4' 8 1/2"	56 1/2 in.

Anthropometric Technique Observation – Observe 3 Infants, 3 Children and 3 Adults

Staff Name: _____ WIC Nutrition Center: _____ Name of Observer: _____

Anthropometric Technique	Yes/ No	Date		Yes/ No	Date		Yes/ No	Date	Comments – Note type of participant measured.
Are coats, jackets, and shoes removed?									
For height measurements of women/children:									
a. Are head, shoulders, buttocks & heels touching the wall when possible?									
b. Are arms at sides, knees back and straight?									
c. Are feet flat on the floor?									
For length measurement of infants/ children:									
a. Is infant on back with body straight?									
b. Is the head against headboard, eyes looking up?									
c. Are both legs fully extended?									
d. Are heels of both feet touching the footboard?									
e. Are there 2 people to measure length?									
Are length and height measures duplicated, and read and recorded correctly?									
Is clean paper drape used on infant scale/length board?									
Is scale is balanced to zero before weight is taken?									
Are new infants weighed in dry diaper?									
Are children and adults weighed in light indoor clothing without shoes?									
Are weight measurements read and recorded correctly?									
Is infant head measured twice, read/ recorded correctly?									

Anthropometry Post-Test

1. Accurate weights and measures are important because (Circle all that apply):
 - A. WIC uses these measures to help determine if children are healthy and growing well
 - B. Small errors make a big difference in growth assessment, especially for infants
 - C. The CDC uses these measures for evaluation of infants and children in the U.S.
2. T F New infants should be weighed in a dry diaper only unless the room is very cold.
3. You should measure children lying down until they are at least
 - A. 18 months old and able to stand alone.
 - B. 24 months old and able to stand alone.
 - C. 36 months old and able to stand alone.
 - D. Able to stand alone.
- 4 T F Children 24 - 36 months who are less than 30" tall and/or less than 20 lbs should be measured lying down.
5. To measure length accurately, you need (*circle all that apply*)
 - A. Two people to perform the procedure.
 - B. To remove all of the infant's clothing and diaper.
 - C. To read the measurement to the nearest 1/8 inch.
 - D. To make sure that two measurements agree within 1/4 inch of each other.
6. Height measurement should be
 - A. Taken for adults using the rod on the adult beam scales.
 - B. Repeated until you have two measurements that agree within 1/4 inch.
 - C. Done only when a pregnant woman cannot remember her exact height.
7. The following will help you be more accurate when you weigh and measure:
 - A. Repeat each procedure until two measurements agree within the appropriate range.
 - B. Weigh yourself on the scale to check its accuracy.
 - C. Make sure that the client removes shoes and outer clothing .
 - D. A and C.
8. When measuring the height of a person greater than 2 years old, the following should be in contact with the wall
 - A. Head, shoulder blades and heels.
 - B. Head and buttocks.
 - C. Head, heels, buttocks and shoulder blades.
 - D. Head and heels.
9. Measurement errors can result from (*circle all that apply*)
 - A. Misreading the scale or tape measure
 - B. Interruptions before writing down the result
 - C. Uncooperative children
 - D. Weighing in heavy outer clothing or shoes

Anthropometry Post-Test Answers

Correct Answers are bolded

1. Accurate weights and measures are important because (Circle all that apply):
 - A. WIC uses these measures to help determine if children are healthy and growing well**
 - B. Small errors make a big difference in growth assessment, especially for infants**
 - C. The CDC uses these measures for evaluation of infants and children in the U.S.**
2. T F New infants should be weighed in a dry diaper only unless the room is very cold.
3. You should measure children lying down until they are at least
 - A. 18 months old and able to stand alone.
 - B. 24 months old and able to stand alone.**
 - C. 36 months old and able to stand alone.
 - D. able to stand alone.
4. T F Children 24 - 36 months who are less than 30" tall and/or less than 20 lbs should be measured lying down.
5. To measure length accurately, you need (*circle all that apply*)
 - A. Two people to perform the procedure.**
 - B. To remove all of the infant's clothing and diaper.
 - C. To read the measurement to the nearest 1/8 inch.**
 - D. To make sure that two measurements agree within 1/4 inch of each other.**
6. Height measurement should be
 - A. Taken for adults using the rod on the adult beam scales.
 - B. Repeated until you have two measurements that agree within 1/4 inch.**
 - C. Done only when a pregnant woman cannot remember her exact height.
7. The following will help you be more accurate when you weigh and measure
 - A. Repeat each procedure until two measurements agree within the appropriate range.
 - B. Weigh yourself on the scale to check its accuracy.
 - C. Make sure that the client removes shoes and outer clothing
 - D. A and C.**
8. When measuring height of a person greater than 2 years old, the following should be in contact with the wall
 - A. Head, shoulder blades and heels.
 - B. Head and buttocks.
 - C. Head, heels, buttocks and shoulder blades.**
 - D. Head and heels.
9. Measurement errors can result from:
 - A. Misreading the scale or tape measure**
 - B. Interruptions before writing down the result**
 - C. Uncooperative children**
 - D. Weighing in heavy outer clothing or shoes**

ANTHROPOMETRIC TRAINING MANUAL

Part 2 - Plotting and Interpreting Children's Growth Measures

June 2010

Division of Women, Infants and Children (WIC)



Plotting Children's Growth Measurements

Learner Objectives

The learner will be able to:

- State the purpose of the growth chart.
- Calculate the actual age of each child before plotting measurements.
- Plot accurately weight for age, length or height for age, BMI and head circumference on the correct growth charts.
- Accurately interpret and monitor growth charts

Growth Charts

Purpose of growth charts

By plotting a child's growth over time, WIC staff can screen for potential growth problems, make referrals and provide nutrition counseling as appropriate.

How to plot the growth charts manually

Normally, the data system will plot the growth charts for you based on the child's sex, birth date and current measurements. *Note: If the values you input are in error, the growth plots will be also!* **If the WIC data system is down, you will need to know how to plot growth charts manually.**

Plotting length/age, weight/age, and head/age on the 0-36 months charts

First, calculate the child's age by subtracting the child's *date of birth* from the *date of measurement*.

Example 1:

Date of Measurement: April 15, 2005
Child's Date of Birth: January 10, 2005

	Year	Month	Day
Date of Measurement	2005	4	15
Date of Birth	2005	1	10
Age		3 mo	5 days

Example 2:

You may need to borrow 30 days from the month column and/or 12 months from the year column.

Date of measurement: April 15, 2005
Child's Date of Birth: October 26, 2002

	Year	Month	Days
Date of Measurement	2005 (2004)	4 (15)	15 (45)
Date of Birth	2002	10	26
Age	2 yrs	5 mo.	19 days

Locate the child's age on the horizontal axis of the length/age, weight /age, or head/age grid. (The chart is calibrated to the nearest half month.) Locate the child's length, weight or head circumference on the vertical axis of the grid. Plot the point where these two values intersect.

Note: Use adjusted age to plot weight/age, length/age and head/age for premature infants and children less than 2. Adjusted age is the actual age minus the number of weeks or months premature. Example: What is the adjusted age of a 7 week baby born at 36 wks gestation (4 wks early)?

7 wks (actual age) *minus* 4 wks (# wks premature) = 3 wks Adjusted Age

Plotting the weight/length on the 0-36 months growth chart

Find the infant/child's length on the horizontal axis and the weight on the vertical axis. Find the point where these two values intersect.

Plotting height/age and weight/age on the 2 - 5 or 2 – 20 growth charts

Calculate the child's age as instructed on page 3.

If using the 2-5 years chart, plot to the nearest month. On the 2-20 years chart, you must first round the months to the nearest 'quarter year' using the following guide:

- 0-1 month: nearest year (4 years 1 month would be 4 years.)
- 2-4 months: ¼ year (4 years 3 months would be 4 ¼ years)
- 5-7 months: ½ year (4 years 7 months would be 4 ½ years)
- 8-10 months: ¾ year (4 years 10 months would be 4 ¾ years)
- 11-12 months: next year (4 years 11 months would be 5 years)

Locate the child's age in years on the horizontal axis of the grid and the child's height or weight on the vertical axis of the grid. Plot the point where these two values intersect

Plotting the BMI on the 2-20 year growth chart

Normally the data system will calculate BMI for you. If the system is down, you can use the following equations:

English system:

$$\text{BMI} = \text{Weight in pounds} \div \text{height in inches} \div \text{height in inches} \times 703$$

Note: fractions and ounces must be entered as decimal points.

Fraction	Ounces	Decimal
1/8	2	.125
1/4	4	.25
3/8	6	.375
1/2	8	.5
5/8	10	.625
3/4	12	.75
7/8	14	.875

Example: A 33 pound 4 ounce child is 37 5/8 inches tall.

$$\text{BMI} = 33.25 \div 37.625 \div 37.625 \times 703 = 16.5$$

Metric System

$$\text{BMI} = \text{Weight in kilograms} \div \text{height in centimeters} \div \text{height in centimeters} \times 10,000$$

Example: A 16.9 kg. child is 105.2 cm tall.

$$\text{BMI} = 16.9 \div 105.2 \div 105.2 \times 10,000 = 15.3$$

Locate the BMI value on the vertical axis and the child's age on the horizontal axis. Find where those two intersect on the grid.

Note: CDC also has an extended BMI table that you may print off the internet and keep at your desk for reference in the event that the data system is down:

WWW.CDC.gov/growthcharts

Growth Percentiles

A child's growth plots will fall on or between a percentile line. These lines (or growth curves) range from the 97th to the 3rd percentile. The percentile ranking compares a child's height, weight, head circumference and BMI (Body Mass Index) to other children in the United States who are the same age and sex.

The 50th percentile represents the 'midpoint' of the range. Greater than the 50th percentile represents the higher end of the range and less than the 50th, the lower end of the range.

Height/Age, Weight/Age, Head Circumference/Age and Weight/Height percentiles

You can interpret the percentiles on these growth charts as follows:

- If the child's height for age plots at the 50th percentile, it means that 50 out of 100 children of the same sex and age would be taller and 50 would be shorter.
- If a child's height for age plots at the 25th percentile, it means 75 out of 100 children of the same sex and age would be taller and 25 would be shorter.
- If a child's weight for age plots at the 75th percentile, it means 75 out of 100 children of the same sex and age would weigh less and 25 would weigh more.
- If a child's weight/height plots at the 95%, it means that 5 out of 100 children of the same height and sex would be heavier and 95 would be lighter.
- If a child's head circumference plots at the 90%, it means that 10 out of 100 children of the same sex and age would have a larger head circumference and 90 children, smaller.

The growth curves for the height/age, weight/age, and weight/height follow a steady upward trend as age increases.

Note: It is not necessary to explain every percentile reading to participants. You should *interpret* all growth plots, focusing on progression of growth, but you may summarize your findings with the participant. You are not obligated to show the participant the charts, unless they specifically request to see them. For example, when appropriate you may say "your child is growing well", or "your child didn't gain much weight in the past 6 months", etc.

BMI Percentiles

BMI (Body Mass Index) is a number value that is calculated from the child's height and weight. BMI provides an estimate of the amount of body fat in children *between the*

ages of 2-20. Usually, the lower the BMI, the leaner the child. A high BMI is generally associated with a higher proportion of body fat. (However, those with a higher proportion of muscle mass may also have a higher BMI. This is not likely during the pre-school years.)

Example of how to interpret the 75thile on the BMI grid:

- The BMI growth chart shows how heavy or lean a child is compared to other children. This child is at the 75thile which means that he/she is somewhat heavier than average. 75 out of 100 children would be leaner and 25 out of 100 children would be heavier. This is within a normal range.

BMI decreases during the preschool years because children slowly lose their ‘baby fat.’ During pre-adolescence, they begin to lay down more fat and therefore BMI starts to increase somewhere between the ages of 4-6.* Thus, the growth curves on the BMI chart first go downward and then upward, producing a ‘roller coaster’ effect. Explain this pattern to endorsers if they have questions about why the BMI growth grid looks different from the others.

*Note: The point on the growth curve where the BMI begins to increase is called *adiposity rebound*. The earlier the adiposity rebound occurs, the more at risk the child is for becoming an overweight adult. Studies show that adiposity rebound occurring *before age 4* is associated with higher BMI in adolescence and adulthood. Because BMI grids provide a more sensitive indicator of changes in body fat, these grids should be used in place of the weight/height grids once a child turns two and can stand.

Interpretation of Growth Percentiles

Values between the 10th and 85th percentiles are considered normal. Values above the 85th or below the 10th merit further evaluation and do not meet the criteria for specific WIC risks. These values may be normal, but they may also indicate a growth problem.

Growth grid reading

Interpretation

Ht./Age $\leq 10^{\text{th}}$

May be a normal measurement.
May also be due to chronic malnourishment, genetic/medical condition or pre-maturity.

BMI/age or Wt./Ht. $\leq 10^{\text{th}}$

May be undernourished or dehydrated.
May indicate disease process.
May be normal leanness for the individual
Note: BMI/age or Wt/Ht < 5% is rarely normal and usually indicates malnutrition or failure to thrive.

BMI/age between 85-95th

CDC and WIC define a BMI in this range as at

	risk for becoming overweight.
BMI/age or Wt./Ht. $\geq 95^{\text{th}}$	WIC defines BMI/age or Wt/Ht $\geq 95^{\text{th}}$ as overweight.
Ht./Age $\geq 95^{\text{th}}$	Likely normal (evaluate height of parents), but excessive growth may indicate hormonal imbalance.
Head Circ/age $> 95^{\text{th}}$ or $< 5^{\text{th}}$	Head circumference can be related to brain size. Children with a head circumference below 5^{th} percentile or above 95^{th} percentile may have a neurological/developmental risk that needs further assessment. Refer to MD.

Percentile related nutrition risks for infants/children

Some percentile readings qualify as a nutrition risk. Refer to attachment 1, P&P 2.15.

DG: At risk of overweight (BMI/age 85^{th} to $< 95^{\text{th}}$) (*only allowed for children ≥ 24 months*)

DH: Overweight (BMI/age or Wt/Ht. $\geq 95^{\text{th}}$) (*only allowed for children ≥ 24 months*)

DK: Underweight/at risk of becoming underweight (BMI/age or Wt/Ht. $\leq 10^{\text{th}}$)

DM: Short Stature or risk of short stature (Height/Age or length/age $\leq 10^{\text{th}}$)

Learning Exercises on Manually Plotting Growth Measurements

1. **Gregory** was born on November 14, 2004. Today's date is April 15, 2005.
His weight is 12 pounds and his length is 25 inches. His head circumference is 16 ½ inches.

How old is Gregory? _____

What are his growth percentiles for:

Length for age _____

Weight for age _____

Wt./length _____

Head circumference _____

What is Gregory's WIC nutritional risk criteria? _____

2. **Tom** was born March 21, 2001. He was measured March 19, 2005.
His height was 42 ½ inches and his weight was 47 pounds.

How old is Tom? _____

What is Tom's BMI? _____

What are his growth percentiles for:

Height for age _____

Weight for age _____

BMI/age _____

What is Tom's nutritional risk? _____

3. **Jane** was born on February 3, 2003. Today's date is April 30, 2005.
Her standing height is 32 inches and her weight is 25 pounds.

How old is Jane? _____

Which chart should you use to plot her measurements? _____

What are her percentiles for:

Wt/Age _____

Ht/Age _____

BMI _____

Learning Exercises on Manually Plotting Growth Measurements--Answers

1. **Gregory** was born on November 14, 2004. Today's date is April 15, 2005.
His weight is 12 pounds and his length is 25 inches. His head circumference is 16 ½ inches.

How old is Gregory? 5 months, 1 day

What are his growth percentiles for:

Length for age	<u>25th</u>
Weight for age	<u><5th</u>
Weight for length	<u><5th</u>
Head circumference	<u>25th</u>

What is Gregory's WIC nutritional risk criteria? DK

2. **Tom** was born March 21, 2001 He was measured March 19, 2005.
His height was 42 ½ inches and his weight was 47 pounds.

How old is Tom? 3 years, 11 months, 28 days (round to 4 years)

What is Tom's BMI? 18.3

What are his growth percentiles for:

height for age	<u>90th</u>
weight for age	<u>>95th</u>
BMI for age	<u>>97th</u>

What is Tom's nutritional risk? DH

3. **Jane** was born on February 3, 2003. Today's date is April 30, 2005
Her standing height is 32 inches and her weight is 25 pounds.

How old is Jane? 2 years, 2 months, 27 days (round to 2 years 3 months)

Which chart should you use to plot her measurements? 2-20 chart because Jane is older than two years, is taller than 30 inches and weighs more than 20 pounds.

What is Jane's percentile for:

Weight/age	<u><25th</u>	<u>>10th</u>
Height/age	<u>5th</u>	
BMI/age	<u>75th</u>	BMI <u>17.2</u>

Note: Tom and Jane's growth charts are not displayed electronically in this document. Please request hard copies from the State Agency.

Monitoring growth patterns

Plotting a single set of measurements on a growth chart only compares a child to other children. It will not tell you if the child's growth rate is normal *for that child*. Even though a plot may fall within normal limits, it may not be 'normal' for that particular child when compared to his/her previous plots or measurements.

To evaluate growth, you must look at the child's progression of growth over time. A large drop or increase in percentile channel, fluctuations in weight or inadequate gains in height or weight may indicate potential problems. Always double check that weight and height was accurately recorded and accurately inputted into QuickWIC or hand plotted.

The following are examples of growth patterns that may require further follow-up or referral.

Monitoring Growth Curves/Measurements

Interpretation

1-2 percentile curve drop in Wt./Age or...
Inadequate weight gain between certs.
May be eligible for Nutrition Risk DF.
See back of assessment form.

May be normal growth pattern.***
May be due to inadequate food intake, illness,
or dehydration.
Evaluate diet. Refer to MD if necessary.

1-2 percentile curve drop in Ht./Age

May be normal growth pattern*** or inaccurate
measurements. May be due to disease or
chronic malnutrition.
Evaluate diet. Recheck measurements. Refer to
MD if necessary.

1-2 percentile curve drop in BMI/age
or Wt/Ht.

May be due to poor nutrition, dehydration, or
illness.

1-2 percentile curve gain in BMI/age
or Wt/Ht.

May be gaining weight disproportionately. An
upward trend in BMI prior to age of 4 may
indicate that the child is at higher risk for
becoming obese later in life.
Note: May also be recovering from
undernutrition or an illness.

***Note: Any weight loss in infants (after first few days of life) or young children is not normal. However, it may be normal for children less than 24 months to gradually shift percentiles upward or downward toward their 'genetic potential.' Most healthy children shift toward rather than away from the 50th percentile. Do not assume any shifts are normal without first completing a full VENA by evaluating diet, activity, overall health, etc.

Special Notes on Assessing Growth of New Infants

When assessing growth of new infants, it is important to look at weight gain in ounces in addition to looking at the growth percentiles:

- Infants may lose about 6 % of birth weight during the first few days of life.
 - *A loss of greater than or equal to either 8% or 8 oz should be evaluated and referred to a physician. There is a chart on the back of the Children's Nutrition Risk Assessment (NRA) Form that calculates 8% loss for you.*
- Infants should begin regaining any weight lost by day 5 – 7.
 - *Ask caregiver about hospital discharge weight and compare to current weight to make sure baby is beginning to regain any weight lost.*
- Infants are usually back to birth weight by 10 -14 days, and gain about 5 -7 oz/wk during the first 4 - 6 months of life. They should double birth weight by 4 – 6 months and triple it by one year.
- Infant birth length measures may be inaccurate or distorted due to birth trauma, so length/age and wt/length of new infants may be inaccurate. *Be sure to also look at progression of weight/age.*

Note: New infants should be weighed in dry diaper only (unless the room is very cold) to ensure accurate assessment of weight gain. Even light outer clothing can add ounces that make a difference in small infants.

Assessing Growth of Breastfed Infants

Since human milk is species specific, the growth pattern of breastfed infants represents the biological norm. Breastfed infants:

- Gain weight more rapidly than formula fed infants during the first 3 months of life.
- Gain weight more slowly than formula fed infants from 4-12 months.
- Tend to be ¾ to 1½ lbs. lighter than formula fed infants by one year old.

CDC Growth Charts: Current limitations

The CDC growth charts were based on growth patterns of formula and combination fed infants. Therefore, breastfed infants gaining weight normally tend not to follow a standard growth curve when plotted on the CDC “weight x age” and “weight x height” charts. (Length x age chart is not affected.)

Normal growth for breastfed infants may look different when plotted on CDC charts:

0-3 months: Growth curve spikes upward due to rapid weight gain.

4-6 months: Growth curve begins to ‘flatten’ as rate of weight gain slows down.

7-12 months: Growth curve may appear to ‘falter,’ dropping percentiles, as rate of weight gain decreases further. (Especially true for infants with birth weight < 6 pounds. By one year of age, these infants may decrease to ≤5%ile on the CCD chart even though their growth curve appears normal when plotted on the WHO charts (based on growth patterns of breastfed and combination fed infants).)

Growth patterns vary depending on feeding method: fully breastfed, combination fed or fully formula fed. Growth rate can slow down or increase as the feeding mode changes. Example: If an infant changes from fully breastfed to partially breastfed or fully formula fed, the rate of weight gain may increase resulting in a percentile increase

Growth Assessment: The whole picture

Growth charts should not be used as the only tool for assessing growth. A single set of measurements on a chart does not determine if the rate of growth is normal for that child. Also consider:

- Weight gain pattern: Is the baby gaining the recommended amount of weight per week or month?

