

Michigan WIC Anthropometric Measurement Procedures
APPENDIX A: GLOSSARY OF TERMS

Accuracy	Degree to which a measurement of a person corresponds to his/her actual weight or height (length or stature).
Anthropometry	Body measurements consisting of length or stature, head or arm circumference, weight and skin fold.
Beam-Balance Scale	A weighing device characterized by having a set of sliding weights to counterbalance the object being weighed.
Body Mass Index (BMI)	An anthropometric index of weight and stature that is defined as the weight in pounds divided by the stature in inches squared multiplied by 703. Like weight for length, BMI-for-age is a screening tool used to identify individuals who are underweight or overweight.
Health Professional	For the WIC Program, the term refers to a Competent Professional Authority (CPA).
Height	General term use to describe length or stature.
Length	Distance from the crown of the head to the bottom of the feet when the subject is measured supine.
Pattern of Growth	Progress of physical growth impacted by heredity and environment (health, food and socioeconomic factors). When a child is well, growth is sequential. During acute illness, growth rate will be depressed. The best interpretations of a child's growth are made from several observations made over time rather than body measurements made at a single point in time. Measurements taken at different times permit calculations of growth over that defined time period. One time measurements give only size.
Precision	Degree to which successive measurements of the same child agree within specified limits.
Recumbent	Lying down, on either front or back of body.
Stature	Distance from the crown of the head to the bottom of the feet when the subject is measured standing .
Supine	Lying on the back.
Zeroed Scale	The condition of a scale being in balance when there is nothing being weighed and the sliding weights are directly over their respective zeroes.

APPENDIX B: EQUIPMENT SOURCES AND SPECIFICATIONS

Head Circumference

- Insertion tape readable to nearest 1/16 inch.
- OR
- Disposable paper tape readable to nearest 1/8 inch.

Several pharmaceutical companies print disposable paper measuring tapes as a service to health professionals. Mead Johnson Nutritional Division and Abbott Laboratories are possible sources.

Perspective Enterprises also has flexible plastic insertion tape for head circumference measurements available for purchase. These tapes are reusable and can be cleaned with alcohol.

Other sources are available online.

Weight

Beam-balance scales (non-detachable weights with a zero adjustment weight, and **WITHOUT** built-in measuring rods).

- Pediatric beam-balance or digital scale that weighs in 0.01 kg (10 gm) or ONE (1) ounce increments.
- Adult beam-balance or digital scale in 1/4 pound (or 0.2 pound) or 0.1 kg (100 gm) increments.

CDC checklist indicates the following Infant Scale checklist:

A scale for weighing infants should have a large enough tray to support the infant and weigh to 20 kg or 40 lb.

High quality beam balance or electronic digital

- Weighs to 20 kg or 40 lb
- Weighs in 0.01 kg (10 gm) or 1/2 oz increments (note: MI WIC allows 1 oz.)
- Tray large enough to support the infant
- Can be easily 'zeroed' and checked
- Weight can be 'locked' in
- Can easily be 'tared' to zero
- Can be read at 'eye level' of measurer
- Can be calibrated
- Motion detector and stabilizer
- No length device attached

Spring balance scales, such as bathroom scales, are not appropriate and should not be used. Over time, the spring counterbalance mechanism loses its accuracy.

Recommended scale models:

1. Pediatric Scales

2. Adult Scales

Since equipment changes frequently, specific models are no longer recommended. See the following for 'Clinic quality' equipment:

<http://www.perspectiveent.com/>

Perspective Enterprise
7829 Sprinkle Rd.
Portage, MI 49002
1-800-323-7452
Fax: 269-327-0837

For additional sources, please contact the state WIC Anthro consultant:

Joyce Bryant, MHSA, RD, CLS

Bryantj5@michigan.gov

517-335-8943

Scale Calibration

- Testing the accuracy of clinic scales needs to occur at least once a year. This is done using standardized test weights with documentation of such recorded.

- DIY- Standardized test weights can be purchased from various scale distributors, such as:

Z-Weigh, Inc., 5321 Hill 23 Drive, Flint, MI 48507;

Pike William Co., 7741 Dix, Detroit, MI;

Perspective Enterprise, 7829 Sprinkle Road, Portage, Michigan 49002.

- Scale service companies, such as Toledo Scales, can be used to calibrate agency scales.

Length

CDC recommended: **Infant Recumbent Length Board Checklist:**

Length boards for infants must be sturdy, easily cleaned and specific to the purpose and have:

- A firm, inflexible, flat horizontal surface with a measuring tape in 1 mm (0.1 cm) or 1/8 inch increments.
- Tape is stable and easy to read.
- An immovable headboard at a right angle to the tape.
- A smoothly moveable footboard, perpendicular to the tape.

A measuring device with hinges can lose screws and bend out of shape no longer maintaining a right angle to the ruler making it difficult to operate and obtain an accurate measurement.

Infant recumbent length boards are available from Perspective Enterprises, 7829 Sprinkle Road, Portage, MI 49002. Contact them at 1-800-323-7452, or Fax to (616) 327-0837.

Stature

- Steel tapeline readable to nearest 1/16 inch and at least 75 inches long.
- Moveable headboard.

OR

- Wall mounted stature measurement board with permanently attached headboard. The tape line should be readable to nearest 1/16 inch and at least 75 inches long.
- Make certain the stature board and the foot board are mounted so that a small child can stand straight with heels and buttocks aligned vertically. Some stature boards may require a footboard and extension to measure small children.

Source for right angle headboard and a wall mounted stature measurement board is Perspective Enterprises, 7829 Sprinkle Road, Portage, MI 49002. Phone number: 1-800-323-7452.

Replacement steel tapelines are available at hardware or department stores.

Determining Gestational Age

MI-WIC calculates Expected Date of Delivery (EDD) when date of Last Menstrual Period (LMP) is entered on the Certification screen. MI-WIC will also accept entry of EDD provided by her health care professional. The American College of Nurse-Midwives produce Pregnancy Calculator wheels as a service to health professionals

https://member.midwife.org/members_online/members/viewitem.asp?item=903&catalog=EDU&pn=1&af=ACNM and Gestational Wheel apps are available for purchase, as well. The American College of Nurse-Midwives wheel also describes gestational development according to month of pregnancy. Example is pictured in Appendix K. Follow the instructions on the bottom of the wheel for determining due date.

APPENDIX C: RECORDING MEASUREMENT VALUES

ACCURACY

The following 3 steps are necessary for obtaining accurate data about a client's growth:

Taking the measurement:

The client needs to be in the best alignment. The top of the client's head is parallel to the floor- in the correct position, the client is looking straight ahead when measuring their height, the heels are against the wall for children and adults. For infants, mimic the same alignment by having mom hold the head against the head board, straighten the knees and both heels are flat against the foot piece. If the measurement cannot be obtained using the procedure, mark the '?' and enter a comment.