Infant Age	Minimum weight gain norms for breastfed infants
0-2 weeks	Lose and regain birth weight*
3-4 weeks	≥ 7oz/week
1-3 months	≥ 5 oz/week or 1¼ or more lbs/month
4-6 months	≥ 3 oz/week or ¾ lb. or more/month
7-12 months	≥ 2 oz/week or ½ lb. or more/month

*For delayed milk production, may take 2-3 weeks. (See WIC Breastfeeding Manual.)
- Other factors that may impact growth pattern: Was the infant LGA at birth and now adjusting downward? Did the infant initially gain slowly or too much and now adjusting rate of growth?

Evaluating growth at age 0-3 weeks can be difficult. Weights at birth and certification may be the only data available. If the infant is <2 weeks old, you cannot use the “re-gain birth weight” milestone either. Consideration of birth history, age and percent of loss of birth weight will make assessment easier. As a general rule:

- Infants without birth complications lose about 8% of their weight; with complications, up to 10%.
- Weight loss should peak by the 3rd day.
- Some weight gain should be evident by the end of the first week.
- A loss of >8% of birth weight at certification is a high risk criteria. (Refer to the back of the Nutrition Risk Criteria for Infants and Children for an >8% weight loss chart.)

You can use these norms to evaluate growth in a variety of situations:

- **Example 1:** A 3 day old infant (uncomplicated birth) whose current weight is 8% below birth weight. (Weight loss peaks at day 3 so this falls within normal limits.)
- **Example 2:** A 10 day old infant (uncomplicated birth) whose current weight is 4% below birth weight. (Assuming an initial loss of 8%, this infant is beginning to regain weight.)
- **Example 3:** A 12 day old infant (uncomplicated birth) whose current weight is 8% below birth weight. (Assuming an 8% initial weight loss, there does not appear to be any appreciable weight gain in almost 2 weeks. This infant requires an assessment of breastfeeding practices and closer monitoring.)
- **Example 4:** A 2 week old (C section baby) whose current weight is 5% below birth weight. (Assuming an initial weight loss of 10% and delayed milk production due to C-section, this is probably not a cause of concern although growth and breastfeeding practices should be monitored more closely.)

Nutrition risk codes related to growth

DM (short stature): Length is not affected by feeding method. Stature <5% may indicate stunting due to medical condition or dietary inadequacy. Stature <5-10% may indicate risk for stunting. Further assessment is indicated.

DK: (Height x weight < 10%.): This auto-assigned risk may be due to a difference in growth charts rather than a growth problem. Additional explanation to the mother/parents is required.

DF: (Infants with >8 oz. or 8% weight loss or not back to birth weight by 2 weeks): Explanation to parents required especially in the case of the infant who might not regain weight until three weeks because of birth interventions.

High risk conditions related to growth

> 8% or 8 ounce loss in birth weight: Assign high risk but consider other factors like delayed milk production or birth inventions or LGA. Provide follow-up weight check. If gaining weight normally at follow-up, may be removed from high risk. Document why.

< 5 oz./wk weight gain during the first 3 months: Assign high risk. Weight gain during the first few months is rapid. Less than 5 ounces per week needs further evaluation.

Failure to double birth weight by 6 months. Decrease in 2 or more percentiles on growth chart: Staff discretion since birth weight impacts changes in percentiles as growth adjusts. (Example: Infant weighing 9 lbs. at birth will not double birth weight.) This high risk condition will be eliminated when policy is revised.

Weight x height <5%: Use professional discretion at the 12 month certification. Since breastfed infants tend to be ¾ to 1½ pounds lighter at one year, this may be a growth chart issue. If you choose not to assign high risk, document why.

Health Care Providers, Parents and Growth Charts

Parents may look at the growth percentiles with a ‘higher the better’ mentality. A lower percentile on the chart may be perceived as ‘low milk supply.’ If the growth looks ‘problematic’ from the parents’ perspective, suggest that they track their baby’s weights at home and explain growth by telling them the baby’s weights in list form instead.

Health care providers may prescribe formula if a breastfed infant decreases percentiles. If the WIC assessment demonstrates adequate weight gain pattern, the following talking points can help explain the disparity to parents:

- Growth charts were designed for formula fed infants.
- Growth pattern of breastfed infants is normal growth. (Explain weight gain norms and reassure them by showing the infant’s weights in list form.)
- Each infant plots their own “normal” growth pattern.
- Ask if they would be concerned about their infant if they did not know the numbers.
- For some parents, it may be beneficial to show them how their infant plots on the WHO chart.
- Review the number of feedings and diaper pattern.

If a healthy infant is gaining weight normally according to WIC assessment and the mother decides not to use formula, you do not need to provide it. If the mother insists on formula because the health care provider prescribed it, issue no more than 10% of needs. Contact the health care provider to discuss WIC assessment and mother’s feeding plan and goal. (Note: This does not apply to infants who are prescribed formula for a medical reason.)

To learn more about breastfeeding assessments please see the grow baby grow modules available at the end of this manual.

Interpreting Growth Patterns—Practice Exercises

Case Study 1: Ashley

How would you interpret Ashley's weight/age and height/age?

How would you interpret Ashley's BMI?

Overall, how would you describe Ashley's growth? What issues would you evaluate that might be impacting Ashley's growth?

Case Study 2: Anton

How would you interpret Anton's weight/age and length/age?

How would you interpret Anton's weight/length?

Overall, how would you describe Anton's growth? What issues would you evaluate that might be impacting Anton's growth?

Case Study 3: Maria

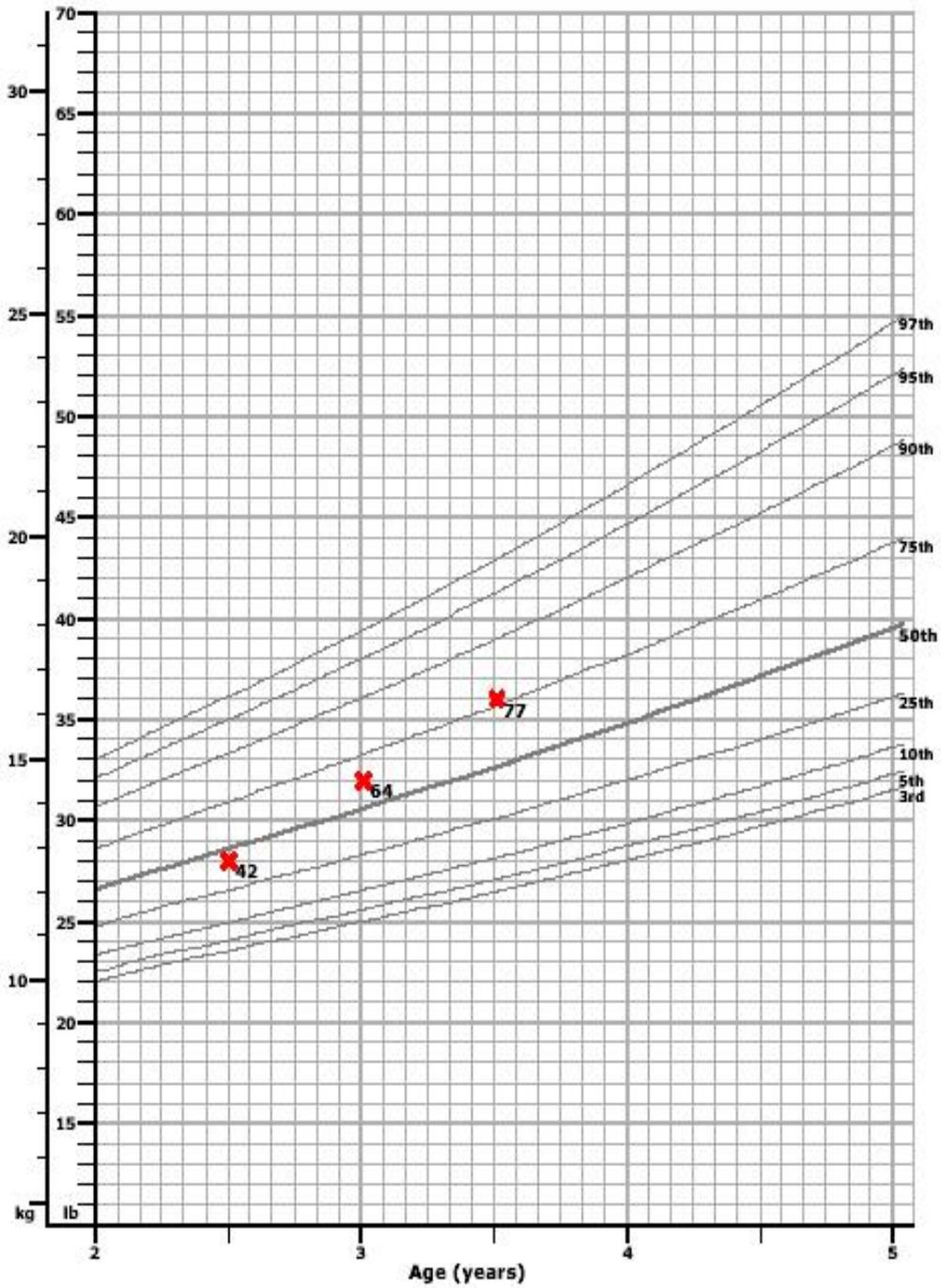
How would you interpret Maria's weight/age and length/age?

Has Maria gained adequate weight since birth?

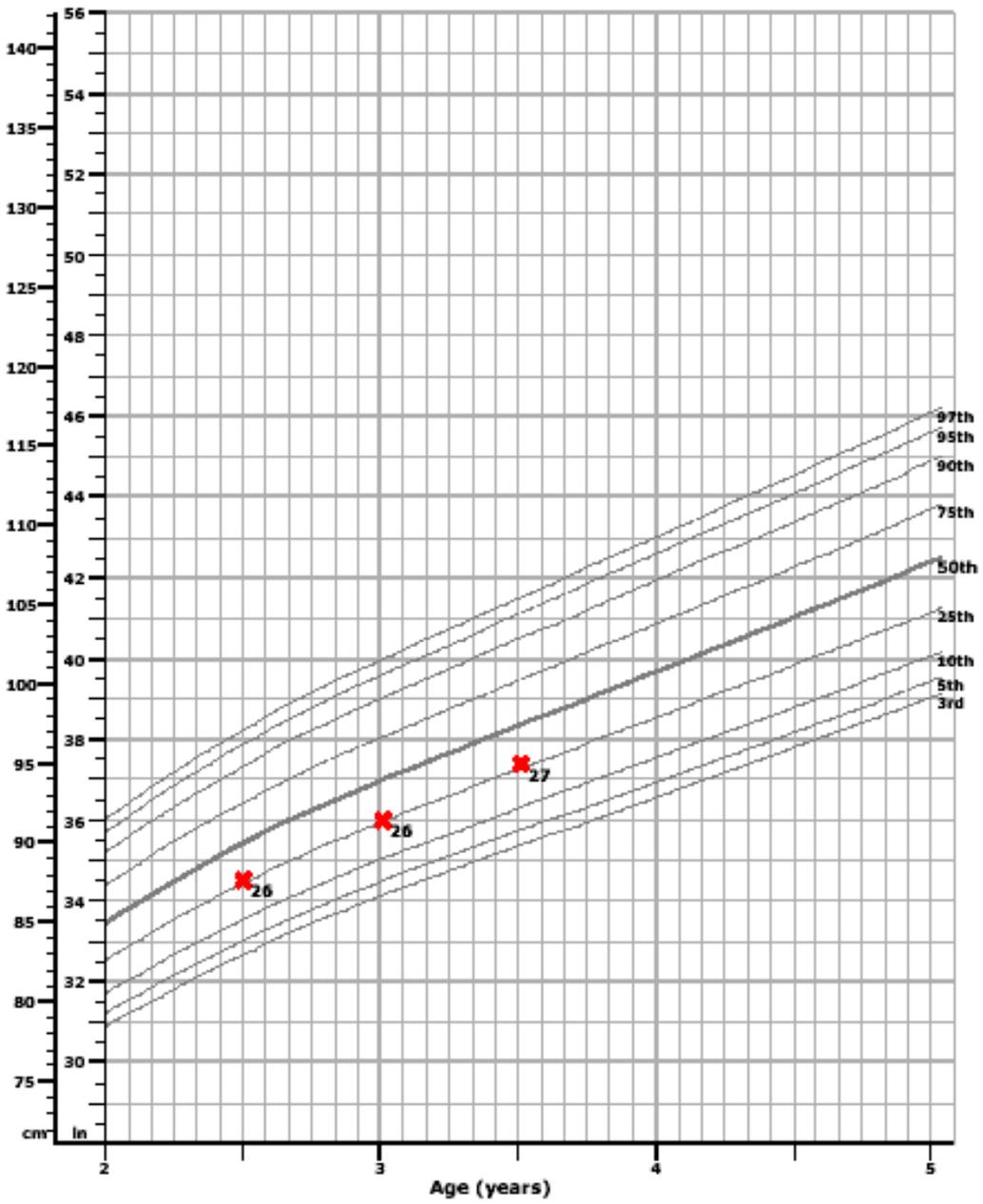
How would you interpret Maria's weight/length?

Overall, how would you describe Maria's growth?

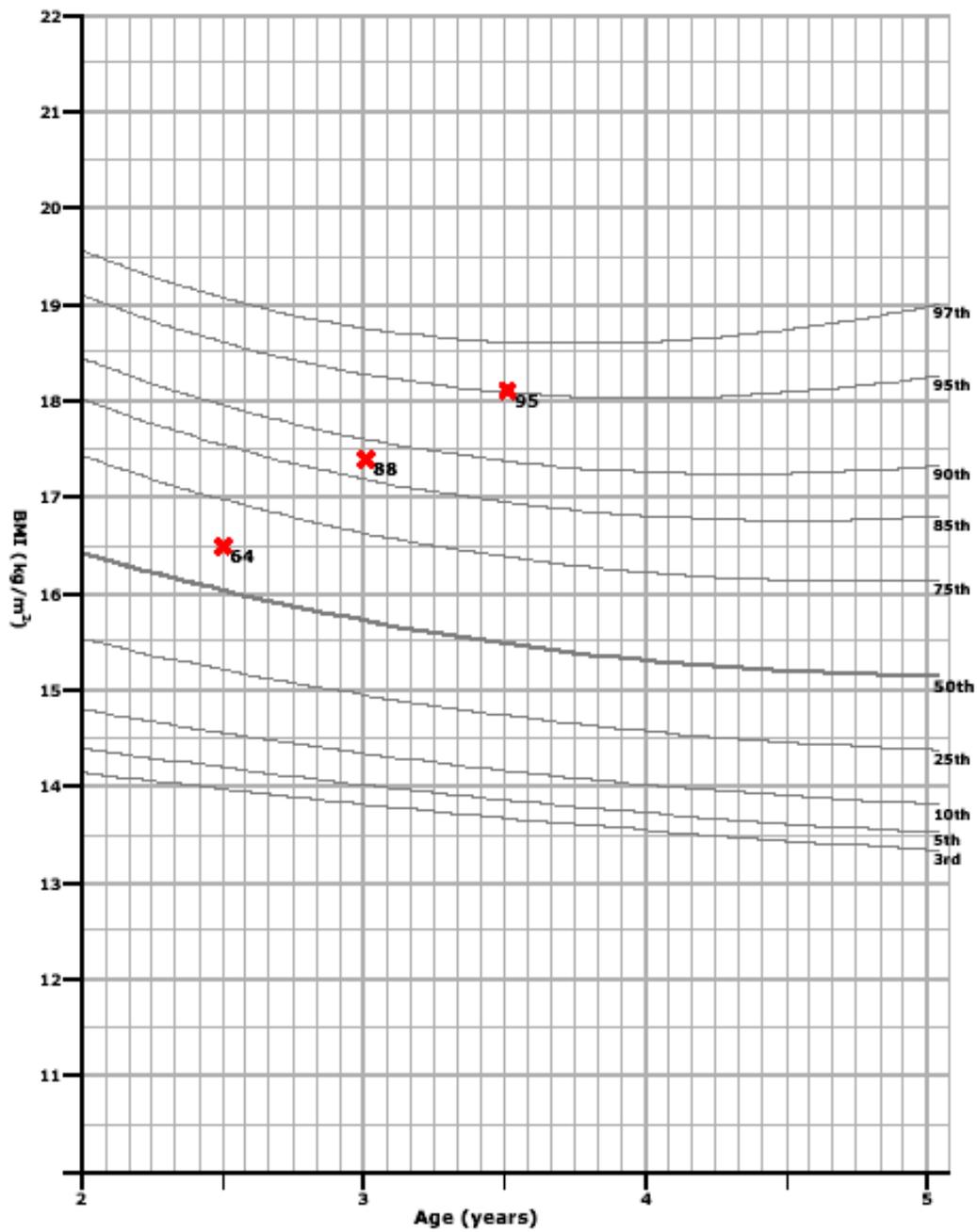
Female Child Weight For Age Chart - Ashley J Perkins



Female Child Stature For Age - Ashley J Perkins



Female Child Body Mass Index (BMI) For Age Chart - Ashley J Perkins



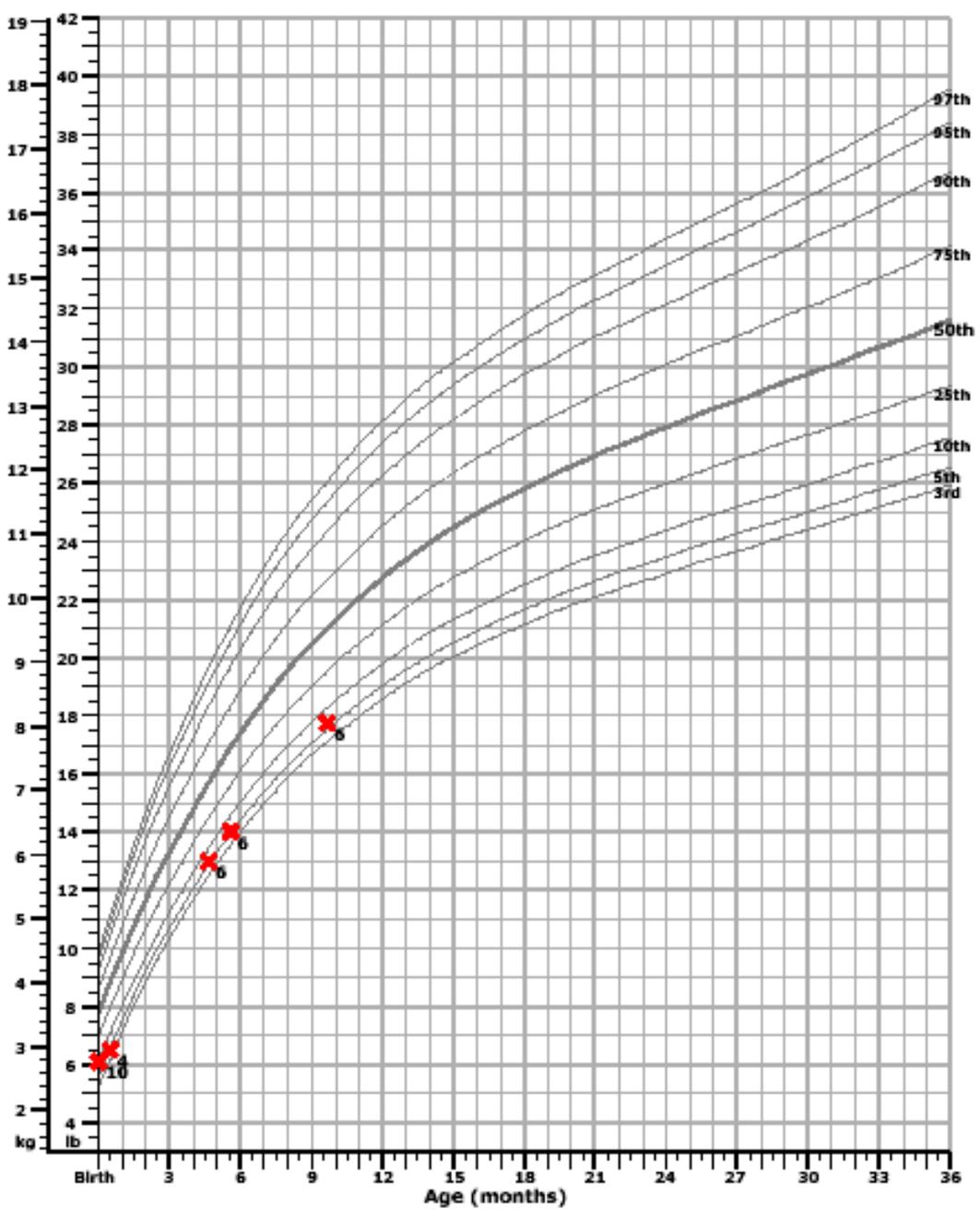
QuickWIC Anthropometric History -- Web Page Dialog

Participant Name: Anton M Grant
 Person ID: 11254770
 Clinic: 97-97
 Family ID: 10469499
 Date: 01/17/2006

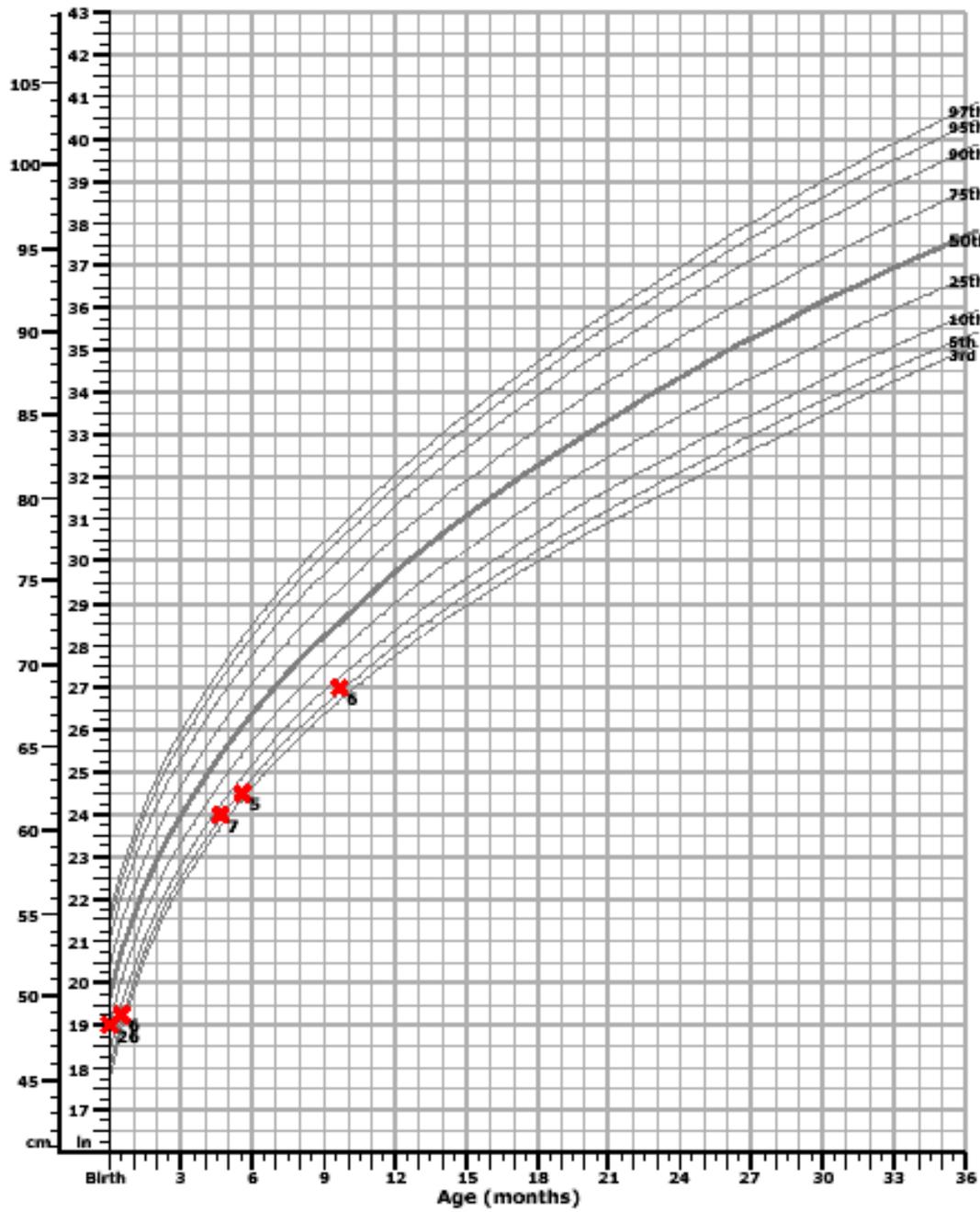
Date	Birth	Number of weeks premature	Recumbent	Weight	Height	Head	BMI
09/20/2005	N		Y	17.75 lbs. 8.0513 kgs.	27 in. 68.58 cm.		
05/18/2005	N		Y	14 lbs. 6.3504 kgs.	24.5 in. 62.23 cm.	16.5 in. 41.91 cm.	
04/21/2005	N		Y	13 lbs. 5.8968 kgs.	24 in. 60.96 cm.		
12/16/2004	N		Y	6.5 lbs. 2.9484 kgs.	19.25 in. 48.895 cm.	13.25 in. 33.655 cm.	
11/30/2004	Y		Y	6.125 lbs. 2.7783 kgs.	19 in. 48.26 cm.	13 in. 33.02 cm.	

Close Print

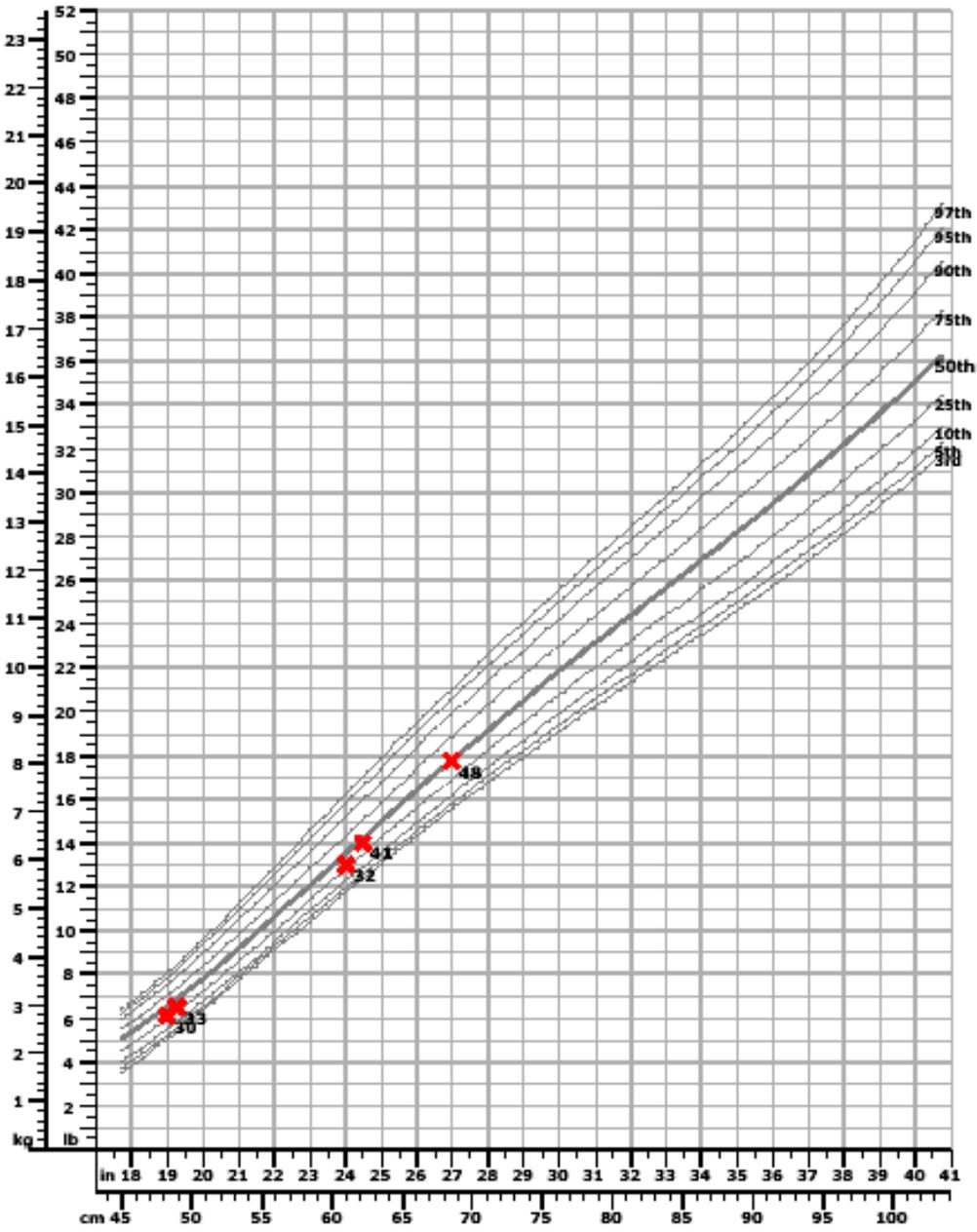
Male Infant Weight For Age Chart - Anton M Grant



Male Infant Length For Age Chart - Anton M Grant



Male Infant Weight For Length Chart - Anton M Grant

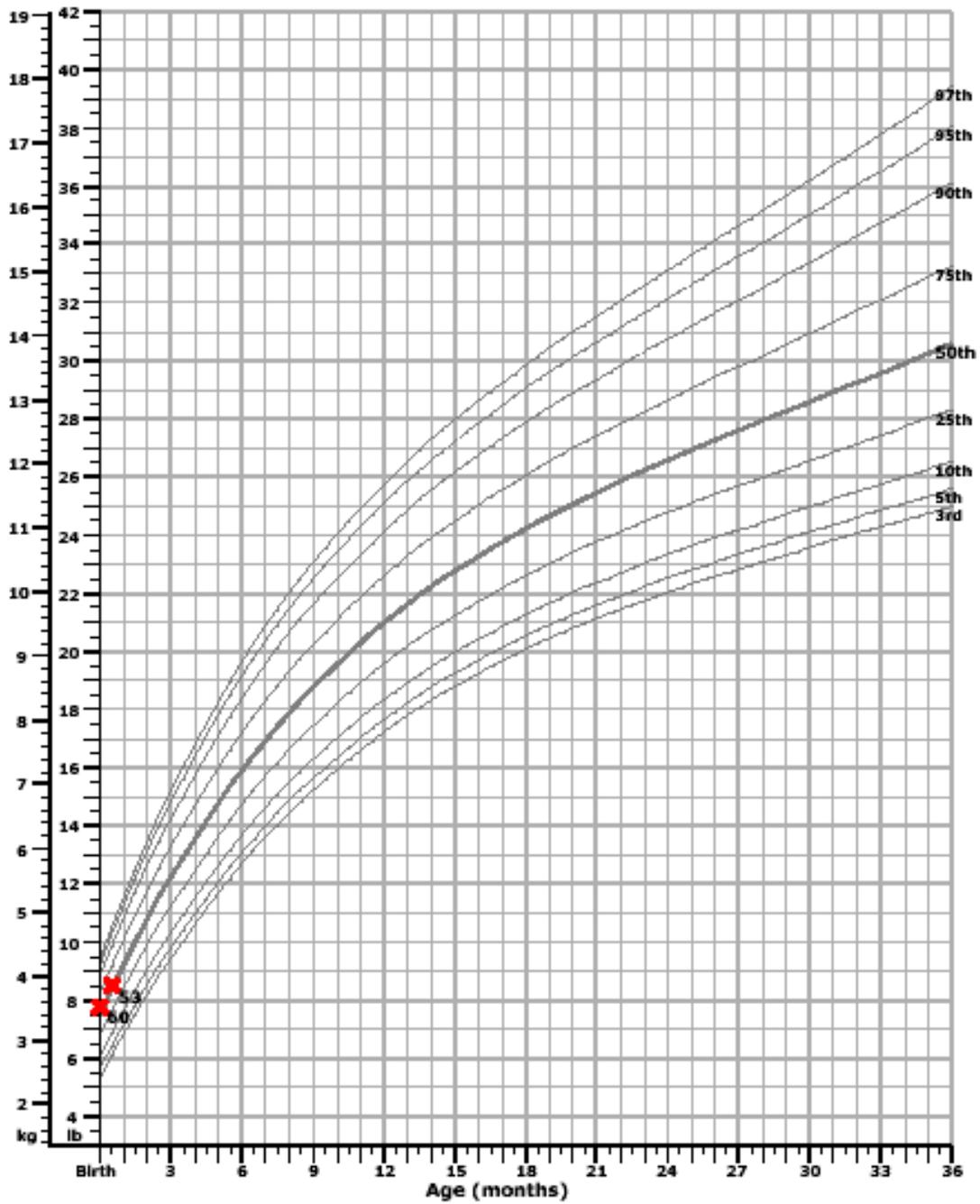


Participant Name: Maria Perkins
Person ID: 11254777
Clinic: 97-97
Family ID: 10469500
Date: 01/20/2006

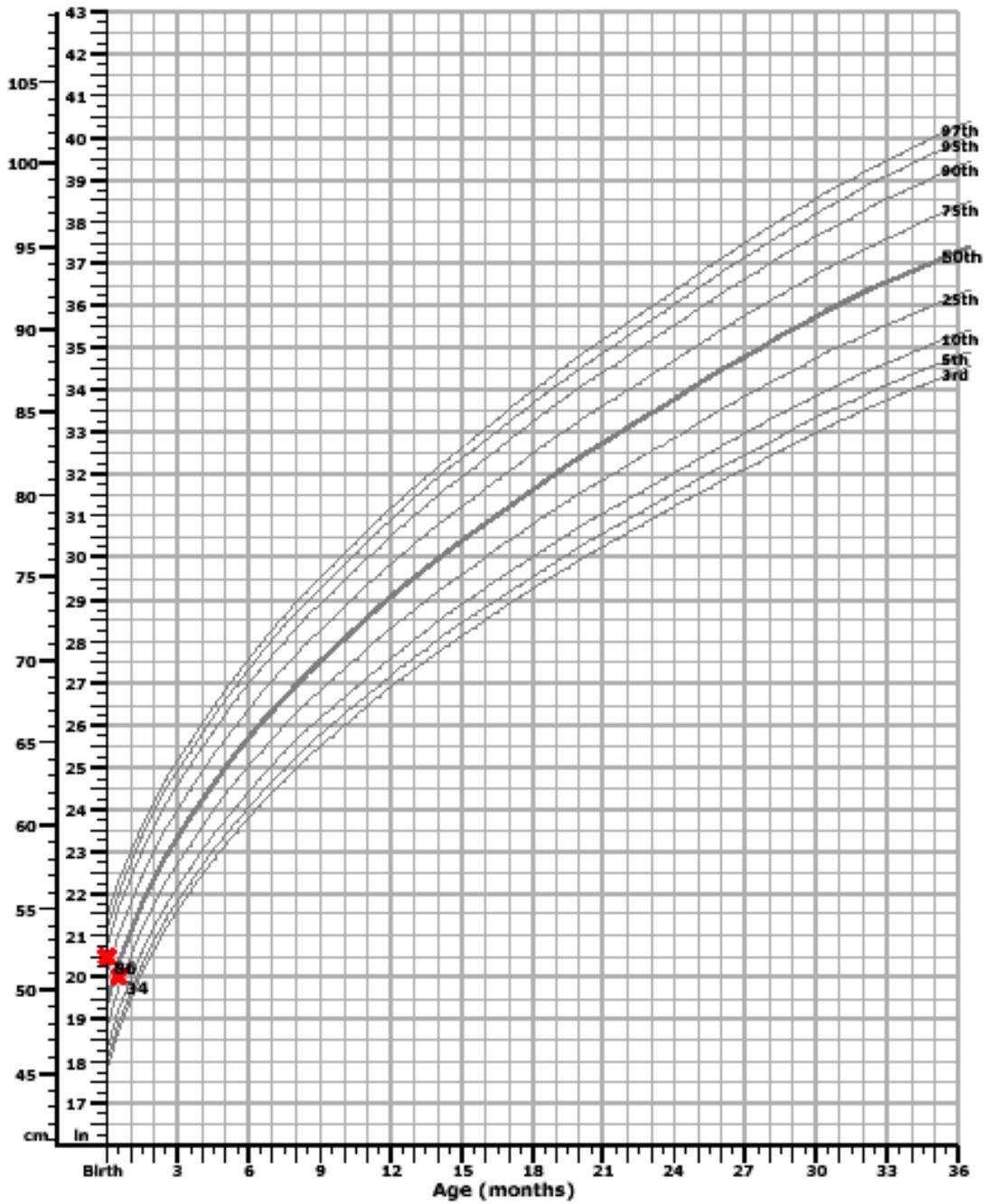
Date	Birth	Number of weeks premature	Recumbent	Weight	Height	Head	BMI
09/07/2005	N		Y	8.5 lbs. 3.8556 kgs.	20 in. 50.8 cm.	13.75 in. 34.925 cm.	
08/22/2005	Y		Y	7.75 lbs. 3.5154 kgs.	20.5 in. 52.07 cm.	13.5 in. 34.29 cm.	

Close Print

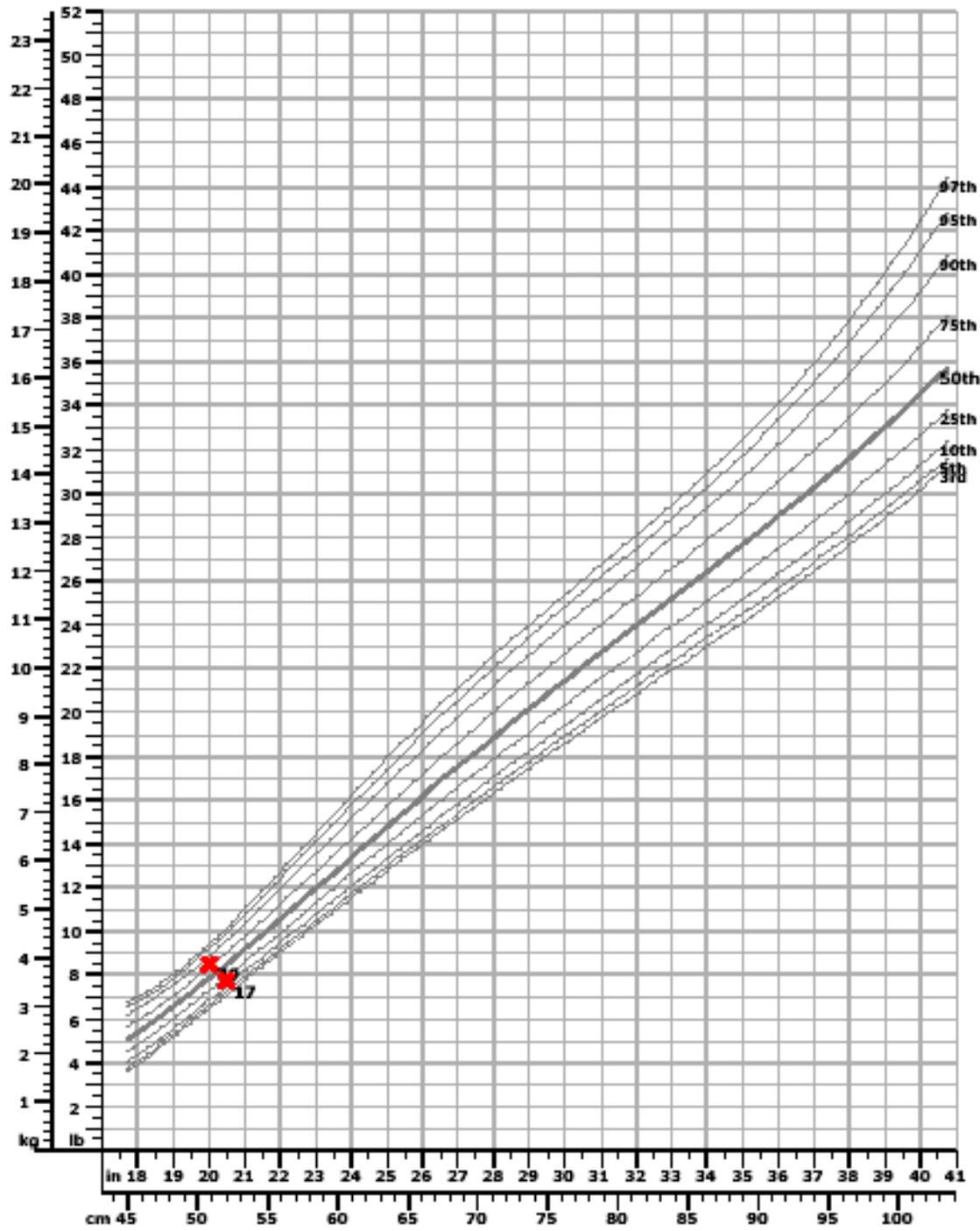
Female Infant Weight For Age Chart - Maria Perkins



Female Infant Length For Age Chart - Maria Perkins



Female Infant Weight For Length Chart - Maria Perkins



Interpreting Growth—Practice Exercises Answers

Case Study 1: Ashley

How would you interpret Ashley's weight/age and height/age?

- Weight/age is slowly rising. Height/age progressing smoothly slightly above the 25%ile.

How would you interpret Ashley's BMI/age?

- BMI/age seems to be rising rapidly and is now at the 95%ile.

Overall, how would you describe Ashley's growth? What issues would you evaluate that might be impacting Ashley's growth?

- She is gaining weight rapidly and could remain overweight later in life if rapid gain continues. (Use your discretion as to whether to explain this to a parent who may be sensitive). Evaluate eating habits and physical activity and focus on improving these practices rather than focusing on weight gain.

Case Study 2: Anton

How would you interpret Anton's weight/age and length/age?

- Weight/age and length/age are progressing smoothly at approximately 5%ile

How would you interpret Anton's weight/length?

- Weight/length is progressing smoothly just below the 50%ile.

Overall, how would you describe Anton's growth? What issues would you evaluate that might be impacting Anton's growth.

- He is small, but his weight and height are proportional and he seems to be growing well. Evaluate birth weight, size of parents, feeding practices, and medical history.

Case Study 3: Maria

How would you interpret Maria's weight/age and length/age?

- Weight/age is progressing smoothly around the 50%ile. Length/age is seems to be dropping, but this is probably due to inaccurate or distorted birth measures.

Has Maria gained adequate weight since birth?

- Maria gained about 12 ounces in the 16 days since birth. Her weight gain is good (See page 14 about weight gain for newborns).

How would you interpret Maria's weight/length?

- Although weight/length appears to be dropping, actually the higher plot is the more recent plot. Birth weight/length was probably inaccurate because the birth length was inaccurate or distorted.

Overall, How would you describe Maria's growth?

- She seems gaining weight well.