Recording the measurement:

Accurate measurements provide the best information on which to make accurate assessment of growth. To help ensure accuracy, it is recommended to say the measurement aloud and record measurements **EXACTLY** as seen on the measuring device on a recording form (sample at the end of this section).

Convert the measurement for MIWIC:

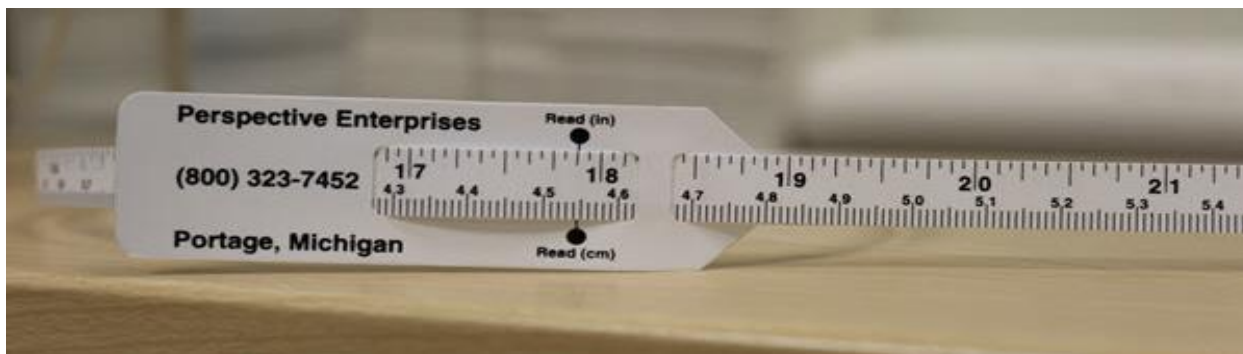
MIWIC calculates in whole numbers and 16th's. The measurement may be accurate but if the number is in a form other than 1/16's, it must be converted into the form MIWIC recognizes in order to provide accurate plotting on growth charts. Use the guide below for the MI-WIC convention for measurements.

Measurement	Read as*	Read as*	MIWIC Entry
1/16			1
(2/16)	1/8		2
3/16			3
(4/16)		1/4	4
5/16			5
(6/16)	3/8		6
7/16			7
(8/16)		1/2	8
9/16			9
(10/16)	5/8		10
11/16			11
(12/16)		3/4	12
13/16			13
(14/16)	7/8		14
15/16			15
16/16			0

*Measurements are 'Read' in the 'reduced' format commonly seen with height, length or head circumference

READING A STADIOMETER, RECUMBENT LENGTH BOARD OR HEAD CIRCUMFERENCE TAPE:

The picture of the head circumference tape shows 1/16th inch marks used on a head circumference tape. MIWIC entries are in inches and 1/16th (sixteenth's) inches for length, height and head circumference but we may not read a measurement as a 16th. For example, we read 8/16th's as 1/2. If a measurement reads as 1/2, we convert it to MIWIC convention- 1/2 is 8/16th's so it is entered as '8' under the '1/16th' column in MIWIC. In the picture below, this measurement is 17 7/8th's inches. MI-WIC data entry would be 17 in and 14/16's.



The first mark after the whole inch mark is read as 1/16th.

The second mark is 2/16th's but is read as 1/8th (remember elementary school math where a fraction is reduced to the smallest denominator).

The third mark is 3/16th's.

The fourth mark is 4/16th's but is reduced and read as 1/4th.

The fifth mark is 5/16th's

The sixth mark is 6/16th's but reduced and read as 3/8th's

The seventh mark is 7/16th's

The eighth mark is 8/16th's but reduced and read as 1/2.

The ninth mark is 9/16th's

The 10th mark is 10/16th's and reduced and read as 5/8th's.

The 11th mark is 11/16's.

The 12th mark is 12/16th's and reduced and read as 3/4th's

The 13th mark is 13/16th's.

The 14th mark is 14/16th's and reduced and read as 7/8th's

The 15th mark is 15/16's and read as 15/16th's

The 16th mark is the next whole inch number.

The measurement above is 17 and 7/8th's, translated for MIWIC as 17 and 14/16th's.

MIWIC data entry calls for measurements to be recorded in inches and sixteenths inches. In the picture below, there are only 8 marks between each inch line so this device measures to the 1/8th inch. If the ‘Read Here’ line fell between 2 marks, that reading would be a sixteenth of an inch.

If the ‘Read Here’ line were in the space between the 64 and the line above it, that measurement would be 64 and 1/16th, recorded as 64 1/16, read as 64 1/16 and entered into MIWIC as 64 1/16. Moving up to the first mark above 64, that mark is 1/8 so it would read as 64 and 1/8 but is entered into MIWIC as 64 and 2/16th's. The measurement shown in the picture is 64 and 1/4, read as 64 1/4 and entered into MIWIC as 64 and 4/16th's.

Recording the measurement:

Head Circumference

- Write measurement value in inches and fractions.
- Example: Head circumference of 13 12/16 inches- record on Recording Form as 13 12/16
Head circumference of 15 5/8 inches - record on Recording Form as 15 5/8