ANTHROPOMETRIC TRAINING MANUAL

Part 3 - Prenatal Weight Grids

June 2010

Division of Women, Infants and Children (WIC)



Plotting Prenatal Weight Changes

Learner Objectives

The learner will be able to:

- State purpose of plotting weight gain
- Determine prepregnancy weight and select appropriate weight gain grid for underweight, normal weight and overweight women.
- Use the gestation wheel to determine the exact weeks of gestation.
- Accurately plot pounds gained/lost on the prenatal weight grid.
- Interpret weight gain grid and counsel/refer participants as appropriate.

Prenatal Weight Gain

Why plot weight gain

Inadequate weight gain during pregnancy increases the risk of pre-maturity and low birth weight. Excess weight gain increases risk of difficult labor, birth complications, and difficulty losing weight post-partum. By plotting weight gain, staff can screen for potential problems.

Usually Quick WIC will plot weight gain for you. However, you should know how to plot weight gain manually for when Quick WIC is unavailable or down.

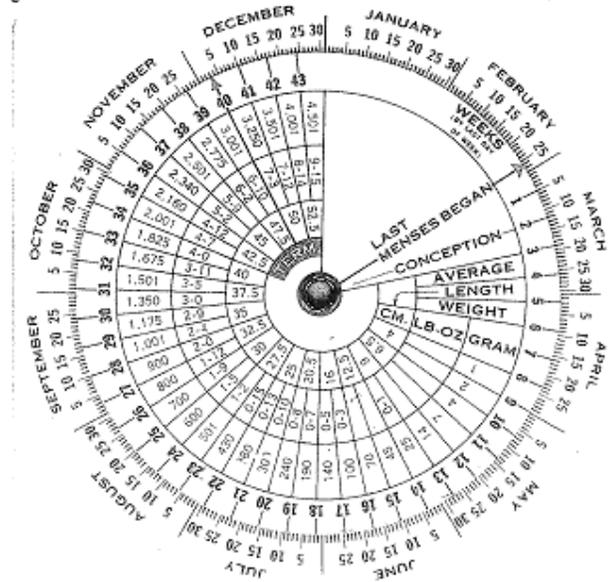
How to plot weight gain manually

1. Determine pre-pregnancy weight and current height. Calculate pre-pregnancy BMI (BMI = weight in pounds ÷ height in inches ÷ height in inches x 703)
2. Select appropriate weight gain grid. Use BMI table on back of WIC grids:
 - Pre-pregnancy BMI < 18.5 Underweight Grid
 - Pre-pregnancy BMI 18.5 – 24.9 Normal Weight Grid
 - Pre-pregnancy BMI 25.0 – 29.9 Overweight Grid
 - Pre-pregnancy BMI ≥ 30.0 Obese Grid
3. Determine current Weight. Determine weeks gestation using gestation wheel.
4. Determine weight gain or loss by subtracting pre-pregnancy weight from current weight.

- Plot weight gain (side of grid) against weeks gestation (bottom of grid)

How to use the gestation wheel

- If you know the woman's estimated delivery date (EDC):
Set arrow indicating "term" 40 weeks or "your estimated due date" on the due date.
- If you do not know the woman's due date:
Set arrow indicating "last menses began" on the first day of the woman's last period.
- Keeping the arrow set in place, locate today's date (or the date she was weighed) on the wheel.
- Read the number below today's date (or the date that she was weighed) for the weeks gestation.



Example: the wheel here shows an estimated due date of December 3. Her last menses began February 26. If today is October 18, she is 33 weeks and 3 days pregnant.

Weight gain recommendations singleton pregnancy

If pre-pregnancy weight is:	the goal is:	the approximate rate of gain is:
Underweight (BMI < 18.5)	28 - 40 lbs	1 lb/wk for 2 nd & 3 rd trimester
Normal (BMI 18.5 – 24.9)	25 - 35 lbs	.8 lb/wk for 2 nd & 3 rd trimester
Overweight (BMI 25.0 – 29.9)	15 - 25 lbs	.5 lb/wk for 2 nd & 3 rd trimester
Obese (BMI ≥ 30.0)	11 - 20 lbs	.4 lb/wk for 2 nd & 3 rd trimester

Weight gain recommendations twin pregnancy

If pre-pregnancy weight is:	the goal is:
Underweight (BMI < 18.5)	no recommendation
Normal (BMI 18.5 – 24.9)	37 - 54 lbs
Overweight (BMI 25.0 – 29.9)	31 - 50 lbs
Obese (BMI ≥ 30.0)	25 - 42 lbs

A gain of 1.5 lbs/wk for the 2nd & 3rd trimesters has been associated with a reduced risk of preterm and low-birth weight delivery in twin pregnancy.

Weight gain recommendations triplet pregnancy

Overall gain around 50 pounds, with a steady rate of gain of approximately 1.5 pounds per week throughout the pregnancy.

Monitoring weight gain

- Plotting weight gain at each clinic visit is recommended, especially if woman presents with weight gain problem at certification.
- Identify major deviations in rate that may signal problems.
- If weight gain appears abnormal, refer to health care provider and/or provide nutrition counseling as appropriate. NOTE: *when evaluating early weight gain, keep in mind that the participant may under/over report her pre-pregnancy weight. Try to verify the accuracy of pre-pregnancy weight by asking where/when she was last weighed before pregnancy.*

Weight related nutritional risks for pregnant women:

Underweight (CC): *Pre-pregnancy BMI < 18.5*

Overweight or Obese (CH): *Pre-pregnancy BMI \geq 25.0*

Low Maternal Weight Gain (CF):

2nd and 3rd Trimesters, singleton pregnancy

<i>Pre-pregnancy Underweight (BMI < 18.5)</i>	< 4 lbs per month
<i>Normal (BMI 18.5 – 24.9)</i>	< 3.2 lbs per month
<i>Overweight (BMI 25.0 – 29.9)</i>	< 2 lbs per month
<i>Obese (BMI \geq 30.0)</i>	< 1.6 lb per month

Low weight gain at any point in pregnancy: plots below the bottom line on appropriate weight gain grid.

Maternal weight loss during the pregnancy: weight loss of any amount to below pregravid weight during the 1st trimester or \geq 2lbs in the 2nd or 3rd trimesters

High Maternal Weight Gain (CF):

All trimesters, all weight groups (singleton pregnancy only): \geq 7 lbs per month

Weight Related Risks for Non Breastfeeding and Breastfeeding Women:

Underweight (CC): N, B < 6 mos ppt: *Pre-pregnancy or Current BMI < 18.5*
B \geq 6 mos ppt: *Current BMI < 18.5*

Overweight (CH): N, B < 6 months ppt: *Pre-pregnancy BMI \geq 25*
B \geq 6 months ppt: *Current BMI \geq 25*

High Maternal Weight Gain (CF) (most recent pregnancy, singleton pregnancy):

Pre-pregnancy Underweight (BMI < 18.5):	> 40 lbs
Normal Weight (BMI 18.5 – 24.9)	> 35 lbs
Overweight (BMI 25.0 – 29.9)	> 25 lbs
Obese (BMI ≥ 30.0)	> 20 lbs

Counseling women on weight gain

CPAs should counsel and/or refer women who display inappropriate weight gain patterns. However, **if a participant under or over reports her pre-pregnancy weight, the weight gain grid will be inaccurate. First try to determine the accuracy of her pre-pregnancy weight by asking where and when she was last weighed before pregnancy.**

If the weight gain pattern is excessive or inadequate, the CPA should review the woman's diet and refer her to MD for evaluation to make sure there is no underlying medical cause.

- *Excess weight gain could possibly be due to:*
 - *gestational diabetes*
 - *multiple births*
 - *increased fluid retention*
 - *quitting smoking*
 - *overeating due to depression, stress or anxiety*

- *Inadequate weight gain could be due to:*
 - *smoking*
 - *illness such as uncontrolled diabetes*
 - *infection*
 - *loss of excess water weight*
 - *depression, issues with her perception of her body image*
 - *problems with nausea, vomiting or poor appetite*
 - *limited access to food*
 - *dental problems*
 - *too much exercise*

Learning Exercises on Prenatal Weight Changes

1. Mary

Today's date: 9/15/2005
EDC 1/1/2006
Prepregnancy Weight 155 BMI _____
Height 64 ½ inches Age at conception 23

Date	Weeks Gestation	Weight
6/18/05	_____	166
9/15/05	_____	175

Which weight gain grid should you use?

Complete weight gain grid. Determine weeks gestation, weight gained and plot.

How much weight should Mary gain during her pregnancy?

What kinds of questions would you ask Mary?

2. Sue

Today's date: 9/15/05
EDC: 2/06/06
Prepregnancy weight: 118 lbs. BMI: _____
Height: 67 inches Age at conception: 25

Date	Weeks Gestation	Weight
7-11-05	_____	119
9-15-05	_____	126

Which weight gain grid should you use?

Complete weight gain grid. Determine weeks gestation, weight gained and plot.

How much weight should Sue gain during her pregnancy?

What kinds of questions would you ask Sue?

Learning Exercises on Prenatal Weight Changes

3. Linda

Today's date: 9/15/05
EDC: 9/29/05
Prepregnancy weight: 110 lbs. BMI: _____
Height: 62 inches Age at conception: 16

Date	Weeks Gestation	Weight
5/12/05	_____	119
7/13/05	_____	131
9/15/05	_____	142

Which weight gain grid should you use?

Complete weight gain grid. Determine weeks gestation, weight gained and plot.

How much weight should Linda gain during her pregnancy?

What would you tell Linda about her weight gain pattern?

Learning Exercises on Prenatal Weight Changes--Answers

1. Mary

Date	Weeks Gestation	Weight
6/18/05	12	166
9/15/05	25	175

BMI = 26.2

Which weight gain grid should you use? Grid for overweight women

Complete weight gain grid--determine weeks gestation, weight gained and plot. (See attached grid.)

How much weight should Mary gain during her pregnancy? 15 -25 Pounds

What kinds of questions would you ask Mary?

- Since Mary seems to have gained a lot of weight in the first trimester of pregnancy, try to verify the accuracy of her pre-pregnancy weight.
- Review diet and ask other questions about smoking, stress etc. if appropriate.
- Refer to MD for further evaluation. (Excess weight gain could possibly be due to gestational diabetes, multiple births or increased fluid).

2. Sue

Date	Weeks Gestation	Weight
7/11/05	10	119
9/15/05	19	126

BMI = 18.5

Which weight gain grid should you use? Grid for normal weight women

Complete weight gain grid--determine weeks gestation, weight gained and plot. (See attached grid.)

How much weight should Sue gain during her pregnancy? 25-35 Pounds

What kinds of questions would you ask Sue?

- Try to verify accuracy of pre-pregnancy weight by asking where and when she was weighed.
- Review diet. If appropriate, ask other questions to determine other causes of low weight gain (e.g. problems with nausea, vomiting or poor appetite; problems getting groceries; concerns about gaining weight, etc)
- Refer to MD for further evaluation if indicated. (Low weight gain could possibly be due to smoking, illness, infection)

3. Linda

Date	Weeks Gestation	Weight
5/12/05	20	119
7/13/05	29	131
9/15/05	38	142

BMI = 20.1

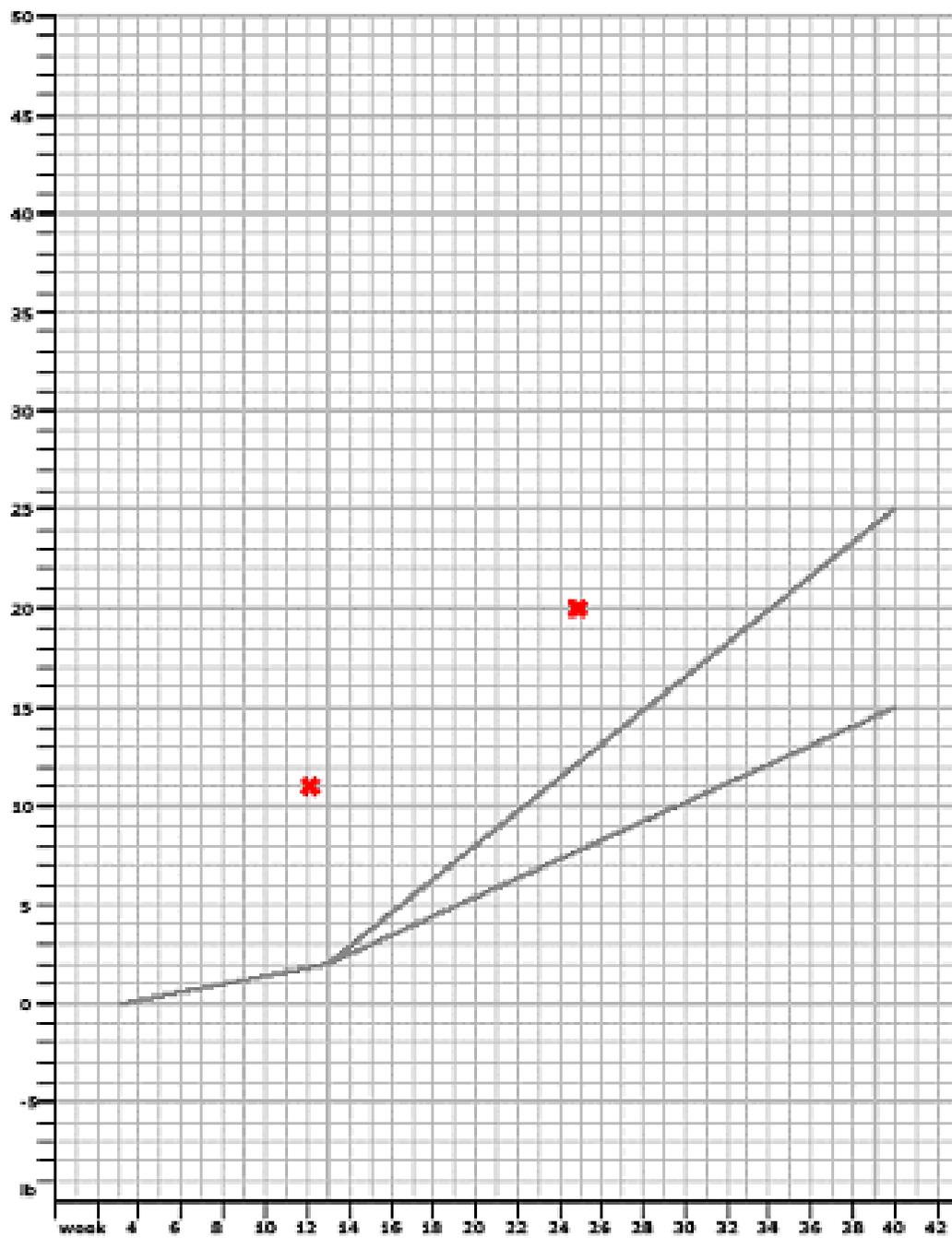
Which weight gain grid should you use? grid for normal weight women

Complete weight gain grid--determine weeks gestation, weight gained and plot. (See attached grid.)

How much weight should Linda gain during her pregnancy? 25 - 35 Pounds

What would you tell Linda about her weight gain pattern? Weight gain is within normal limits.

Prenatal Weight Gain Over - Mary Jones



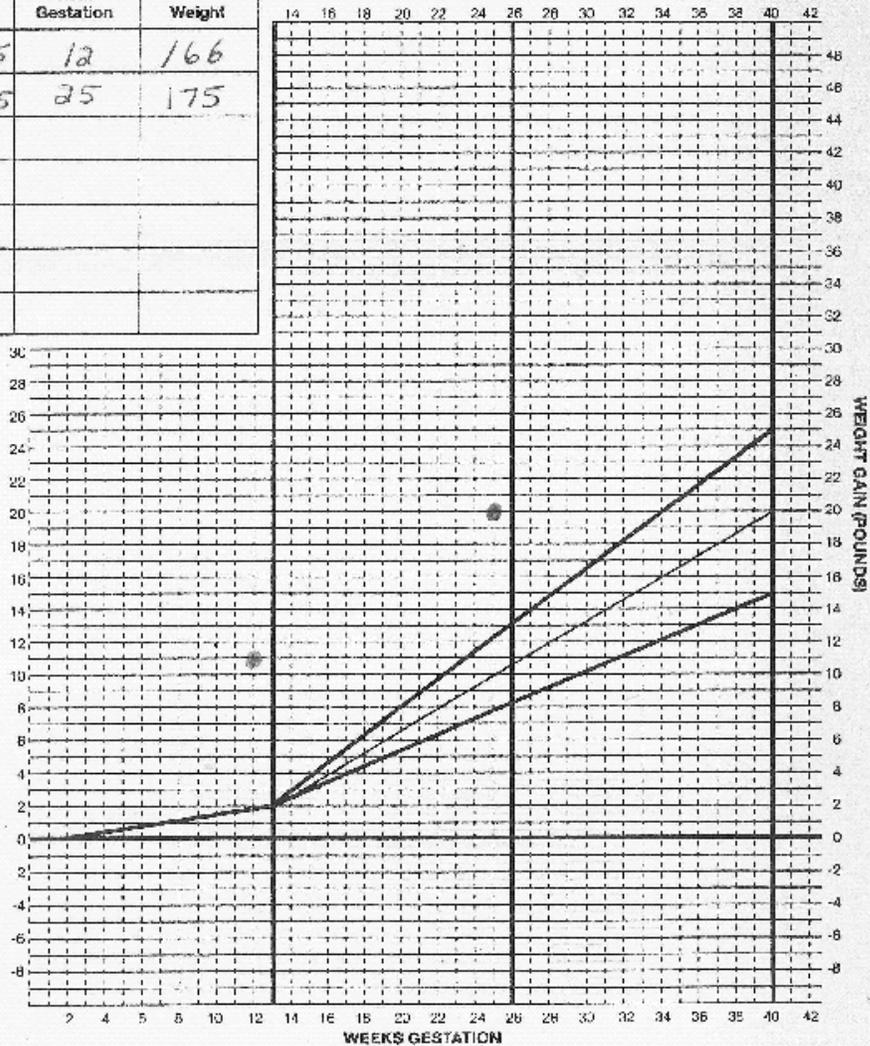


PENNSYLVANIA DEPARTMENT OF HEALTH
DIVISION OF WIC (WOMEN, INFANTS, CHILDREN)
PRENATAL WEIGHT GAIN GRID (OW)

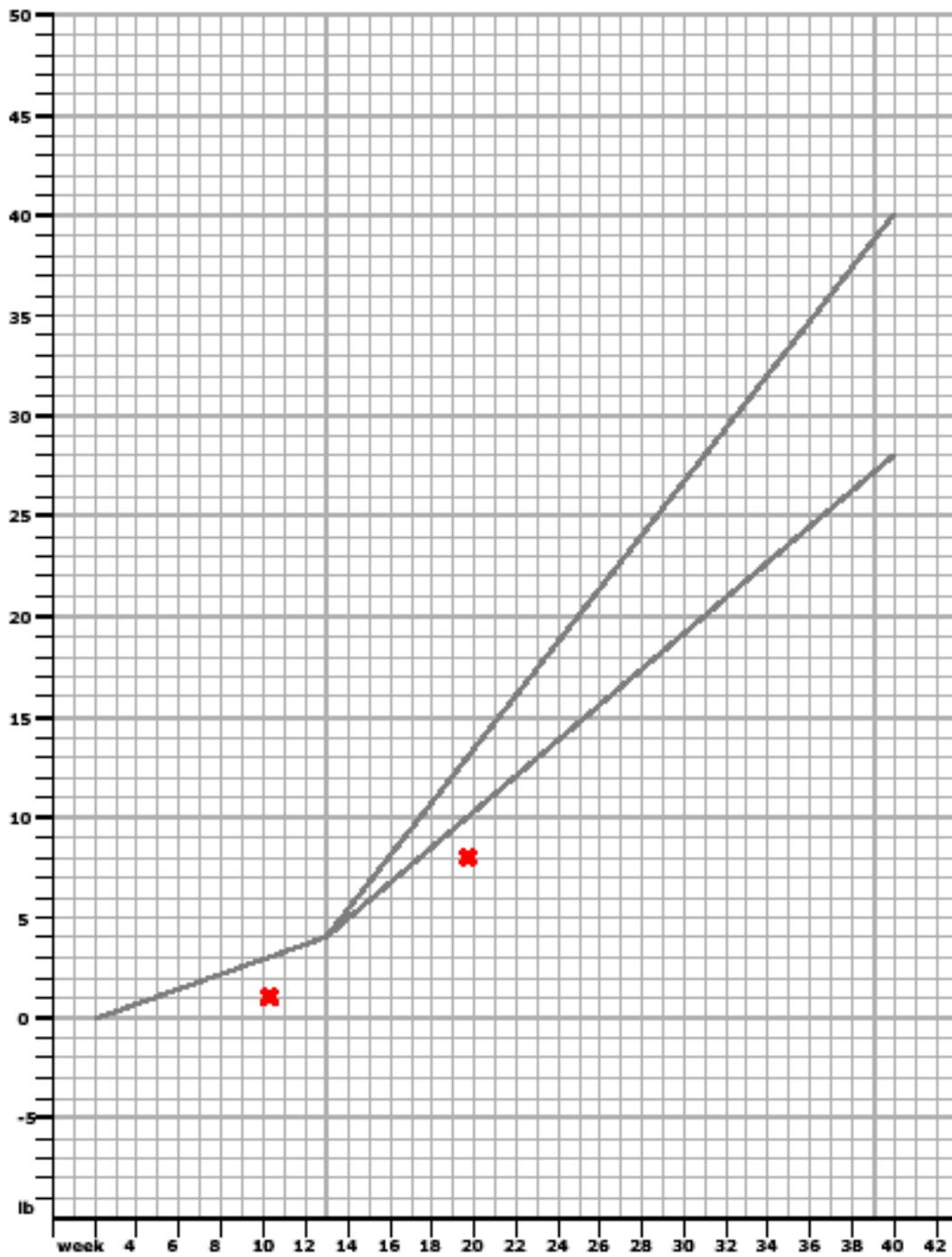


Name Mary Expected Date of Delivery 1/1/06
 Height 64 1/2" Prepregnancy weight 155 Age at conception 23

Date	Wks. Gestation	Weight
6/18/05	12	166
9/15/05	25	175



Prenatal Weight Gain Under - Sue Parsons



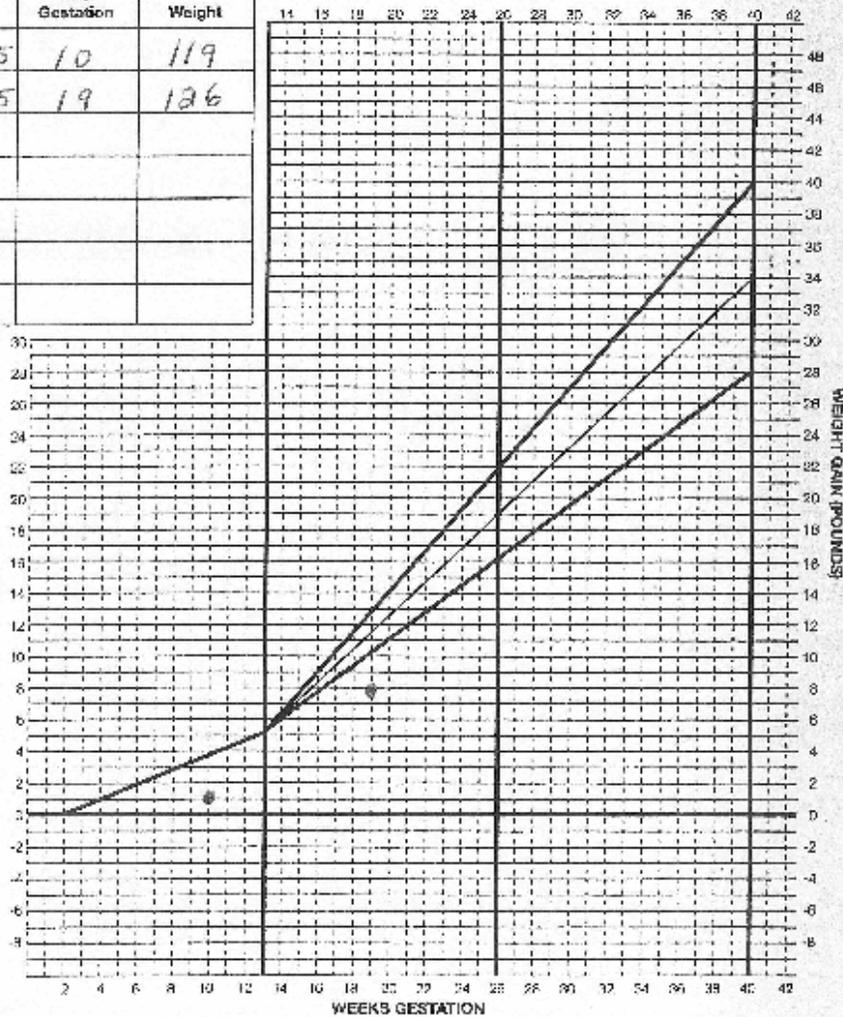


PENNSYLVANIA DEPARTMENT OF HEALTH
 DIVISION OF WIC (WOMEN, INFANTS, CHILDREN)
 PRENATAL WEIGHT GAIN GRID (LW)

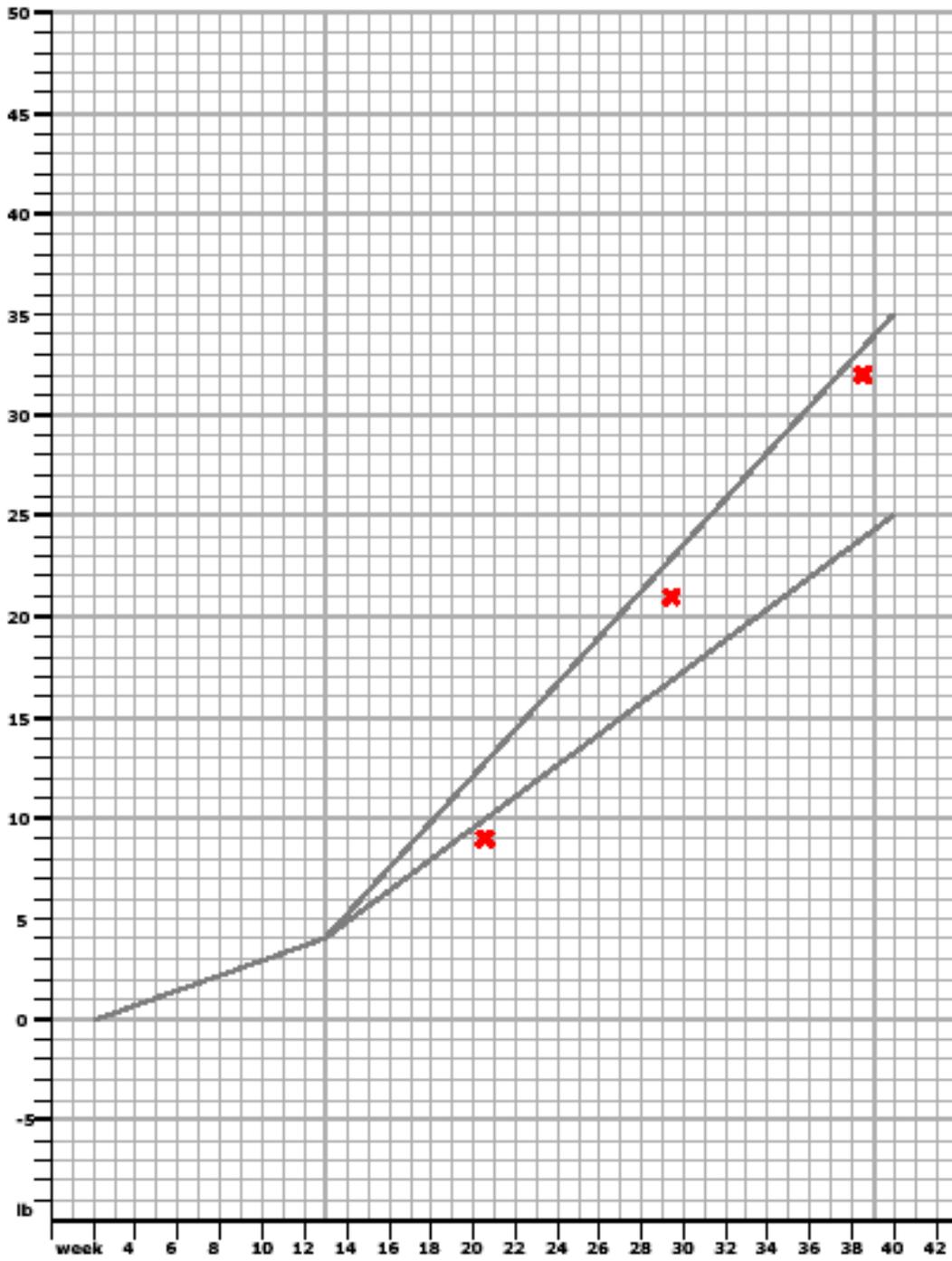


Name Sue Expected Date of Delivery 2/06/06
 Height 67" Prepregnancy weight 118 Age at conception 25

Date	Wks. Gestation	Weight
7/11/05	10	119
9/15/05	19	126



Prenatal Weight Gain Normal - Linda Sims



Anthropometric Training Manual

Part 4: Summary Tables or Hand Outs

June 2010

Division of Women, Infants and Children (WIC)



Summary of Guidelines for Measuring Stature and Weight

	Age	They should wear	Measure to nearest	Until agreement within
Recumbent Length	Infants/children: 0 to 24 mths. and 2-3 yrs. who: cannot stand and /or measure < 30” and/or weigh < 20#.	light clothing, no shoes	1/8 inch	1/4 inch
	Height	Children 2-18 years who measure at least 30” and weigh at least 20#.	clothed, no shoes	1/8 inch
	Adults:	clothed, no shoes	1/8 inch	1/4 inch
Weight	Infants/children (unable to stand, up to infant scale maximum.)	dry diaper ** or light clothing, no shoes	ounce (round to nearest 1/4 lb on PDF)	N/A
	Children: Able to stand.	light clothing, no shoes	1/4 lb	N/A
	Adults	light clothing, no shoes	1/4 lb	N/A

**New infants should be weighed in a dry diaper only, unless the room is too cold.

BMI—WIC Staff Reference Sheet

What is BMI?

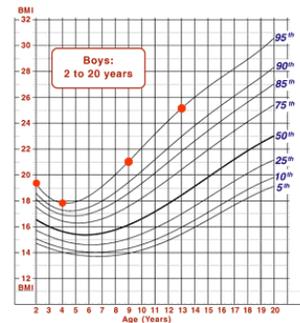
- BMI (Body Mass Index) is a number based on weight and height that helps to identify underweight and overweight in adults and children over age two. BMI correlates well to body fat (usually, the higher the BMI, the more body fat a person has)
- $BMI = \text{Weight (lbs)} \div \text{Height (inches)} \div \text{Height (inches)} \times 703$
- Quick WIC calculates BMI for you.
- For children, BMI is compared with other children of the same sex and age by plotting BMI/age on growth charts.
- For adults BMI is compared with set cut offs for underweight, overweight, etc (see handout “Your BMI”)

Why does WIC use BMI/age rather than weight/height for children over age 2?

- BMI/age allows you to plot weight, height, and age on the same chart, and correlates body fat with age. Body fat varies with age.
- BMI is the best tool to track under/overweight into adulthood. Although weight/height works equally well during the WIC years, BMI is a better tool after age 6.
- BMI can help identify children who may be at risk for future overweight.
- CDC/USDA strongly encourage the use of BMI in children 2 years and older.

Why is the BMI curve shaped differently from the weight/height curve?

The BMI curve tracks how BMI changes with age. BMI usually drops until about age 4–6 (as toddlers lose their “baby fat”) and then begins to rise again. Thus, the BMI curve goes downward then upward. Quick WIC only shows ages 2–5, so you don’t see the whole curve.



What is adiposity rebound?

The point where BMI begins to rise again (usually age 4 – 6)

What is early adiposity rebound and why is it important?

- When BMI begins to rise before age 4 - 6, this is called early adiposity rebound. Early adiposity rebound increases risk for health problems and overweight later in life

Are there any limitations to BMI?

- BMI is a screening tool, not a diagnostic tool. BMI is not an exact measure of body fat. A high or low BMI does not always mean the person has too much or too little body fat. Further evaluation is needed.
- BMI may be misleading in rare instances when high/low weight is due to muscle or bone mass rather than body fat.
 - Some children/adults (esp. athletes) may have high BMI due to large bone or muscle mass, and are not “overfat”.
 - Some children with limited muscle mass (e.g. Spina Bifida, Cerebral Palsy) may be “overfat”, yet have a normal BMI.

Interpretation of Growth Summary

Growth Reading/ Pattern	Nutr Risk	Possible Interpretation
Weight/age \leq 10%ile	N/A	<ul style="list-style-type: none"> ○ May be normal (especially if wt/length or BMI/age are normal and child is following growth curve) ○ May indicate under-nutrition ○ May be caused medical conditions or pre-maturity
Length/age or height/age \leq 10%ile	DM (<i>Short Stature or Risk of Short Stature</i>)	<ul style="list-style-type: none"> ○ May be normal, especially if parents are short (don't assume without full nutrition assessment) ○ May be due to medical condition or pre-maturity ○ May be due to chronic malnourishment
Weight/length or BMI/age \leq 10%ile	DK (<i>Underweight or risk of underweight</i>)	<ul style="list-style-type: none"> ○ May be normal leanness for that individual (don't assume without further evaluation) ○ May indicate under-nutrition or medical problem
BMI/age 85 - <95%ile	DG (<i>at risk of overweight; for children \geq 2 only</i>)	<ul style="list-style-type: none"> ○ May be at risk for future overweight ○ May have a high percentage of body fat due to overeating, high calorie choices and/or inactivity
BMI/age \geq 95%ile	DH (<i>overweight: for children \geq 2 only</i>)	<ul style="list-style-type: none"> ○ Most likely has high percentage of body fat due to overeating, high calorie choices and/or inactivity. ○ Child may have heavy muscles or bones, and is not overfat (not likely in children < 5)
Head/age < 5%ile	DL (<i>low head circumference; infants only</i>)	<p>May be due to heredity or normal for that child, especially if child is small</p> <p>Prenatal or postnatal malnutrition, medical condition</p> <p>Refer to MD if abnormal head size/growth is suspected</p>
Head/age \geq 95%ile	N/A	<p>May be due to heredity</p> <p>May be due to malformations, hydrocephalus, or medical condition</p> <p>Refer to MD if abnormal head size/growth is suspected</p>
1 – 2 percentile drop in wt/age, wt/length or BMI/age	Possibly risk DF (<i>inadequate growth or FTT</i>)	<ul style="list-style-type: none"> ○ May be due to poor nutrition, illness, or medical condition ○ May be normal****
1 –2 percentile drop in length/age or height/age	N/A	<ul style="list-style-type: none"> ○ May be due to chronic malnourishment (especially if wt/age has been dropping too) ○ May be inaccurate measurement ○ May be normal for that individual****
1 –2 percentile increase in BMI/age or wt/length	N/A	<ul style="list-style-type: none"> ○ May be due to high calorie choices, large portions and/or inadequate activity. ○ May be normal or recovering from illness/ underwt

****Weight loss in infants and young children is not normal (except during 1st few days of life). However, it may be normal for children < 24 mos to gradually shift percentiles up or down toward their “genetic potential”, usually toward the 50%ile. Do not assume growth shifts are normal without further evaluation.

Growth Assessment in WIC

Following Johnny through WIC

Johnny is a healthy full term infant new to WIC

It would be normal for Johnny to lose up to about _____ % of his body weight during the first few days of life.

Loss of more than ___ ounces or ___ % of body weight would qualify him for nutrition risk _____. A chart to calculate this is on the reverse side of the Nutrition Risk Assessment (NRA) form.

Johnny should be back to birth weight by _____ days and gain about _____ ounces per week during the first four months of life.

He should double his birth weight by _____ months and triple his birth weight by _____. He will probably grow _____ inches by one year.

Most likely Johnny will follow his growth channels. However, it may be normal for him to **slowly** cross channels toward the 50%ile until he is about _____ months. This is because his birth measures may be reflective of _____ factors and not necessarily his _____. **Weight loss or rapid crossing of growth channels is not normal.**

Beginning at age two and when he can stand, we will begin assessing Johnny's _____. We use BMI because it is a better screening tool for _____, the most common growth problem in children today.

Unlike the weight for height curve, the BMI curve declines until about age _____, and then begins to rise again. The point where BMI begins to rise is called adiposity rebound. If BMI begins to rise before age 4 – 6, this is called early adiposity rebound. Early adiposity rebound is associated with overweight and health problems in adulthood.

Growth Assessment in WIC - Answers

Following Johnny through WIC

Johnny is a healthy full term infant new to WIC

It would be normal for Johnny to lose up to about 6 % of his body weight during the first few days of life.

Loss of more than 8 ounces or 8 % of body weight would qualify him for nutrition risk DEF. A chart to calculate this is on the reverse side of the Nutrition Risk Assessment (NRA) form.

Johnny should be back to birth weight by 10 -14 days and gain about 5 -7 ounces per week during the first four months of life.

He should double his birth weight by 4 -6 months and triple his birth weight by 1 year. He will probably grow 9 - 11 inches by one year.

Most likely Johnny will follow his growth channels. However, it may be normal for him to **slowly** cross channels toward the 50%ile until he is about 24 months. This is because his birth measures may be reflective of prenatal factors and not necessarily his “genetic potential”. **Weight loss or rapid crossing of growth channels is not normal.**

Beginning at age two and when he can stand, we will begin assessing Johnny’s BMI. We use BMI because it is a better screening tool for obesity, the most common growth problem in children today.

Unlike the weight for height curve, the BMI curve declines until about age 4 - 6, and then begins to rise again. The point where BMI begins to rise is called adiposity rebound. If BMI begins to rise before age 4 – 6, this is called early adiposity rebound. Early adiposity rebound is associated with overweight and health problems in adulthood.

Anthropometric Training Helpful Websites and References

www.cdc.gov/growthcharts (to print and obtain growth charts for children)

www.cdc.gov/nccdphp/dnpa/growthcharts/training/modules (CDC Growth Chart Training Modules: Overview of CDC Growth Charts, Using BMI for age Growth Charts, Recommendations to Screen, Assess and Manage Overweight)

<http://depts.washington.edu/growth/> (To learn about accurate weighing and measuring technique)

Please note that some procedures in the Pennsylvania WIC Anthropometric Manual may differ slightly from MCH recommendations on the website due to practical and time considerations. Pennsylvania WIC staff may follow the recommendations in the WIC Anthropometric Manual.

WIC Anthropometric Manual	MCH Recommendation
“Test” scales for accuracy at least yearly and when moved	“Test” scales for accuracy at least monthly and when moved
Weigh on infant scale to the nearest ounce	Weigh on infant scale to the nearest ½ ounce
Measure head circumference to nearest 1/8 inch	Measure head circumference to nearest .1 cm
Weigh children to nearest ¼ lb	Weigh children to nearest ½ ounce
Weigh infants and children once	Weigh infants and children twice
Length, height, and head circumference should be measured twice, or until two measures agree within ¼ inch. Record second measurement	Length, height and head circumference should be measured twice, or until two measures agree within ¼ inch. The average of the two measures should be recorded.
Weigh infants in a dry diaper. Light indoor clothing without shoes is allowed if room is cold	Weigh infants nude or in clean dry diaper
Measure Head Circumference for infants only	Measure head circumference up to age 3
Any child able to stand may be weighed on an adult scale	Children over 36 months may be weighed on adult scale.

<http://depts.washington.edu/growth/poorgrowth/text/intro.htm> (Identifying Poor Growth in Infants and Toddlers)

YOUR CHILD'S BMI

WHAT IS BMI?

BMI (Body Mass Index) is a number based on a person's height and weight. It is used to help identify people who may be underweight or overweight. BMI is used in adults and children over age two.



WHAT DOES YOUR CHILD'S BMI MEAN?

Your child's BMI will be plotted on a growth chart to determine the BMI percentile. The BMI percentile compares your child with other children of the same sex and age. For example:

BMI 0 - 5 th percentile:	Your child may be underweight
BMI 6 – 10 th percentile:	Your child is “at risk of underweight”
BMI 11 – 84 th percentile:	Your child is in the “normal range”
BMI 85 – 94 th percentile:	Your child is “at risk for overweight”
BMI greater than 95 th percentile:	Your child may be overweight

Usually, a child with a high BMI has high body fat. But, BMI alone will not tell you if your child has too much or too little body fat. Some children may have high BMI due to heavy muscles or bones. Also, it is more important to watch how your child grows over time than to look at just one growth plot. Your child's doctor can do a complete evaluation including overall health, diet and activity.

WHY IS YOUR CHILD'S BMI SO IMPORTANT?

We check your child's BMI to help prevent health problems now and as your child gets older. There has been a large increase in children who are overweight. These children are likely to become overweight adults and have health problems.

WIC nutritionists can help you make small changes in your child's diet and activity that can help keep your child at a healthy weight.

Name: _____	Date: _____	
Height: _____	Weight: _____	BMI/age: _____
Nutritionist's Comments/Goal: _____		

BMI AND YOUR CHILD'S HEALTH



WHAT IS BMI?

BMI (Body Mass Index) is a number based on a person's height and weight. It is used to help identify people who may be underweight or overweight, and roughly estimates body fat. BMI is used in adults and children over age two.

WHAT DOES YOUR CHILD'S BMI MEAN?

Your child's BMI will be plotted on a growth chart to determine the BMI percentile. The BMI percentile compares your child with other children of the same sex and age. For example:

BMI 0 - 5 th percentile:	Your child may be underweight
BMI 6 - 10 th percentile:	Your child is "at risk of underweight"
BMI 11 - 84 th percentile:	Your child is in the "normal range"
BMI 85 - 94 th percentile:	Your child is "at risk for overweight"
BMI greater than 95 th percentile:	Your child may be overweight

Usually, a child with a high BMI has increased body fat. But, BMI alone will not tell you if your child has too much or too little body fat. Some children may have high BMI due to heavy muscles or bones. **Also, it is very important that you watch how your child grows over time, rather than to look at one point on the chart.** Your child's doctor can do a complete evaluation including overall health, his diet and activity.