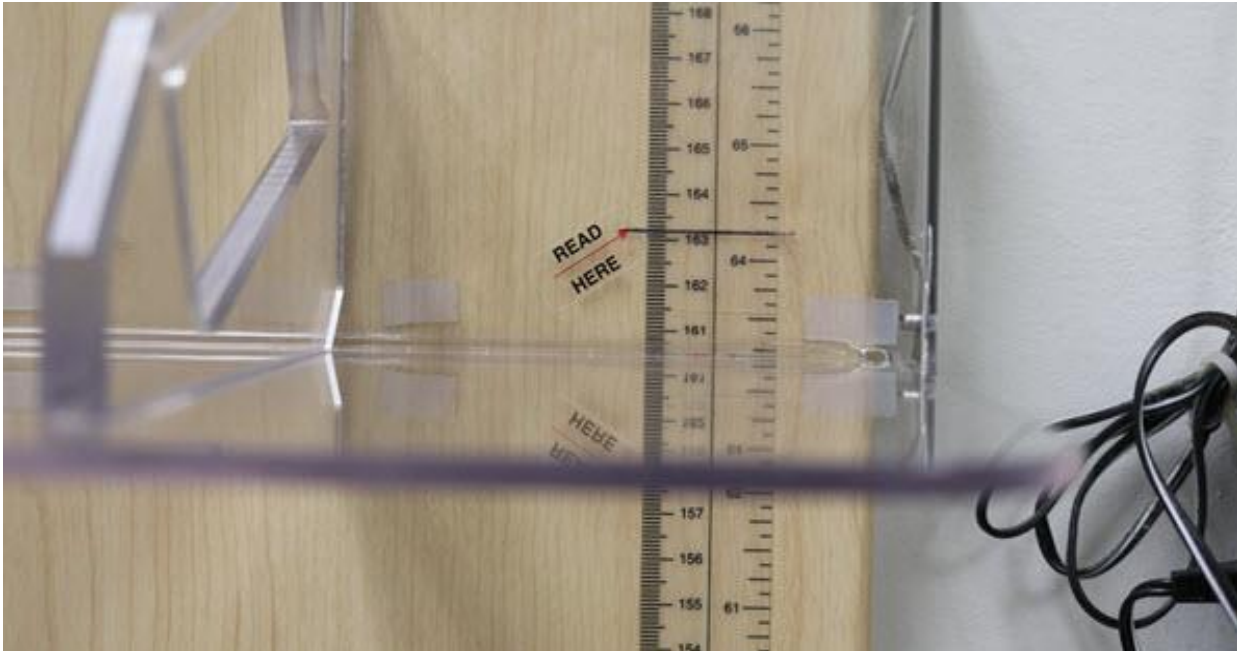
Convert the measurement for MIWIC:

Head Circumference

- Enter inches and fraction
- Convert to sixteenths, if not in sixteenths
- Example: Head circumference of 13 12/16 inches-enter on MI-WIC as 13 inches-12
Head circumference of 15 5/8 inches-enter on MI-WIC as 15 inches-10

Measurement	Read as*	Read as*	MIWIC Entry
1/16			1
(2/16)	1/8		2
3/16			3
(4/16)		1/4	4
5/16			5
(6/16)	3/8		6
7/16			7
(8/16)		1/2	8
9/16			9
(10/16)	5/8		10
11/16			11
(12/16)		3/4	12
13/16			13
(14/16)	7/8		14
15/16			15
16/16			0

*Measurements are ‘Read’ in the ‘reduced’ format commonly seen with height, length or head circumference



READING INFANT AND ADULT INFANTOMETERS OR STADIOMETERS

Recording the measurement:

Length/Stature

- Write measurement values in inches and fractions.
- Example: Length of 24 $\frac{2}{16}$ inches - record on Recording Form as 24 $\frac{2}{16}$
Length of 30 $\frac{2}{8}$ inches - record on Recording Form as 30 $\frac{2}{8}$

Stature of 64 $\frac{1}{4}$ inches (picture above) - record on Recording Form as 64 $\frac{1}{4}$
Stature of 46 inches - record on Recording Form as 46 $\frac{0}{16}$

Convert the measurement for MIWIC:

Length/Stature

- Write measurement value in inches and fractions
- MI-WIC units are in sixteenths
- Convert fractions to sixteenths**

- Example: Length of 24 1/8 inches-enter in MI-WIC as 24 inches-2
 Length of 30 3/8 inches-enter in MI-WIC as 30 inches-6
 Stature of 64 1/4 inches-enter in MI-WIC as 64 inches-4
 Stature of 46 inches-enter in MI-WIC as 46 inches- 0

**If measurement values are in eighths, quarters or halves, it is necessary to convert values to sixteenths.

Measurement	Read as*	Read as*	MIWIC Entry
1/16			1
(2/16)	1/8		2
3/16			3
(4/16)		1/4	4
5/16			5
(6/16)	3/8		6
7/16			7
(8/16)		1/2	8
9/16			9
(10/16)	5/8		10
11/16			11
(12/16)		3/4	12
13/16			13
(14/16)	7/8		14
15/16			15
16/16			0

*Measurements are 'Read' in the 'reduced' format commonly seen with height, length or head circumference

INFANT SCALES:



Infant scales have a sensitivity to 1 ounce

Recording the measurement:

- Write measurement values in pounds, ounces and fractions* (on some Infant scales).
- Example: Weight of 6 pounds, 4.8 ounces - record on Recording Form as 20-4.8
Weight of 28 pounds, 12 3/4 ounces - record on form as 28-12 3/4

Rounding the measurement: For Infants and C-1 only

If an ounce measurement is **GREATER** than .5 or ½, round **UP**

If an ounce measurement is **LESS** than .5 or ½, round **DOWN**

In the above picture, the measurement reads 6 lbs 4.8oz. so MI-WIC data entry is 6lbs 5oz

Convert the measurement for MIWIC:

All of MIWIC's weight measurements data are in pounds and ounces (oz)

Weight - Pediatric Scale- Infant- C1

- Enter actual pounds, ounces and round ounce fraction to nearest ounce

Example:

- so enter the display reading is as follows:
 - Digital- Display of 30 lbs 6.4oz, enter 30 pounds 6oz (last decimal less than .5 so round **6 down** to 6)
 - Digital- Display of 6 lbs 4.8oz, enter 6 pounds 5 ounces (last decimal more than .5 so round 4oz **up** to 5)
- Beam Balance scales: Weight of 20 pounds 5 $\frac{3}{8}$ ounces-enter in MI-WIC as 20 pounds-5oz ($\frac{3}{8}$ is less than $\frac{1}{2}$ so round **5 down** to just 5)
 - Beam-Weight of 28 pounds 12 $\frac{6}{8}$ ounces-enter in MI-WIC as 28 pounds-13 ounces ($\frac{6}{8}$ is more than $\frac{1}{2}$ so round 12oz **up** to 13)

ADULT SCALES

Adult scales have a sensitivity to .2 pounds (3.2 oz) if digital or 1/4lb (4oz) if beam balance. The adult scale is not sensitive enough to pick up a one or two ounce weight gain or loss of an infant or C-1 child if the child is uncooperative and held by an adult and then the weight is tared (to 'tare', weigh the adult with the child, then weigh the adult alone and subtract the adult's weight to obtain the weight of the child).