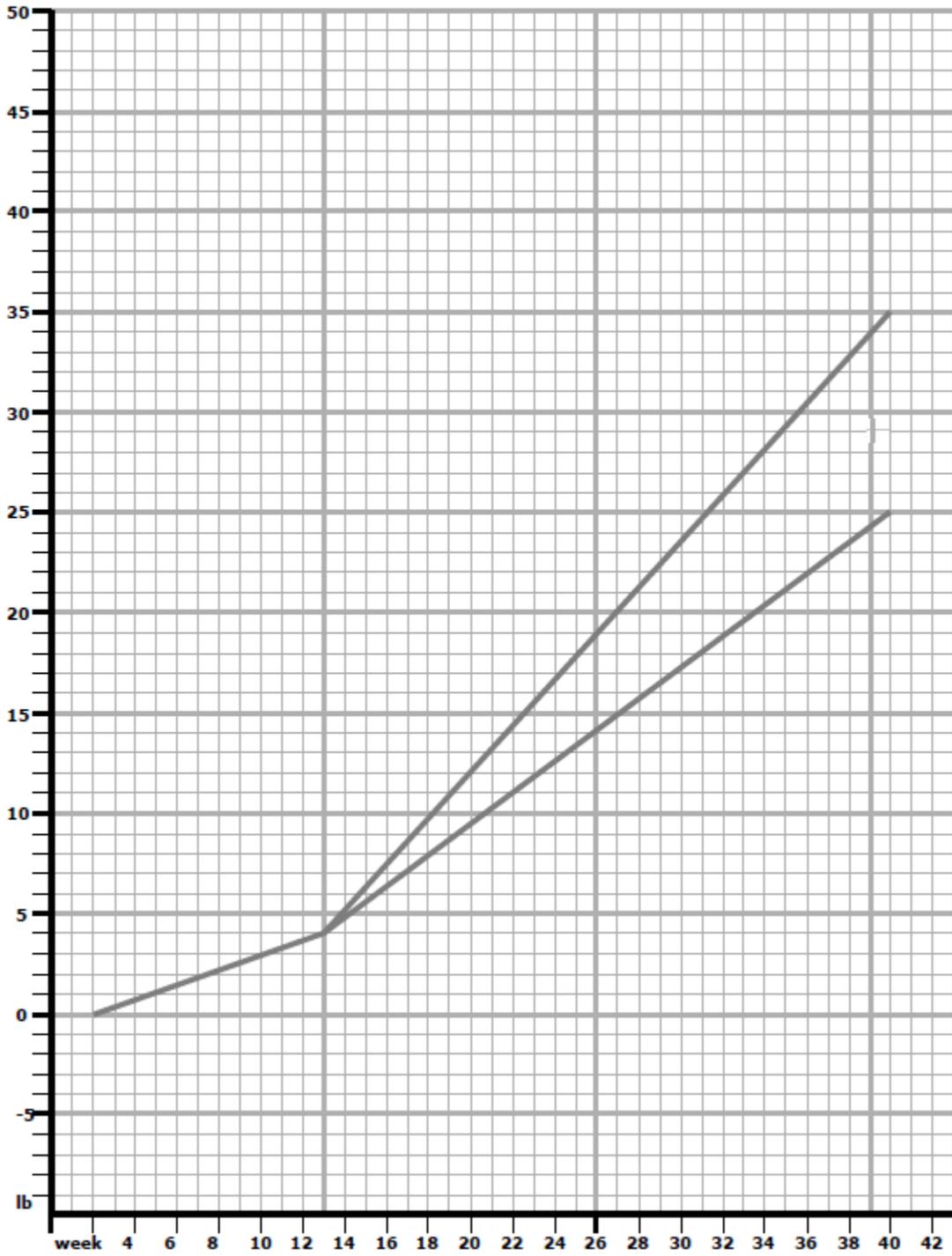


WHY IS YOUR CHILD'S BMI SO IMPORTANT?

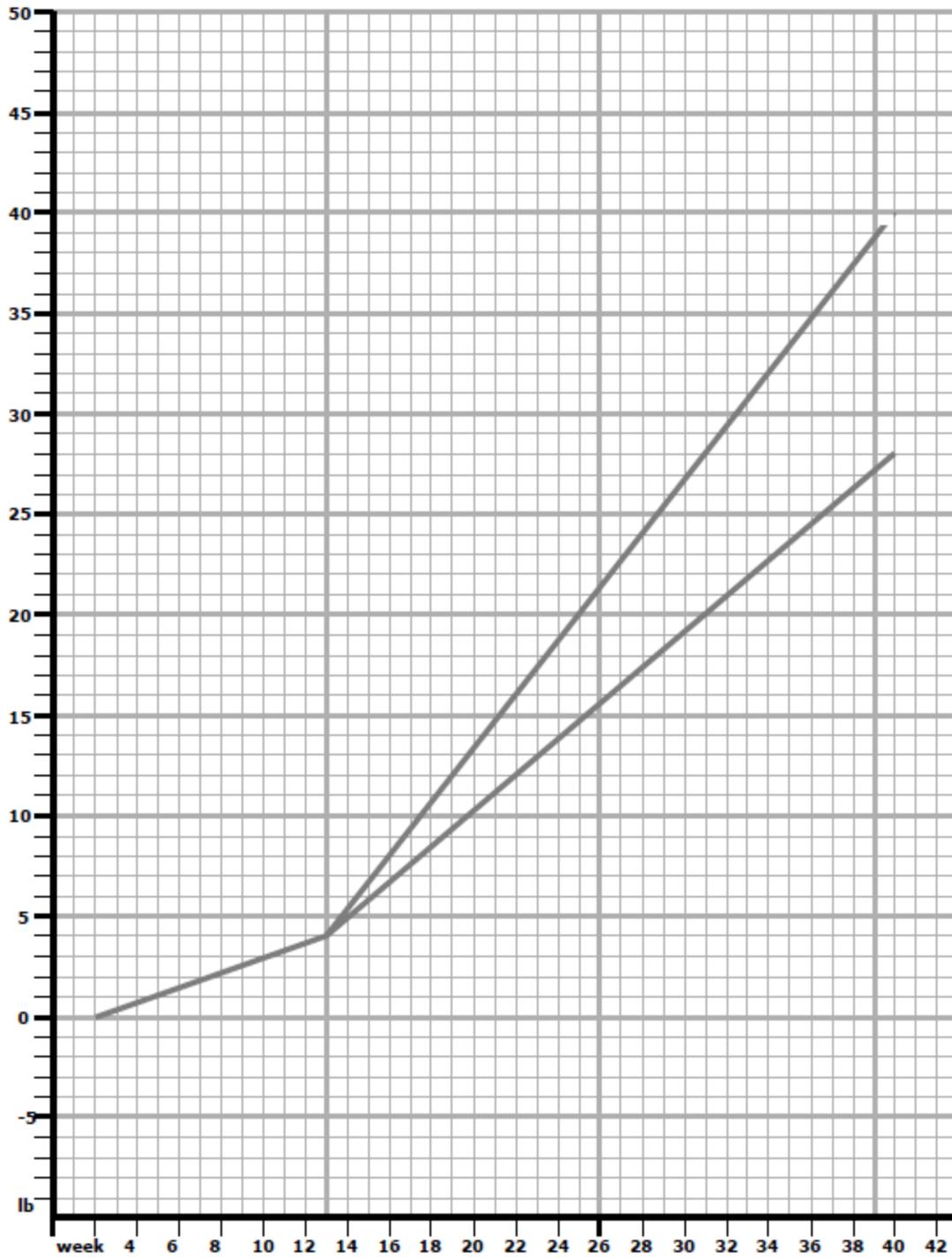
We look at your child's BMI to help prevent health problems now and as your child gets older. There has been a large increase in children who are overweight. These children are likely to have health problems and become overweight adults. Some of these health problems include high blood pressure, heart disease, diabetes, asthma, sleep apnea, and psychosocial problems such as low self-esteem, depression and high risk behaviors.

If your family has a history of heart disease, diabetes, or high blood pressure, it would be especially wise to start making changes now in your child's health habits. Paying attention to the types of foods eaten, portion sizes and physical activity is a good start to better health in the future!

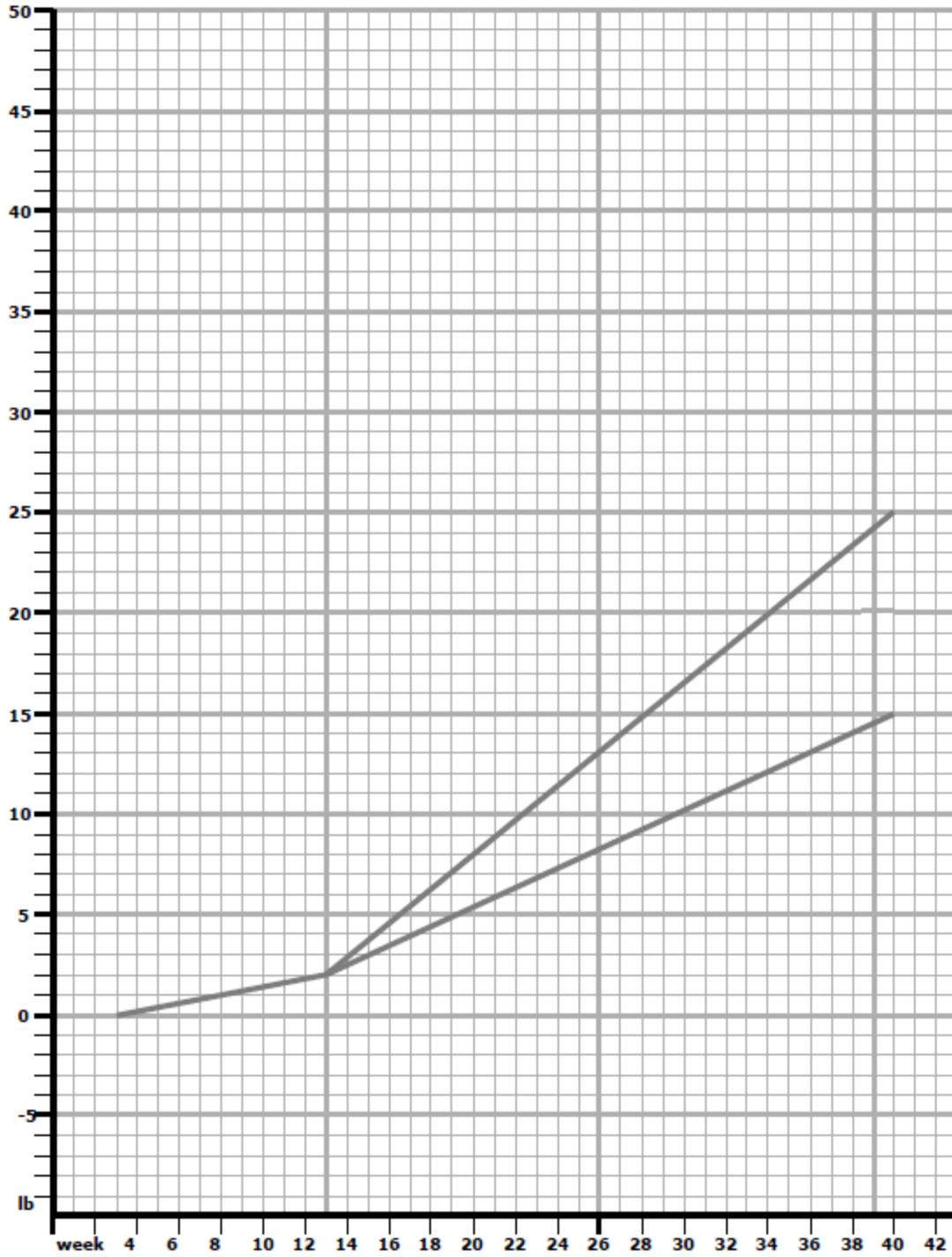
Prenatal Weight Gain Normal



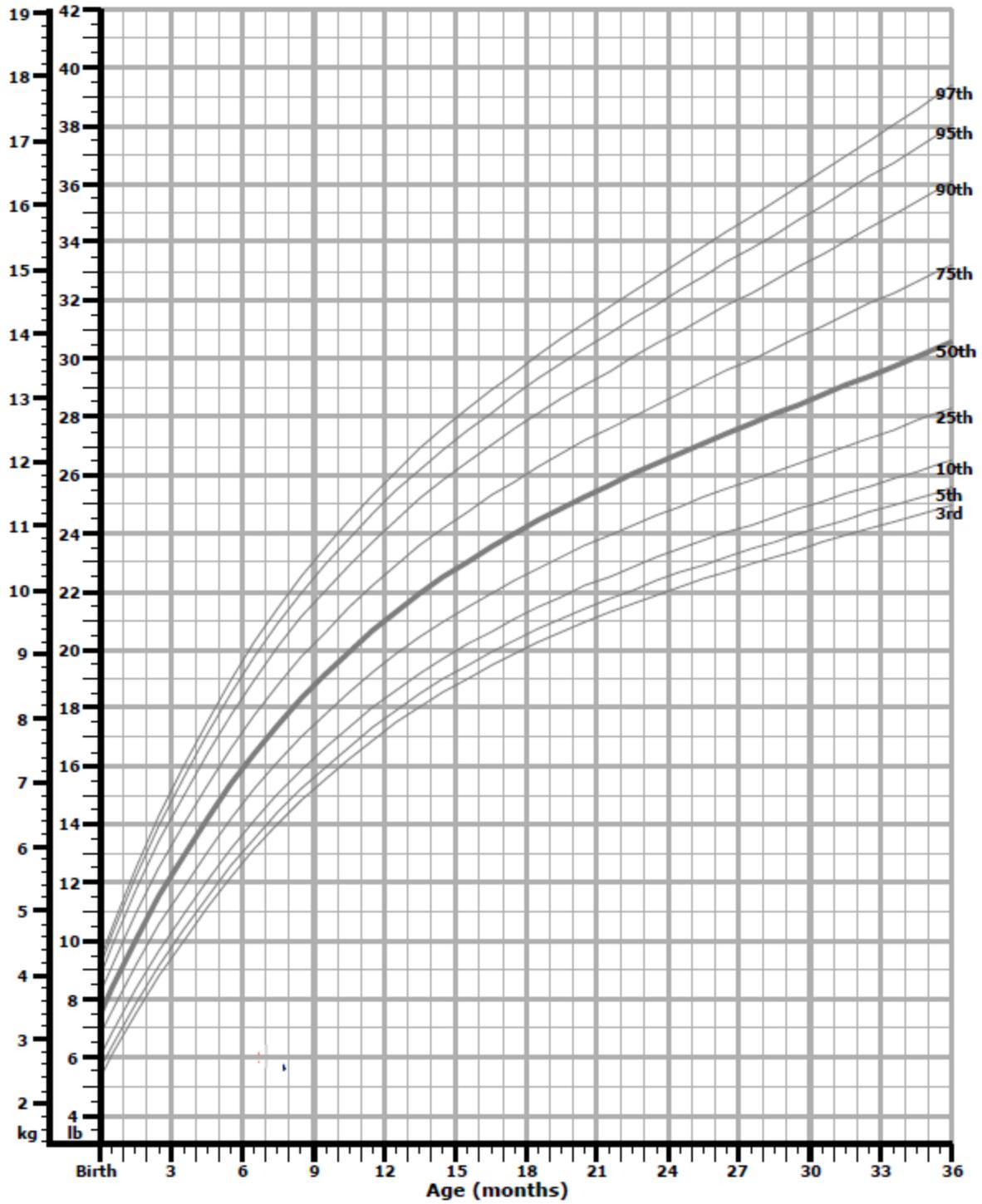
Prenatal Weight Gain Under



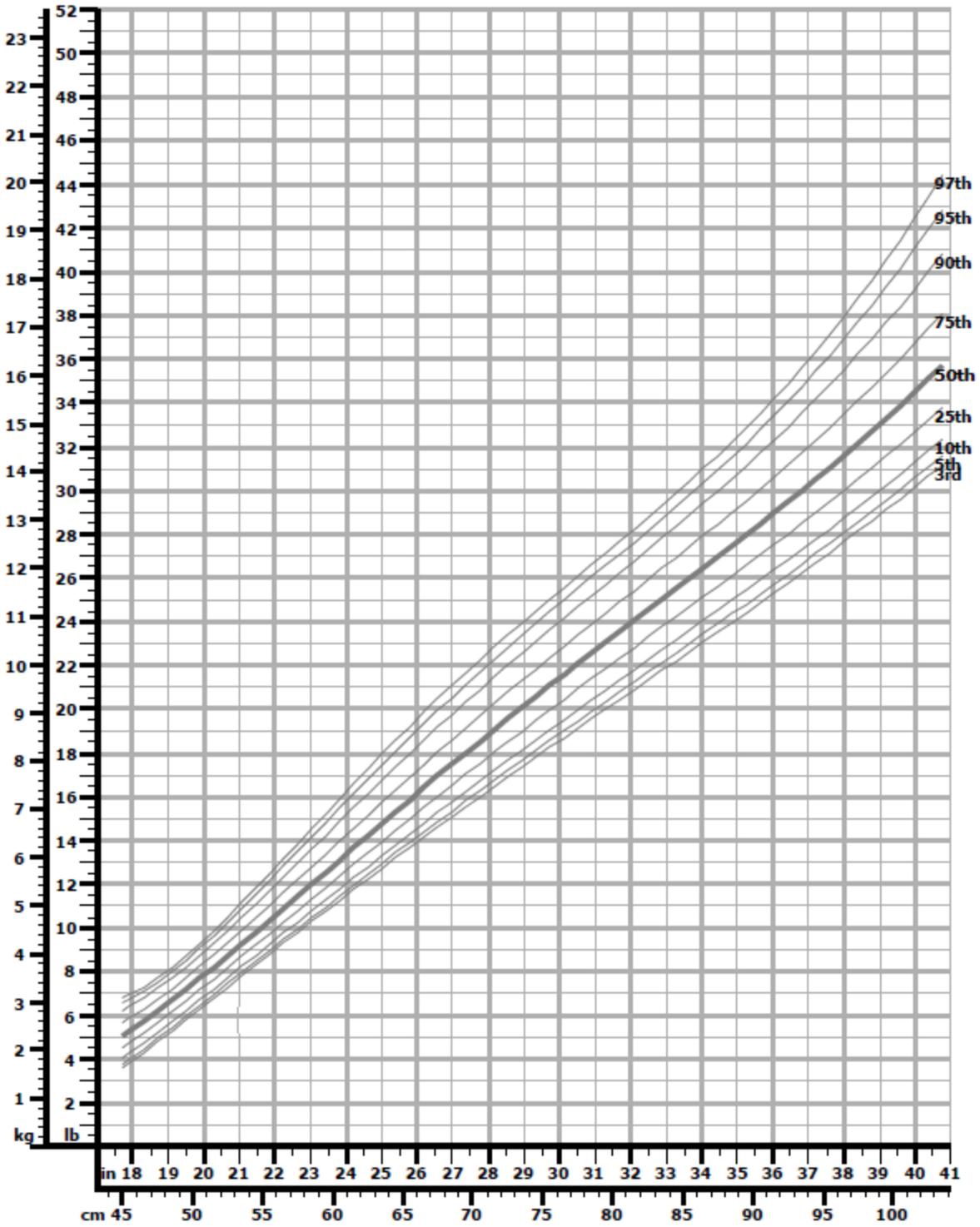
Prenatal Weight Gain Over



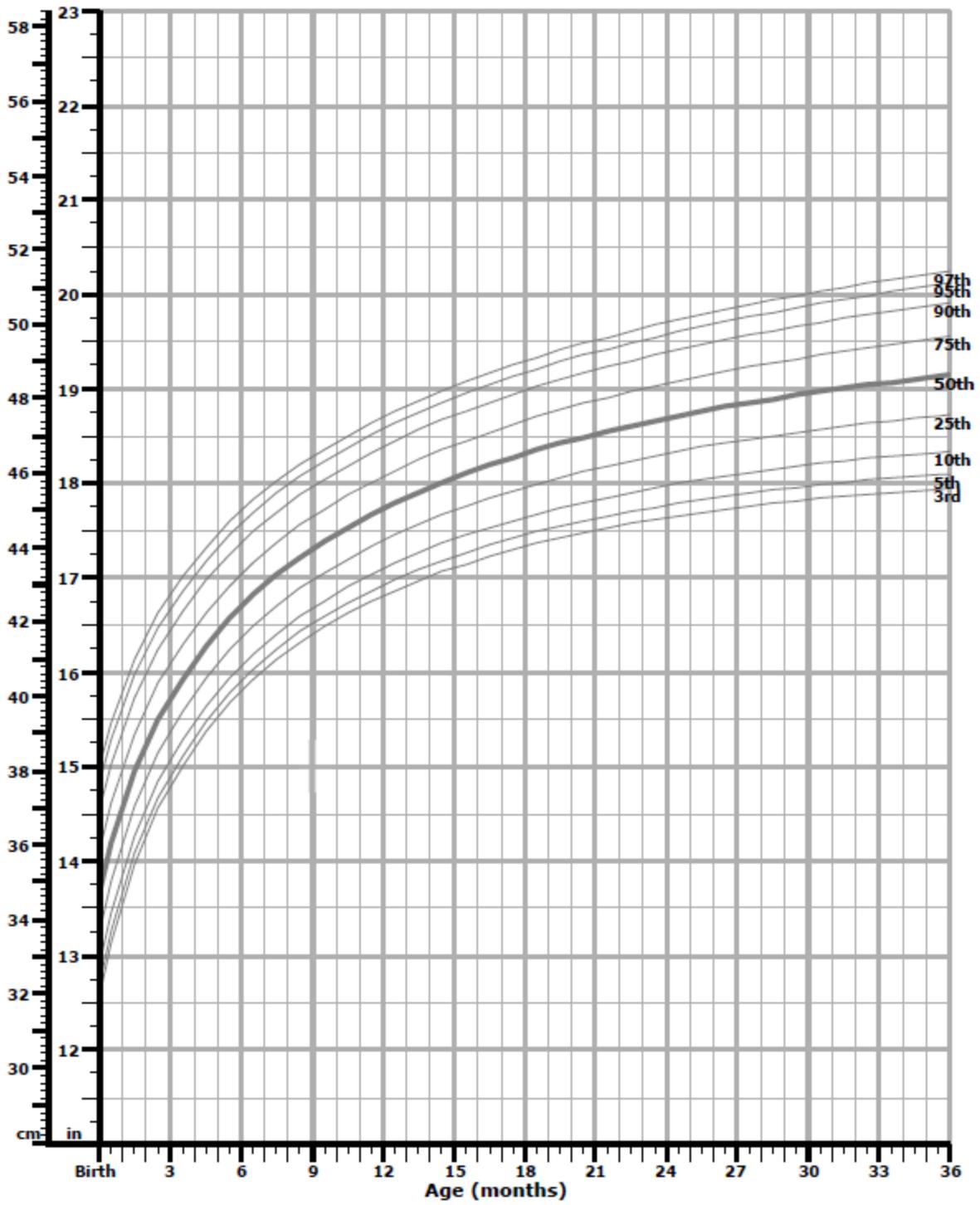
Female Infant Weight For Age Chart



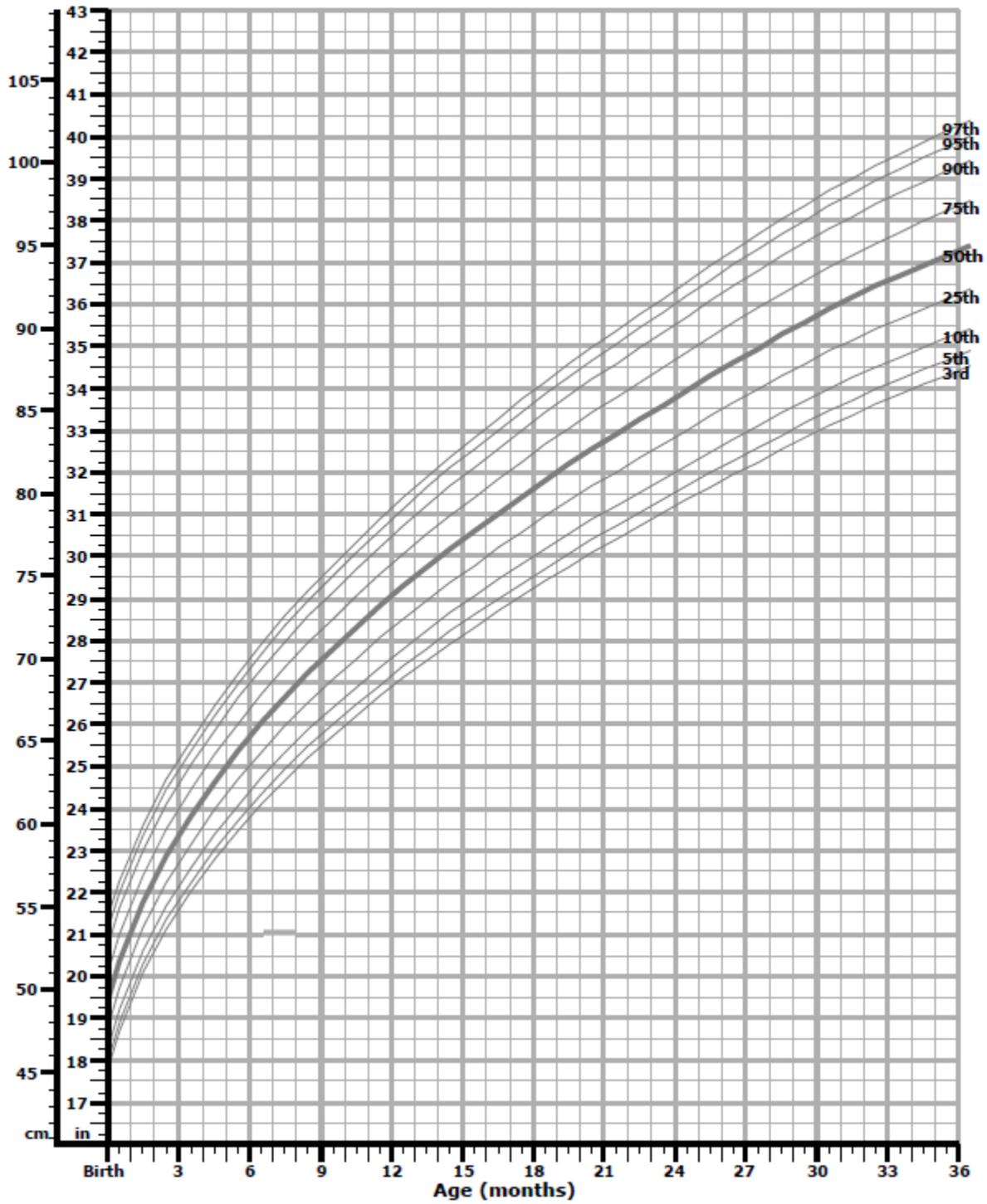
Female Infant Weight For Length Chart



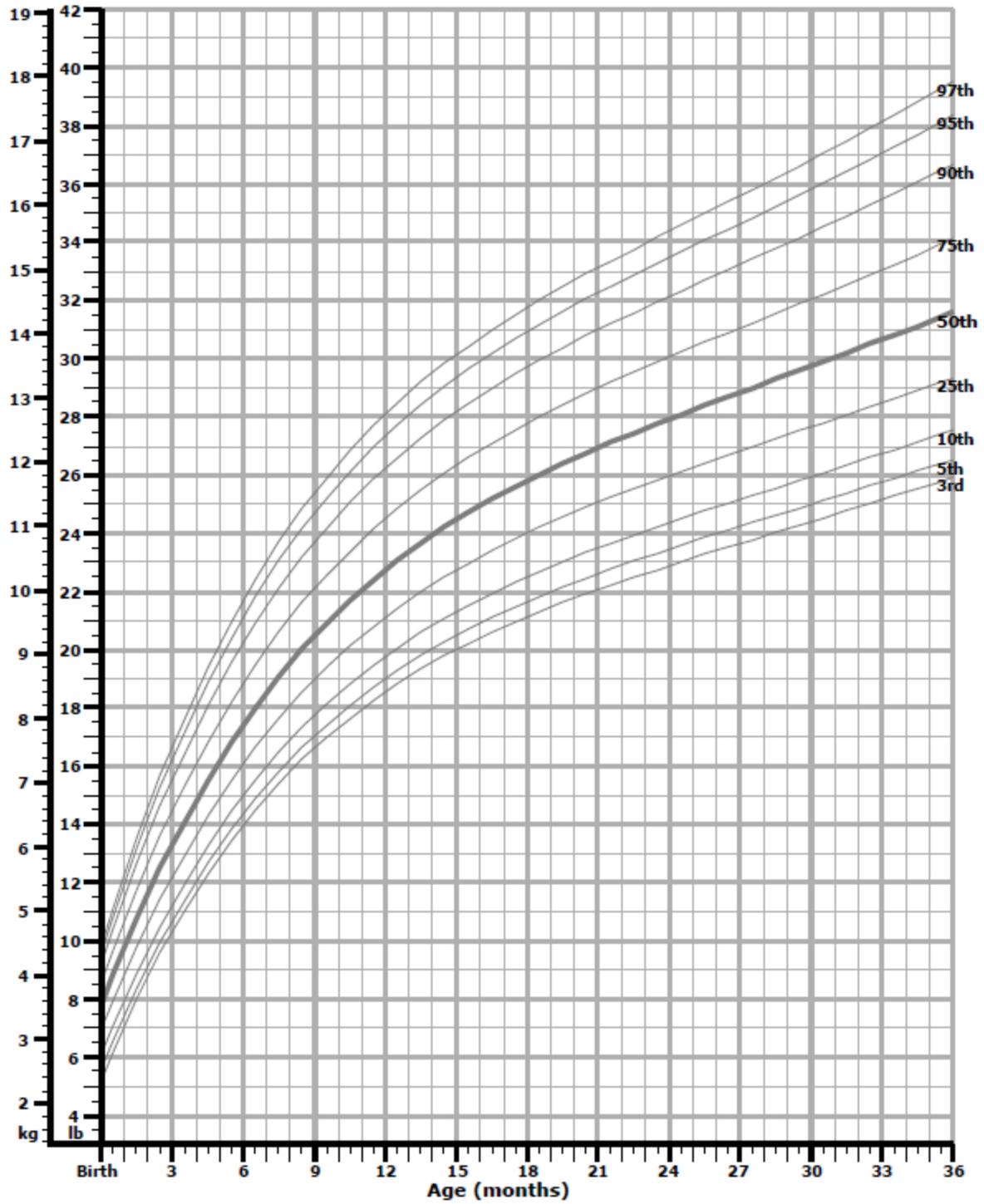
Female Infant Head Circumference For Age Chart