Weight - Adult Scale

- Record actual pounds plus ounces*
- Convert measurement value into MI-WIC units
- Example:
 - Beam-Weight of 52 $\frac{3}{4}$ pounds-enter in MI-WIC as 52 pounds - 12 ounces
 - Beam-Weight of 155 $\frac{1}{4}$ pounds-enter in MI-WIC as 155 pounds-4 ounces
 - Digital- Weight 45.2, hit 'Tab' and weight populates as 45 pounds 3 ounces**
 - Digital- Weight 37.8, hit 'Tab' and weight populates as 37 pounds, 13 ounces**

*It is necessary to change the pound fraction to ounces:

- 1/4 pound - enter as 04 ounces
- 2/4 pound - enter as 08 ounces
- 3/4 pound - enter as 12 ounces

** Tenths of a pound ounce equivalents

- .2 pound – equivalent to 3 ounces
- .4 pound - equivalent to 6 ounces
- .6 pound – equivalent to 10 ounces
- .8 pound – equivalent to 13 ounces

APPENDIX C: RECORDING MEASUREMENT VALUES - continued

SUMMARY TABLE

Measurement	Recording Form	DATA ENTRY
Weight: Infant Scale	<ul style="list-style-type: none"> Record actual values in 1/8, 1/4, or 1 ounce intervals*. Write values in pounds, ounces and fractions. EXAMPLE: weight of 20 pounds and 13 3/8 ounces record as 20-13 3/8. <p>_____ *Depending on the sensitivity of the scales.</p>	<ul style="list-style-type: none"> Enter actual pounds, ounces, and round ounce fraction to nearest ounce (less than 1/2 round DOWN, greater than 1/2 round UP). <p><u>DIGITAL</u></p> <ul style="list-style-type: none"> EXAMPLE: actual weight of 20 lbs and 5.4 ounces, enter as 20 lbs-5 ounces (round DOWN) <p><u>BEAM</u></p> <ul style="list-style-type: none"> EXAMPLE: actual weight of 20 lbs and 5 5/8 ounces, enter as 20 pounds-6 ounces (round UP).
Weight: Adult Scale	<ul style="list-style-type: none"> Record actual values in 1/4 pounds intervals. Write values in pounds and fractions. EXAMPLE: weight of 52 and 3/4 pounds record as 52 3/4. 	<ul style="list-style-type: none"> Enter actual pounds and ounces. <p><u>DIGITAL</u></p> <ul style="list-style-type: none"> EXAMPLE: actual weight of 50.2 lbs, enter as 50 lbs 3 ounces <p><u>BEAM</u></p> <ul style="list-style-type: none"> EXAMPLE: actual weight of 52 and 3/4 pounds, enter as 52 pounds-12 ounces.
Measurement	Recording Form	DATA ENTRY
Length/Stature	<ul style="list-style-type: none"> Record actual values in 1/16 inch intervals. Write values in inches and fractions. EXAMPLE: 24 and 4/16 inches record as 24 4/16. 	<ul style="list-style-type: none"> Enter actual inches and fraction. EXAMPLE: actual length of 24 and 4/16 inches, enter as 24-4.
Head Circumference	<ul style="list-style-type: none"> Record actual value in 1/16 or 1/8 inch intervals. Write values in inches and fraction. EXAMPLE: 13 and 13/16 inches record as 13 13/16. 	<ul style="list-style-type: none"> Enter actual inches and fraction in sixteenths. EXAMPLE: actual head circumference of 13 and 13/16 inches, enter as 13-13.

Anthro Recording Form

Anthropometric measurements for a WIC Family No _____

HEIGHT (Length or stature)									
Name	R/S	First height		Second height		Confirming Height		MI-WIC Entry	
		in	Units*	in	Units*	in	Units*	in	1/16

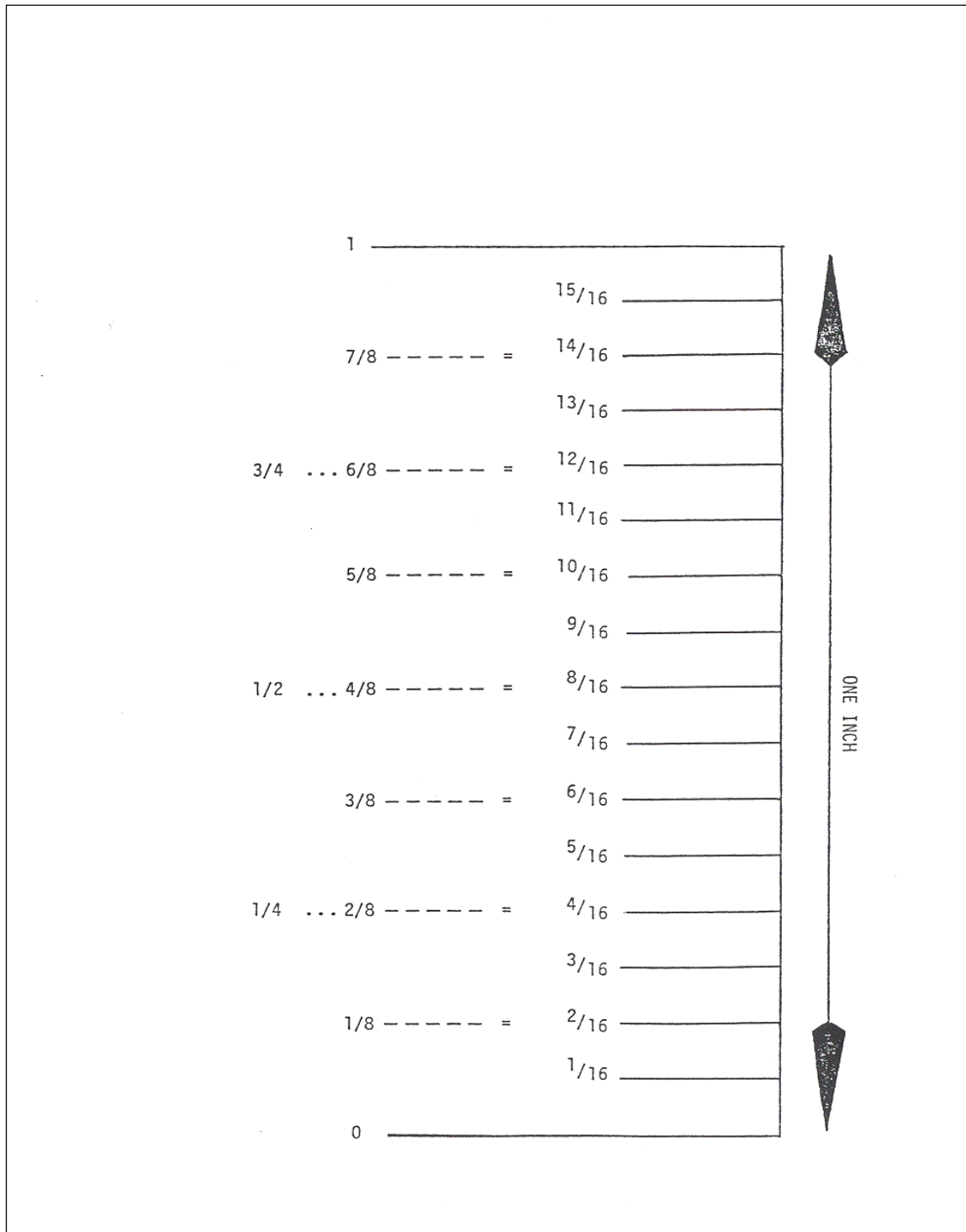
WEIGHT									
Name	First Weight		Second Weight		Confirming Weight		MI-WIC Entry		
	lbs	Units*	lbs	Units*	lbs	Units*	lbs	oz	

HEAD CIRCUMFERENCE									
Name	First HC		Second HC		Confirming HC		MI-WIC Entry		
	in	Units*	in	Units*	in	Units*	in	1/16	

* Specify Units of Measure.

APPENDIX D: MEASUREMENT LINES ON A RULER OR TAPELINE

Sample below is a mock-up of an inch increment of a ruler showing 1/16, 1/8 and 1/4 subdivisions.



Ounces and their equivalents

- 1 oz. = 1/16 lb.
- 2 oz. = 2/16 lb. = 1/8 lb.
- 3 oz. = 3/16 lb.
- 4 oz. = 4/16 lb. = 2/8 lb. = 1/4 lb.
- 5 oz. = 5/16 lb.
- 6 oz. = 6/16 lb. = 3/8 lb.
- 7 oz. = 7/16 lb.
- 8 oz. = 8/16 lb. = 4/8 lb. = 2/4 lb. = 1/2 lb.
- 9 oz. = 9/16 lb.
- 10 oz. = 10/16 lb. = 5/8 lb.
- 11 oz. = 11/16 lb.
- 12 oz. = 12/16 lb. = 6/8 lb. = 3/4 lb.
- 13 oz. = 13/16 lb.
- 14 oz. = 14/16 lb. = 7/8 lb.
- 15 oz. = 15/16 lb.
- 16 oz. = 16/16 lb. = 1 lb.

Fractional Ounces and their equivalents (Beam Balance Scales)

- 1/8 ounce
- 2/8 ounce = 1/4 oz.
- 3/8 ounce
- 4/8 ounce = 1/2 oz.
- 5/8 ounce
- 6/8 ounce = 3/4 oz.
- 7/8 ounce
- 8/8 ounce = 1 oz.

Fractional inches and their equivalents

- 1/16" = 1/16"
- 2/16" = - - - - = 1/8"
- 3/16" = 3/16"
- 4/16" = - - - - = 2/8" - - - - = 1/4"
- 5/16" = 5/16"
- 6/16" = - - - - = 3/8"
- 7/16" = 7/16"
- 8/16" = - - - - = 4/8" - - - - = 2/4" - - - - = 1/2"
- 9/16" = 9/16"
- 10/16" = - - - - = 5/8"
- 11/16" = 11/16"
- 12/16" = - - - - = 6/8" - - - - = 3/4"
- 13/16" = 13/16"
- 14/16" = - - - - = 7/8"
- 15/16" = 15/16"
- 16/16" = - - - - = 8/8" - - - - = 4/4" - - - - = 1 in.

APPENDIX G : EXHIBITS OF GROWTH CHARTS

Purpose: To plot physical growth measurements.

Form Design: Single sheet, front and back, 8 1/2 x 11; available - 250 forms/pkg.

Boys (Birth to 24 Months of Age):

Form DCH-0313a

Boys (2 to 5 Years of Age):

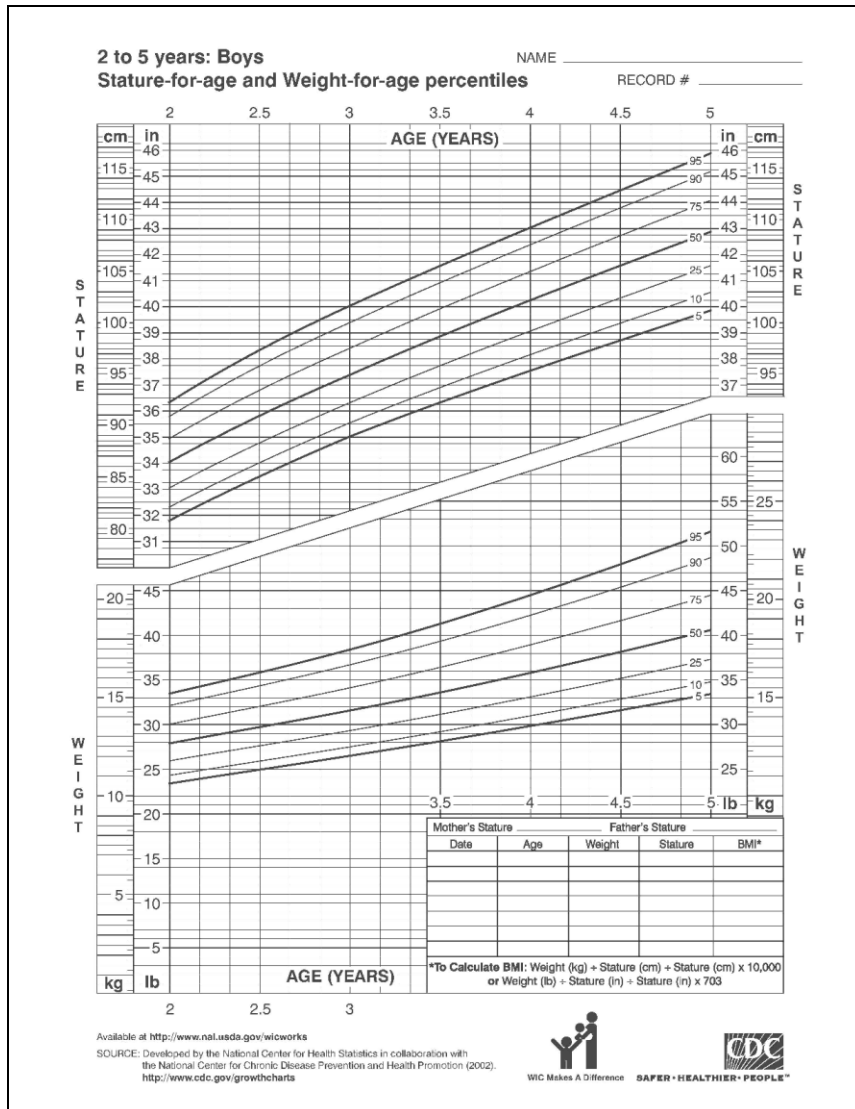
Form DCH-0313b

Girls (Birth to 24 Months of Age):