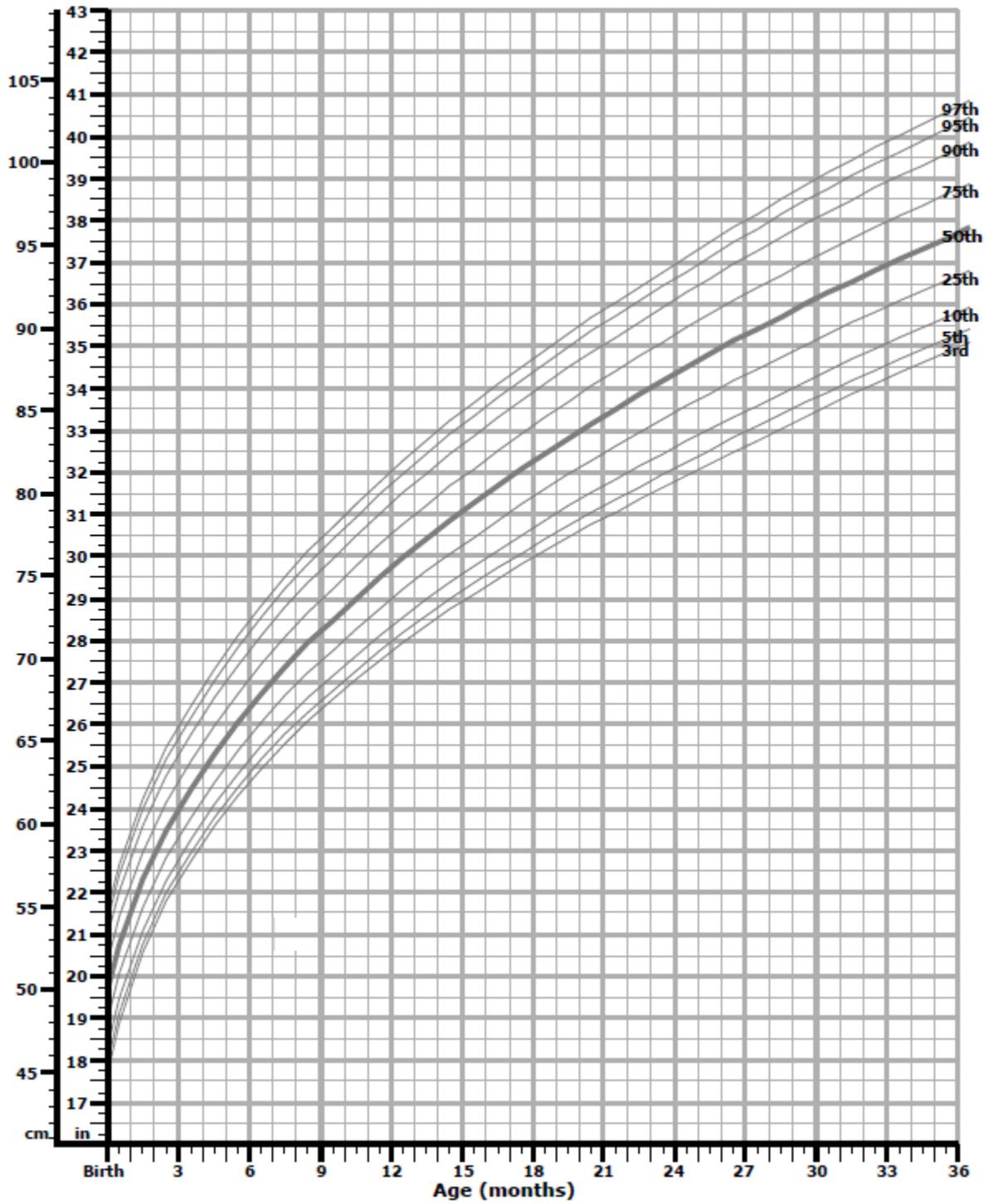
Female Infant Length For Age Chart



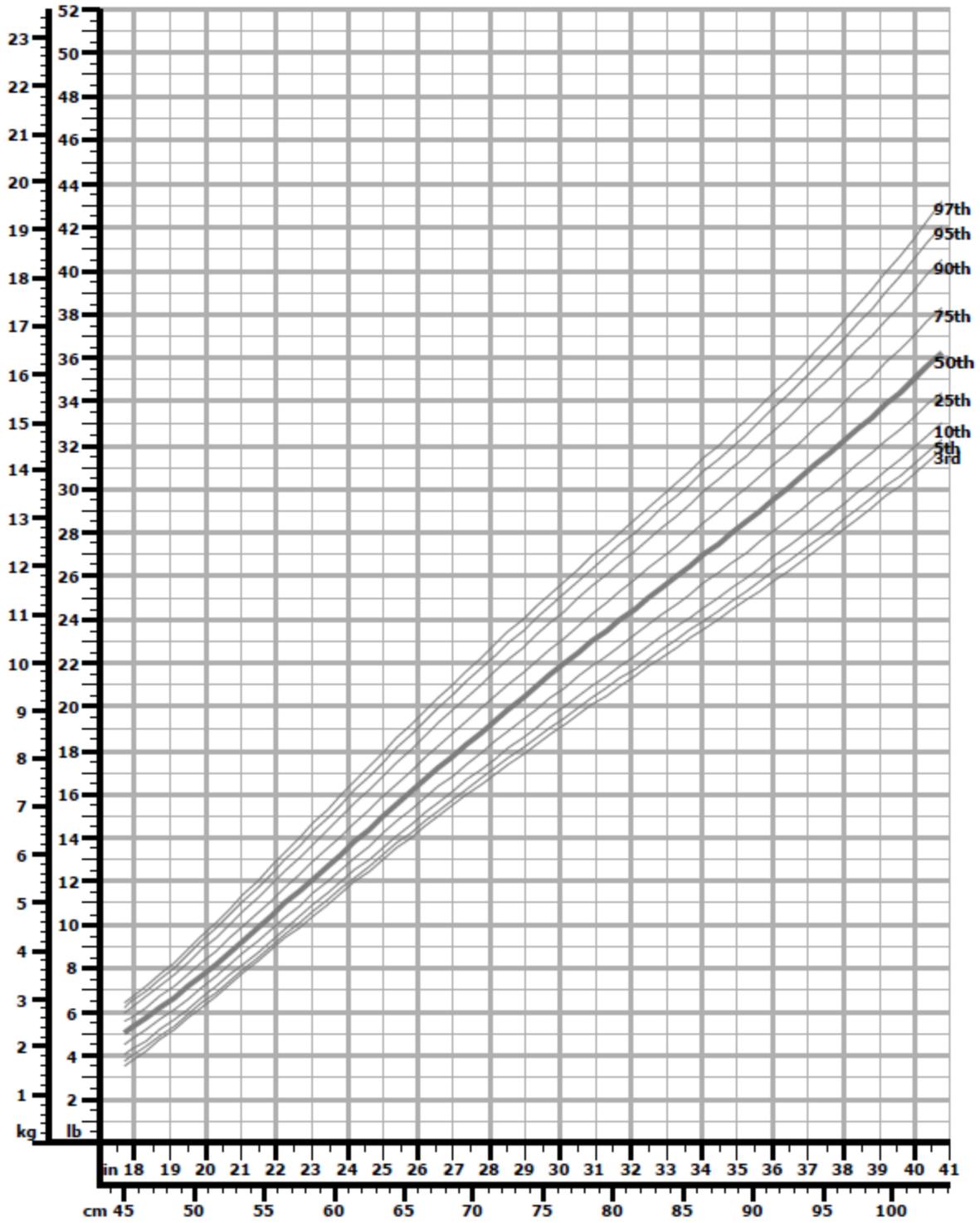
Male Infant Weight For Age Chart



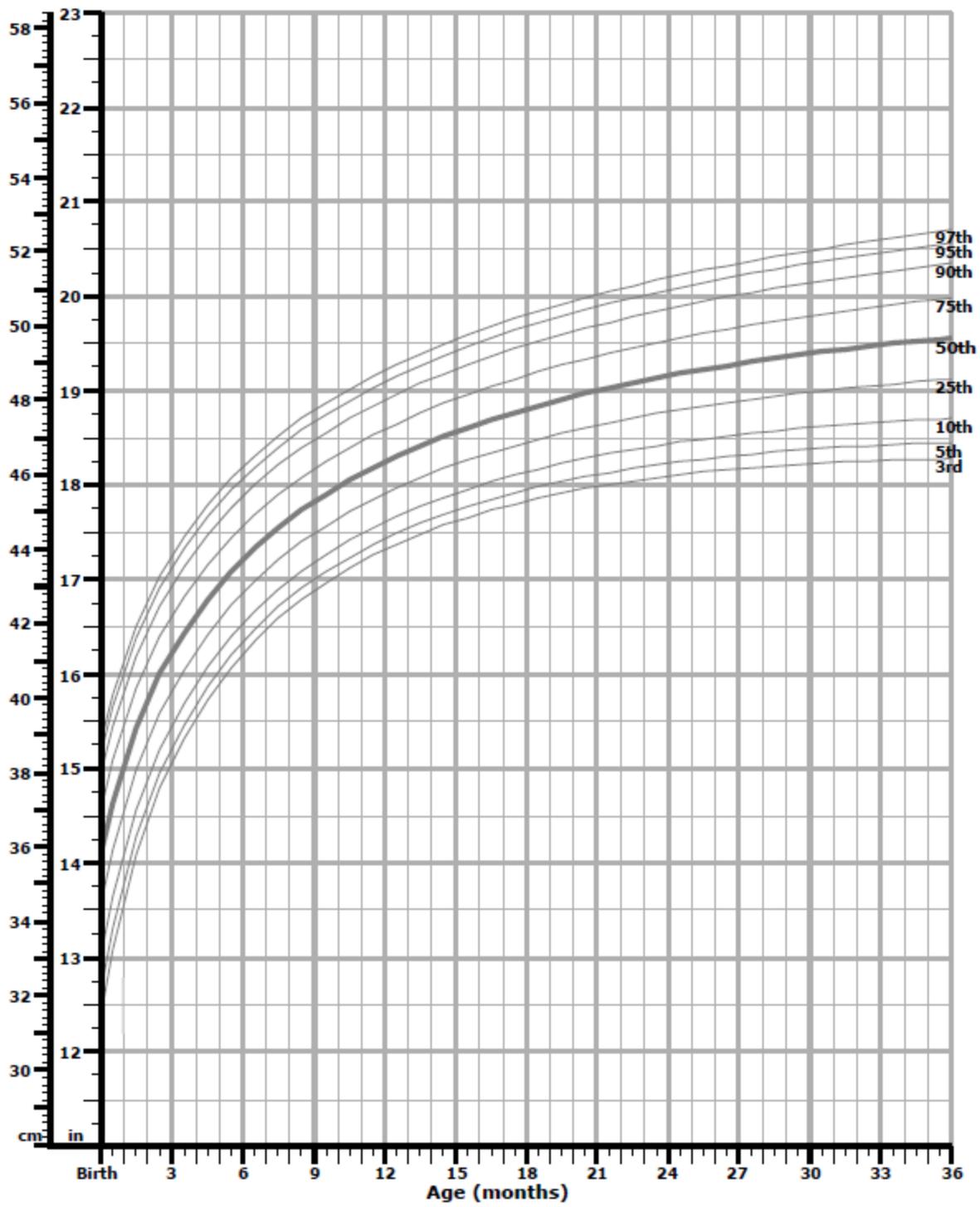
Male Infant Length For Age Chart



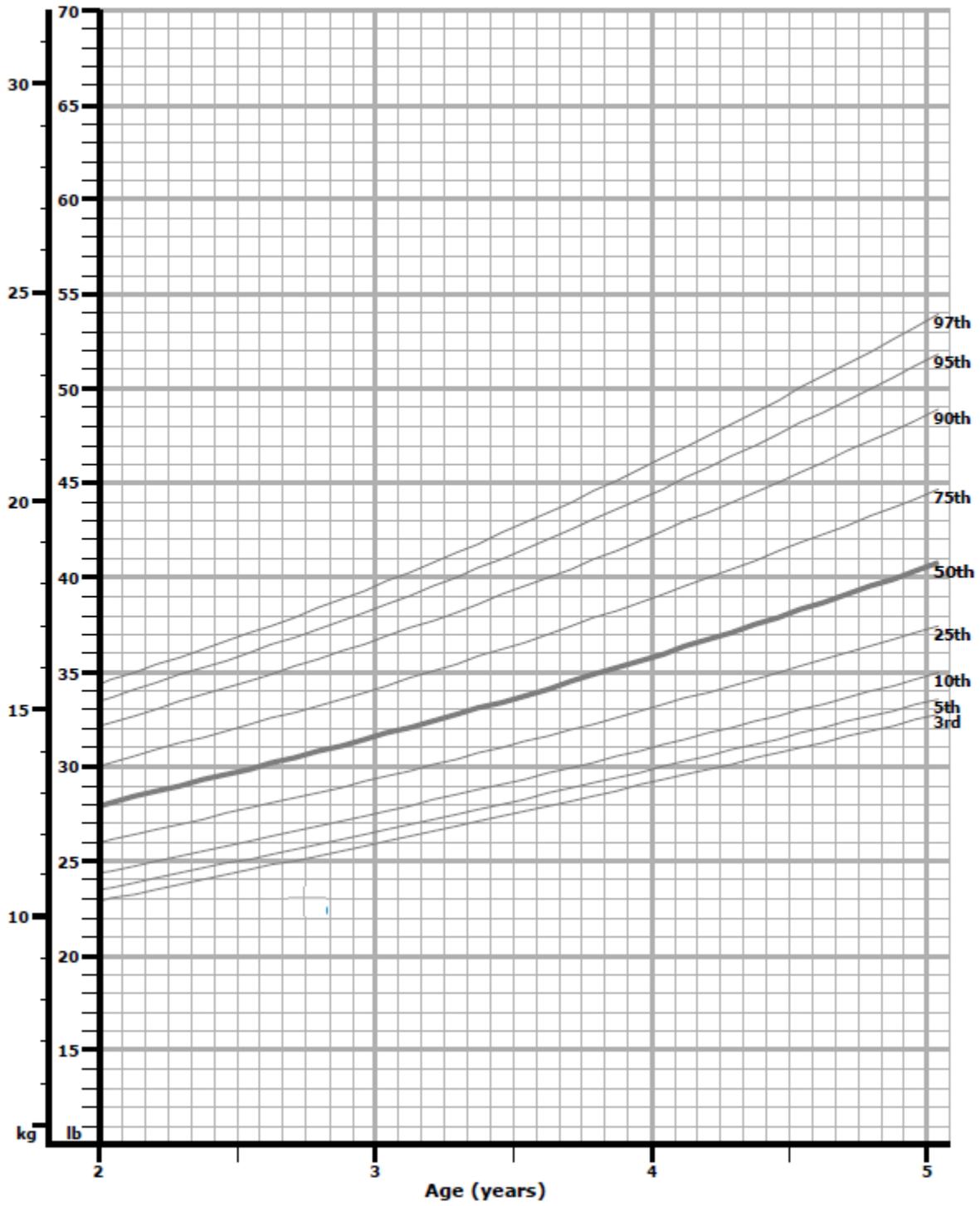
Male Infant Weight For Length Chart



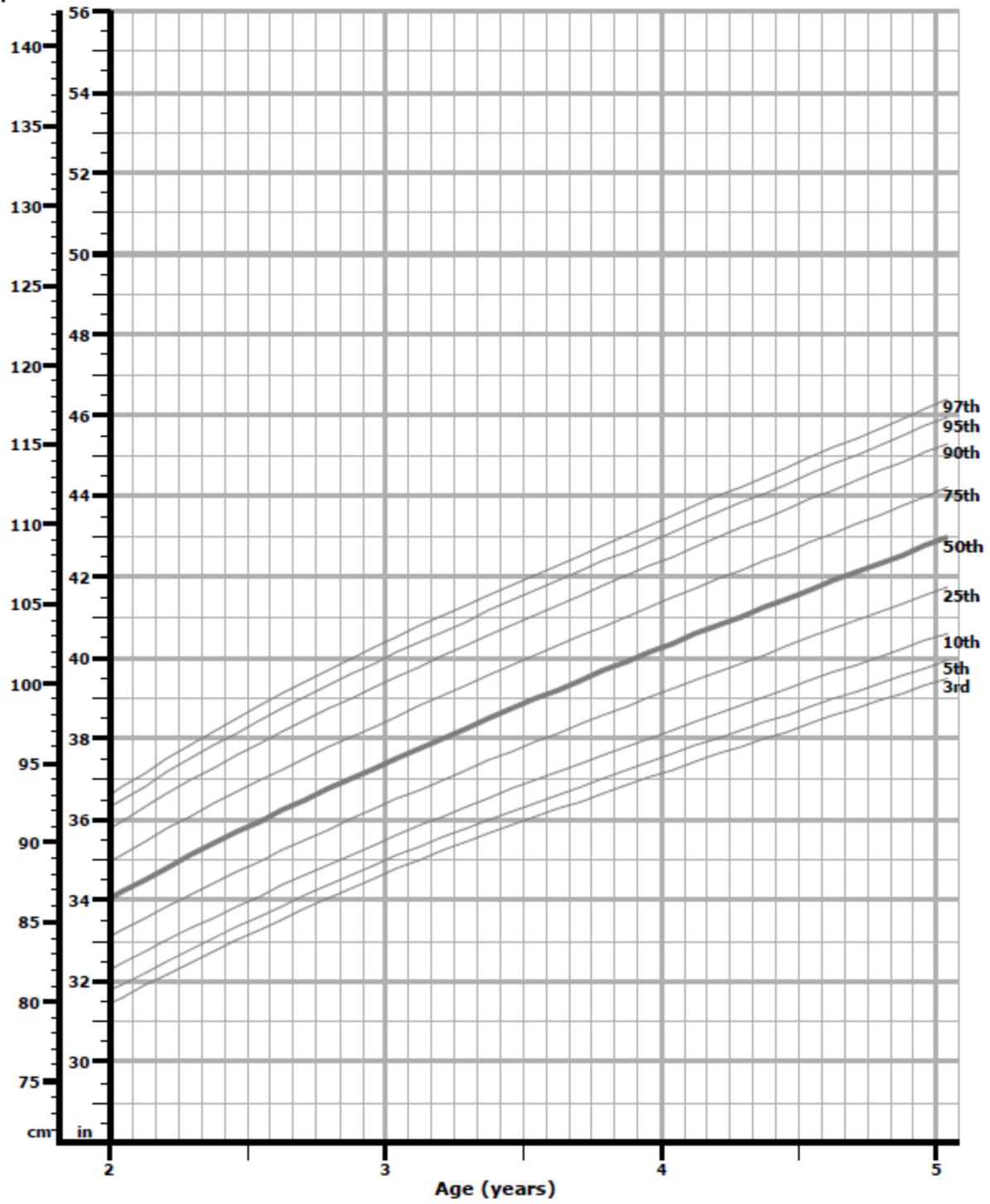
Male Infant Head Circumference For Age Chart



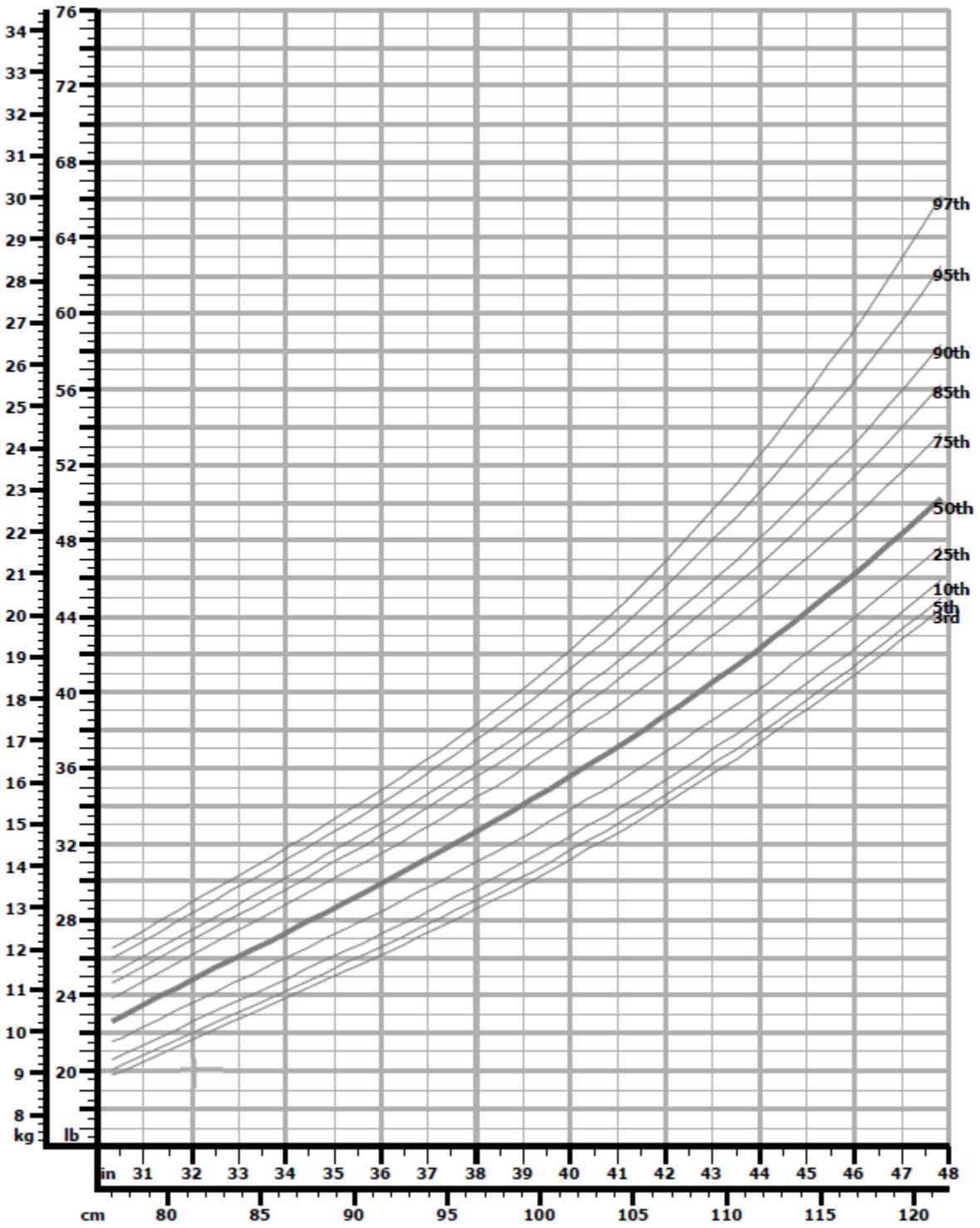
Male Child Weight For Age Chart



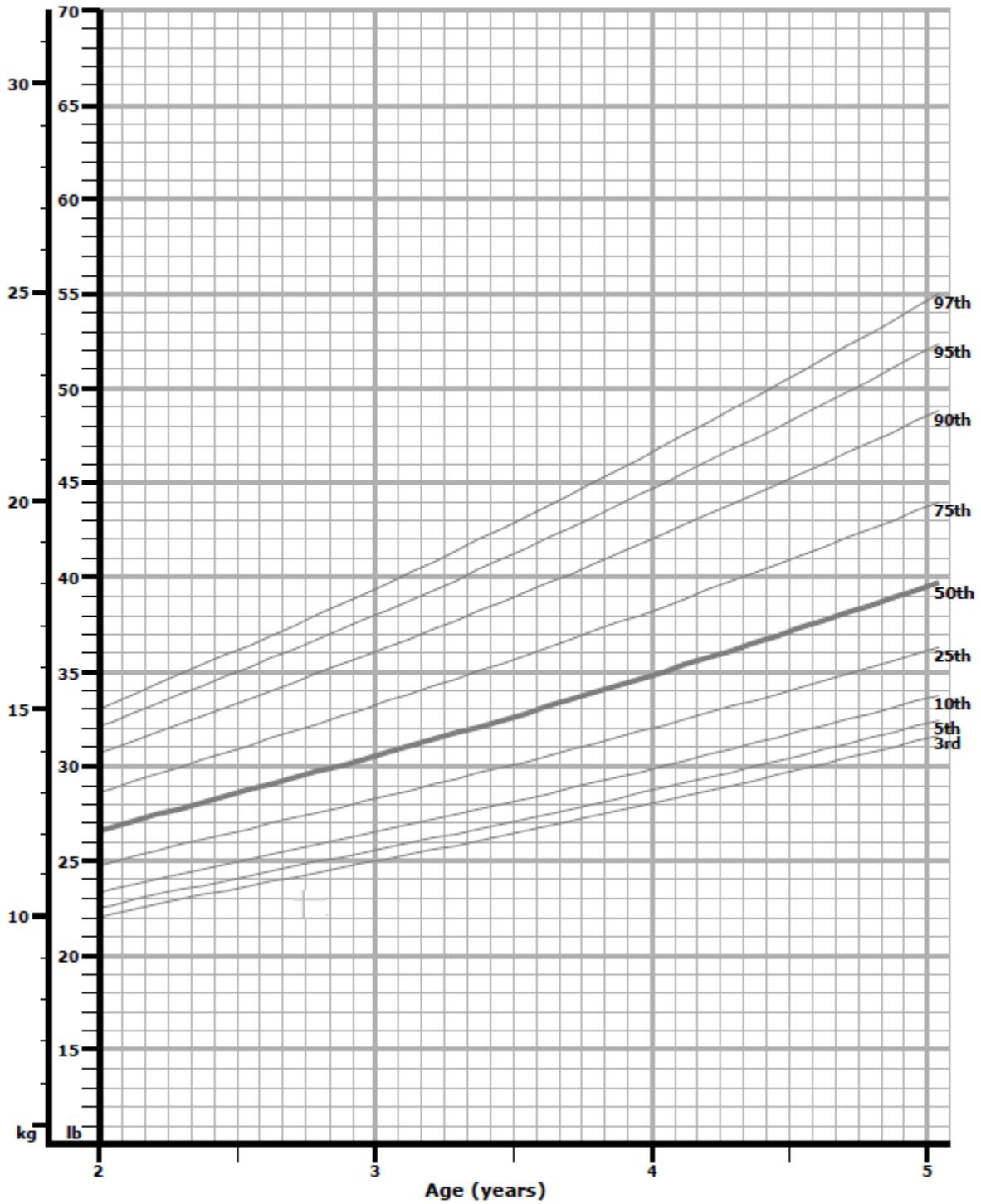
Male Child Stature For Age



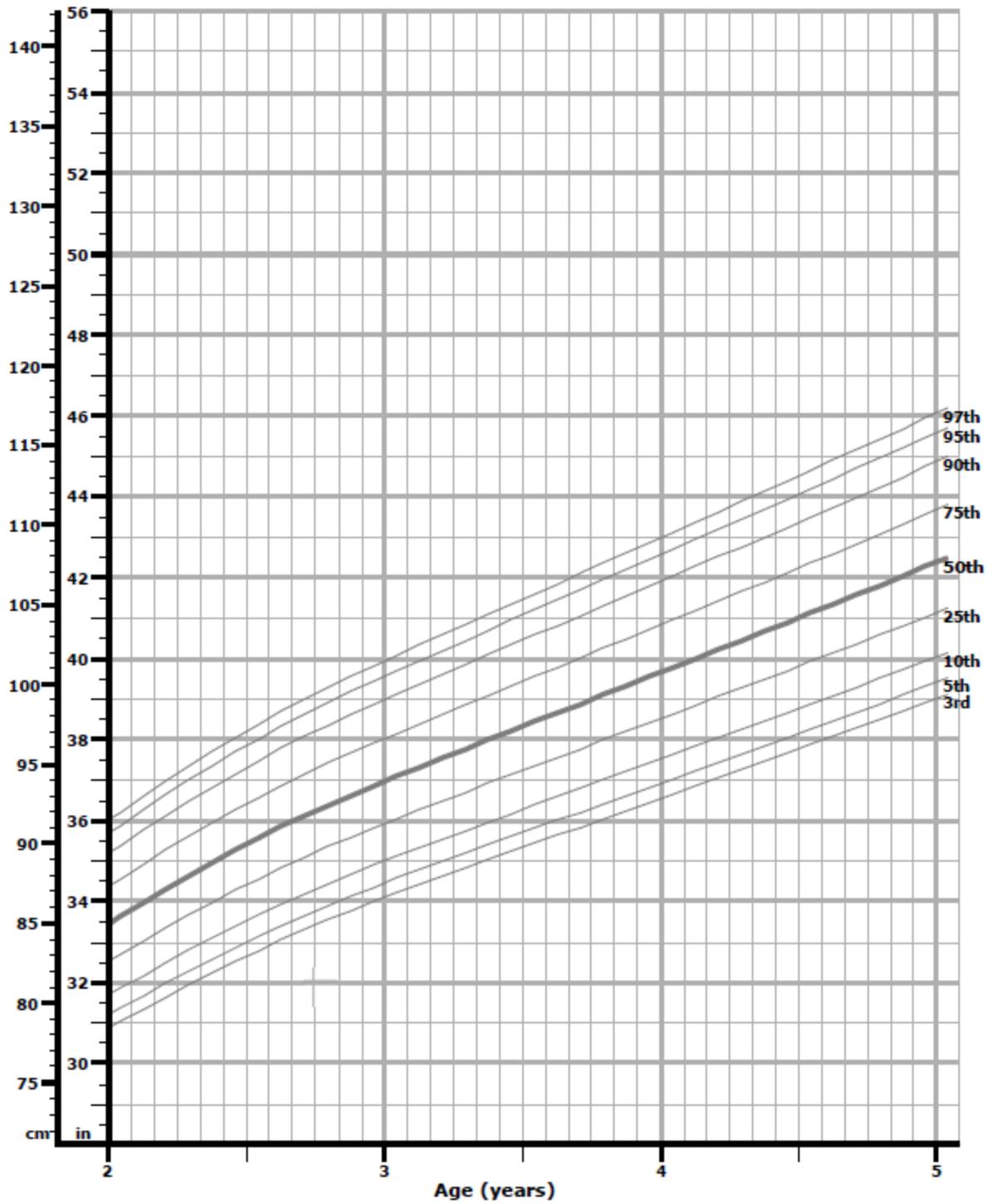
Male Child Weight For Stature Chart



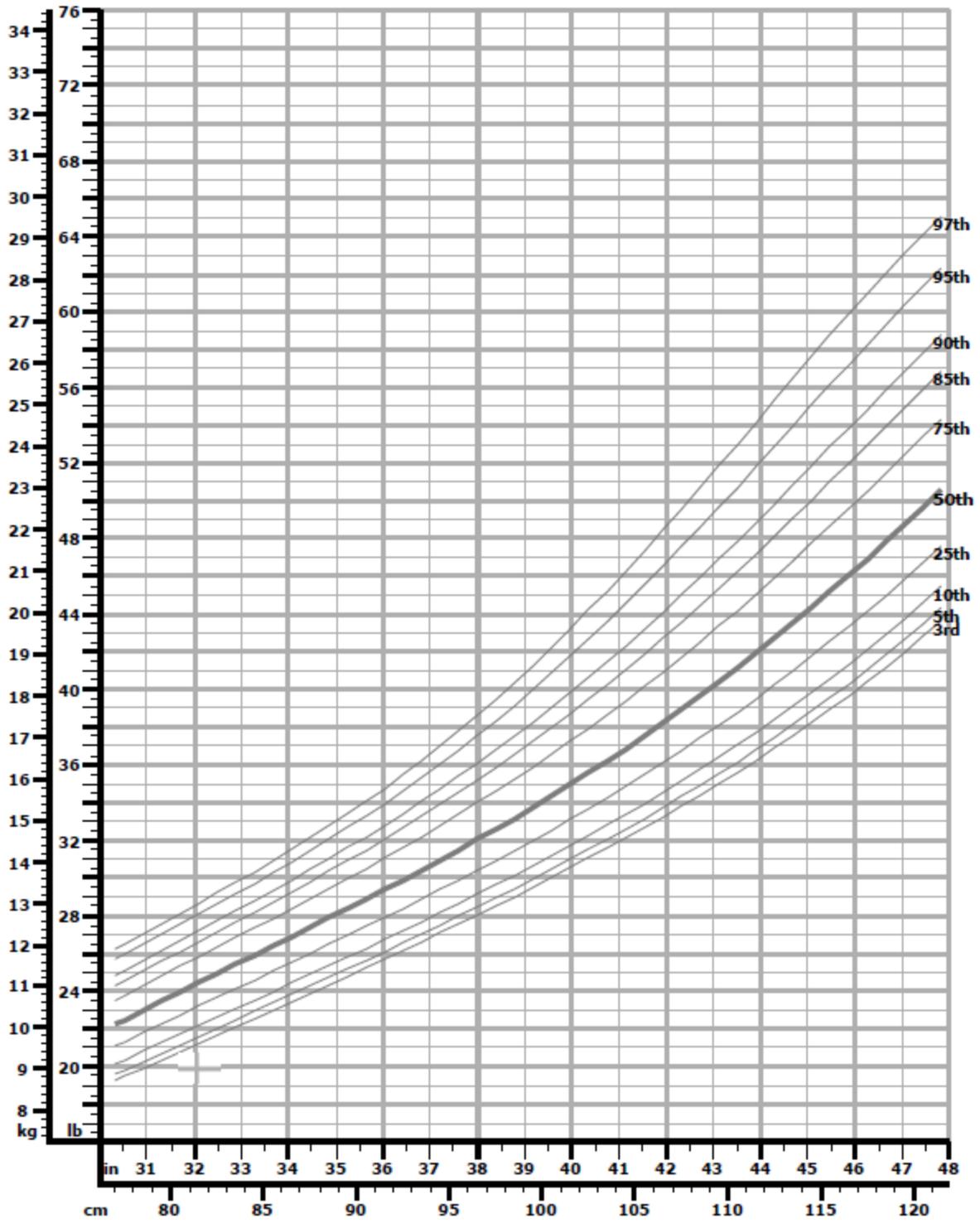
Female Child Weight For Age Chart



Female Child Stature For Age



Female Child Weight For Stature Chart



Anthropometric Training Manual

Part 5: Special Breastfeeding Considerations

June 2010

Division of Women, Infants and Children (WIC)



Growth Assessments of Breastfed Infants

Grow Baby Grow Part 1

[Grow Baby Grow Part 1.pdf](#)

Grow Baby Grow Part 2

[Grow Baby Grow Part 2.pdf](#)

Grow Baby Grow Part 3

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Grow Baby Grow Post Test

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