Form DCH-0313c

Girls (2 to 5 Years of Age):

Form DCH-0313d



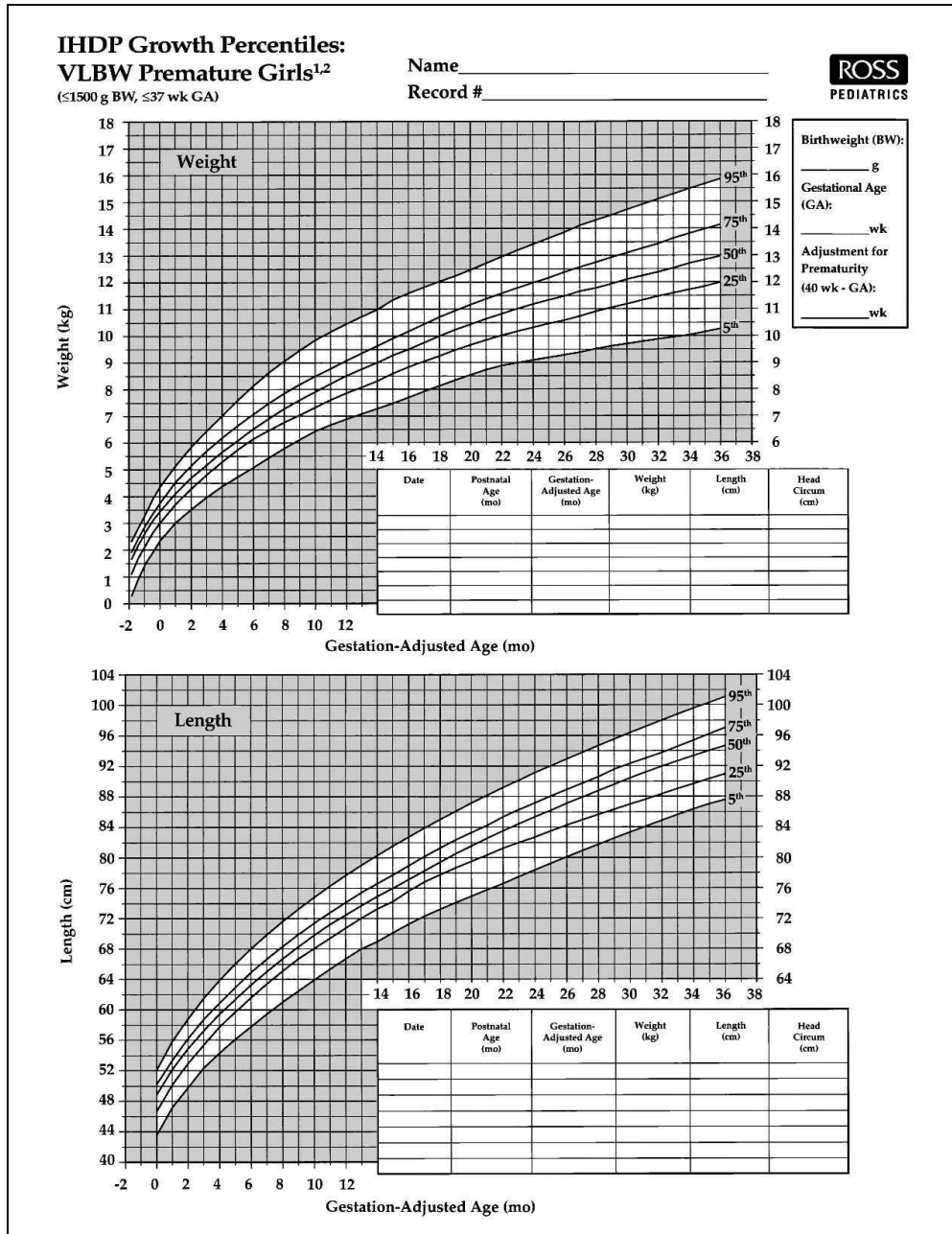
Note: Only the 2-5 chart is illustrated.

APPENDIX G : EXHIBITS OF GROWTH CHARTS - continued

VLBW Boys - IHDP Growth Charts, Ross Pediatrics

VLBW Girls - IHDP Growth Charts, Ross Pediatrics

See illustrated chart on the following page. Note: Only the girls chart is illustrated.



APPENDIX H: SUMMARY OF PLOTTING UNIT INTERVALS FOR CDC-BASED GROWTH CHARTS

AGE \ GROWTH CHARTS	LENGTH/ STATURE-FOR- AGE	WEIGHT- FOR-AGE	HEAD CIRCUM.	WEIGHT-FOR-LENGTH/ BMI-FOR-AGE
Birth < 24 Months	1/2 inch	1 pound	1/2 inch	Length: 1 inch Weight: 1 pound
2 to 5 Years	1/4 inch	1 pounds	-----	Age: 1/2 year BMI: .2 BMI unit

WHO GROWTH CHARTS FOR BIRTH < 24 MONTHS

CHART	VERTICAL LINE	HORIZONTAL LINE
Length-for-age	Age: 1 month intervals	Length: 1/2 inch intervals
Weight-for-age	Age: 1 month intervals	Weight: 1 pound intervals
Head Circumference-for-age	Age: 1 month intervals	Head Circumference: 1/2 inch intervals
Weight-for-length	Length: 1 inch intervals	Weight: 1 pound intervals

CDC GROWTH CHARTS FOR BOYS/GIRLS (2 TO 5 YEARS OF AGE)

CHART	VERTICAL LINE	HORIZONTAL LINE
Stature-for-age	Age: 2 month intervals	Stature: 1/4 inch intervals
Weight-for-age	Age: 2 month intervals	Weight: 1 pound intervals
BMI-for-age	BMI: .2 BMI unit	Age: 1/2 year intervals

VLBW GROWTH CHARTS (BIRTH < 24 MONTHS-for Education Purposes)

CHART	VERTICAL LINE	HORIZONTAL LINE
Length-for-age	Age: 1 month intervals	Length: 2 cm intervals
Weight-for-age	Age: 1 month intervals	Weight: 1/2 kg. intervals
Head Circumference-for-age	Age: 1 month intervals	Head Circumference: 1 cm intervals
Weight-for-length	Length: 2 cm intervals	Weight: 1/2 kg. intervals

APPENDIX I: GUIDE FOR PLOTTING AGE ON GROWTH CHARTS

Each set of growth charts has the age line divided into different intervals.

Birth < 24 Months of Age Growth Chart has the age lines divided into one month intervals.

2 to 5 Years of Age Growth Chart has the age lines divided into two month intervals and hatch marks at one month intervals.

Guide for Rounding Off Age to Plot Age on Growth Chart

After calculating the age of the person, locate the age line on the appropriate growth charts. To facilitate the plotting of age, age can be rounded. For the 2 to 5 Chart, round to the nearest year and month by rounding down for days 1-15 and rounding up for days 16 and above. For the Birth < 24 Month Charts, round to the nearest one half month. To round off age to the nearest one half month, follow these rules:

ROUNDING TO THE NEAREST HALF MONTH FOR BABIES 0-36 MONTHS

0-7 Days	Round DOWN to previous month
8-21 Days	Round to 2 month
22-31 Days	Round UP to next month

EXAMPLE: Child's age is 2 months, 15 days
Plotting age is 2 1/2 months.

EXAMPLE: Child's age is 2 months, 23 days
Plotting age is 3 months.

EXAMPLE: Child's age is 4 months, 6 days
Plotting age is 4 months.

EXAMPLE: Child's age is 1 year, 6 months, 28 days
Plotting age is 19 months (1 year, 7 months).

EXAMPLE: Child's age is 4 years, 6 months, 29 days
Plotting age is 4 years, 7 months.

Birth to 24 Months of Age Growth Chart

The location of the age line on this growth chart can either represent the rounded age and use the chart's printed age line which is divided into one month intervals, or the position of actual age is estimated.

2 to 5 Years of Age Growth Chart

Since the age lines are divided into 6 month intervals, the child's calculated age is rounded to year and nearest month. To locate the position of age on the growth chart, find the child's age in years and estimate position of approximate age in months. The approximate age in months reflects the combination of months plus days rounded to the nearest month.

APPENDIX J: PRENATAL WEIGHT GAIN GRIDS

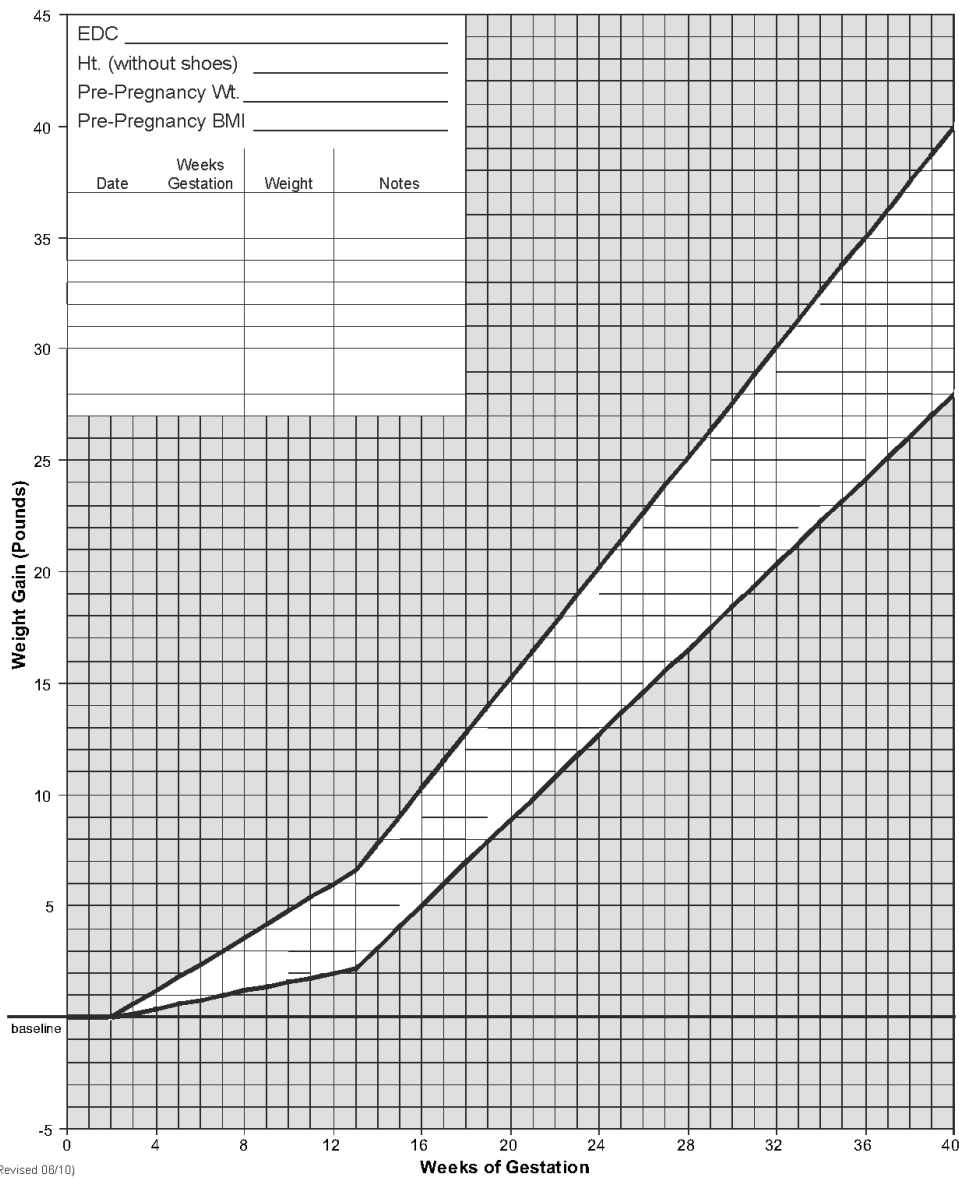
1. Last Name		First Name		MI	
2. Patient Number					
3. Date of Birth (MM/DD/YYYY)			Month	Day	Year
4. Race <input type="checkbox"/> American Indian or Alaska Native <input type="checkbox"/> Asian <input type="checkbox"/> Black/African American <input type="checkbox"/> Native Hawaiian/Other Pacific Islander <input type="checkbox"/> Unknown <input type="checkbox"/> White					
5. Ethnic Origin <input type="checkbox"/> Hispanic Cuban <input type="checkbox"/> Hispanic Mexican American <input type="checkbox"/> Hispanic Other <input type="checkbox"/> Hispanic Puerto Rican <input type="checkbox"/> Not Hispanic/Latino <input type="checkbox"/> Unreported					
6. Gender <input type="checkbox"/> Female <input type="checkbox"/> Male					
7. County of Residence					

N.C. Department of Health and Human Services
Women's and Children's Health Section

PRENATAL WEIGHT GAIN CHART Pre-Pregnancy Underweight BMI <18.5

Weight Gain Recommendations (singleton):

- ◆ 2.2–6.6 lb. gain 1st trimester
- ◆ 1 lb. gain per week 2nd and 3rd trimesters
- ◆ 28–40 lb. total weight gain



DHHS 2388 (Revised 06/10)
Women's and Children's Health Section (Review 06/13)
Source: Institute of Medicine, 2009. *Weight Gain During Pregnancy: Reexamining the Guidelines*. Washington, DC: National Academies Press; Committee to Reexamine IOM Pregnancy Guidelines.

1. Last Name	First Name	MI
2. Patient Number		
3. Date of Birth (MM/DD/YYYY)		
	Month	Day
		Year
4. Race		
<input type="checkbox"/> American Indian or Alaska Native <input type="checkbox"/> Asian <input type="checkbox"/> Black/African American <input type="checkbox"/> Native Hawaiian/Other Pacific Islander <input type="checkbox"/> Unknown <input type="checkbox"/> White		
5. Ethnic Origin		
<input type="checkbox"/> Hispanic Cuban <input type="checkbox"/> Hispanic Mexican American <input type="checkbox"/> Hispanic Other <input type="checkbox"/> Hispanic Puerto Rican <input type="checkbox"/> Not Hispanic/Latino <input type="checkbox"/> Unreported		
6. Gender <input type="checkbox"/> Female <input type="checkbox"/> Male		
7. County of Residence		

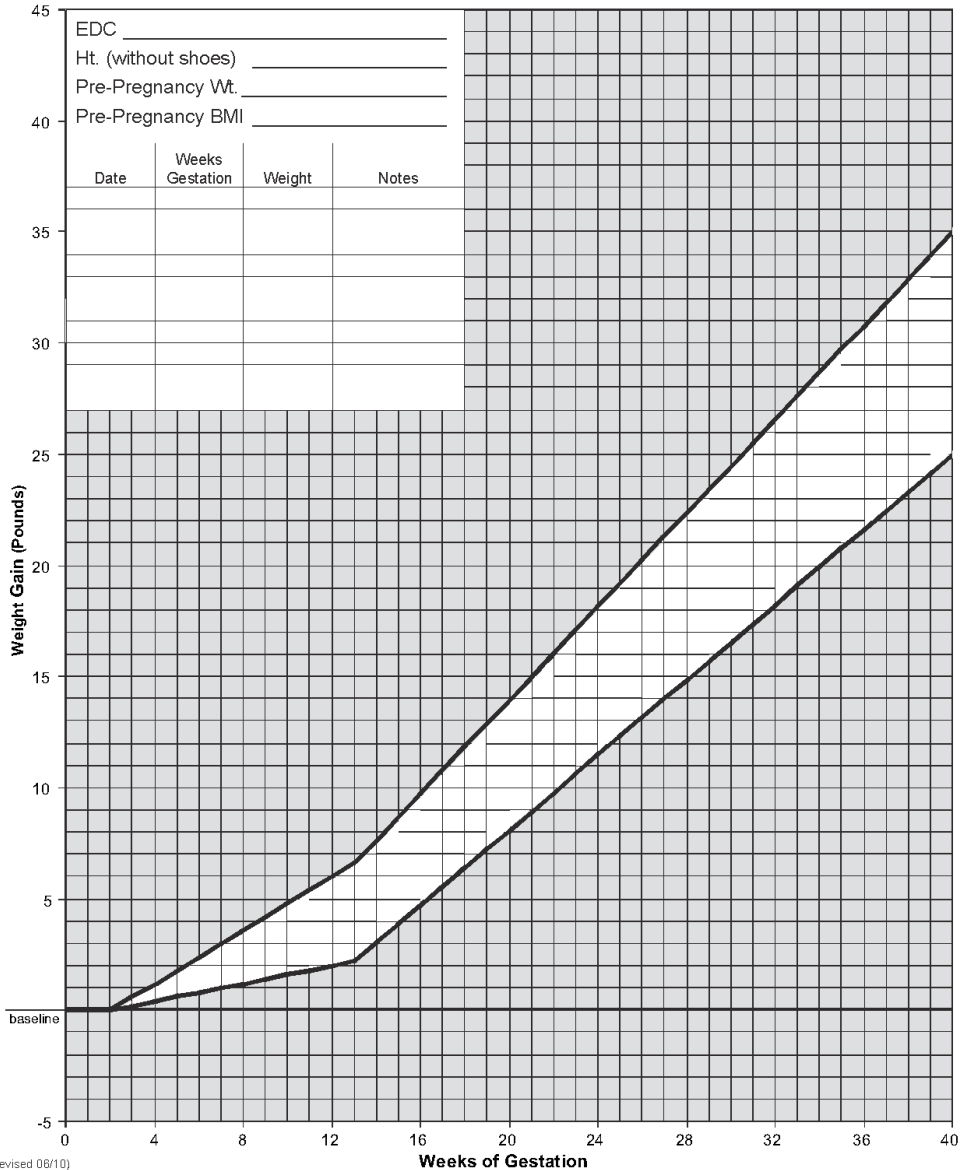
N.C. Department of Health and Human Services
Women's and Children's Health Section

PRENATAL WEIGHT GAIN CHART

Pre-Pregnancy Normal Weight BMI 18.5–24.9

Weight Gain Recommendations (singleton):

- ◆ 2.2–6.6 lb. gain 1st trimester
- ◆ 1 lb. gain per week 2nd and 3rd trimesters
- ◆ 25–35 lb. total weight gain



DHHS 2388 (Revised 06/10)
Women's and Children's Health Section (Review 06/13)
Source: Institute of Medicine, 2009. *Weight Gain During Pregnancy: Reexamining the Guidelines*. Washington, DC: National Academies Press; Committee to Reexamine IOM Pregnancy Guidelines.

1. Last Name	First Name	MI
2. Patient Number		
3. Date of Birth (MM/DD/YYYY)	Month	Day
		Year
4. Race <input type="checkbox"/> American Indian or Alaska Native <input type="checkbox"/> Asian <input type="checkbox"/> Black/African American <input type="checkbox"/> Native Hawaiian/Other Pacific Islander <input type="checkbox"/> Unknown <input type="checkbox"/> White		
5. Ethnic Origin <input type="checkbox"/> Hispanic Cuban <input type="checkbox"/> Hispanic Mexican American <input type="checkbox"/> Hispanic Other <input type="checkbox"/> Hispanic Puerto Rican <input type="checkbox"/> Not Hispanic/Latino <input type="checkbox"/> Unreported		
6. Gender <input type="checkbox"/> Female <input type="checkbox"/> Male		
7. County of Residence		

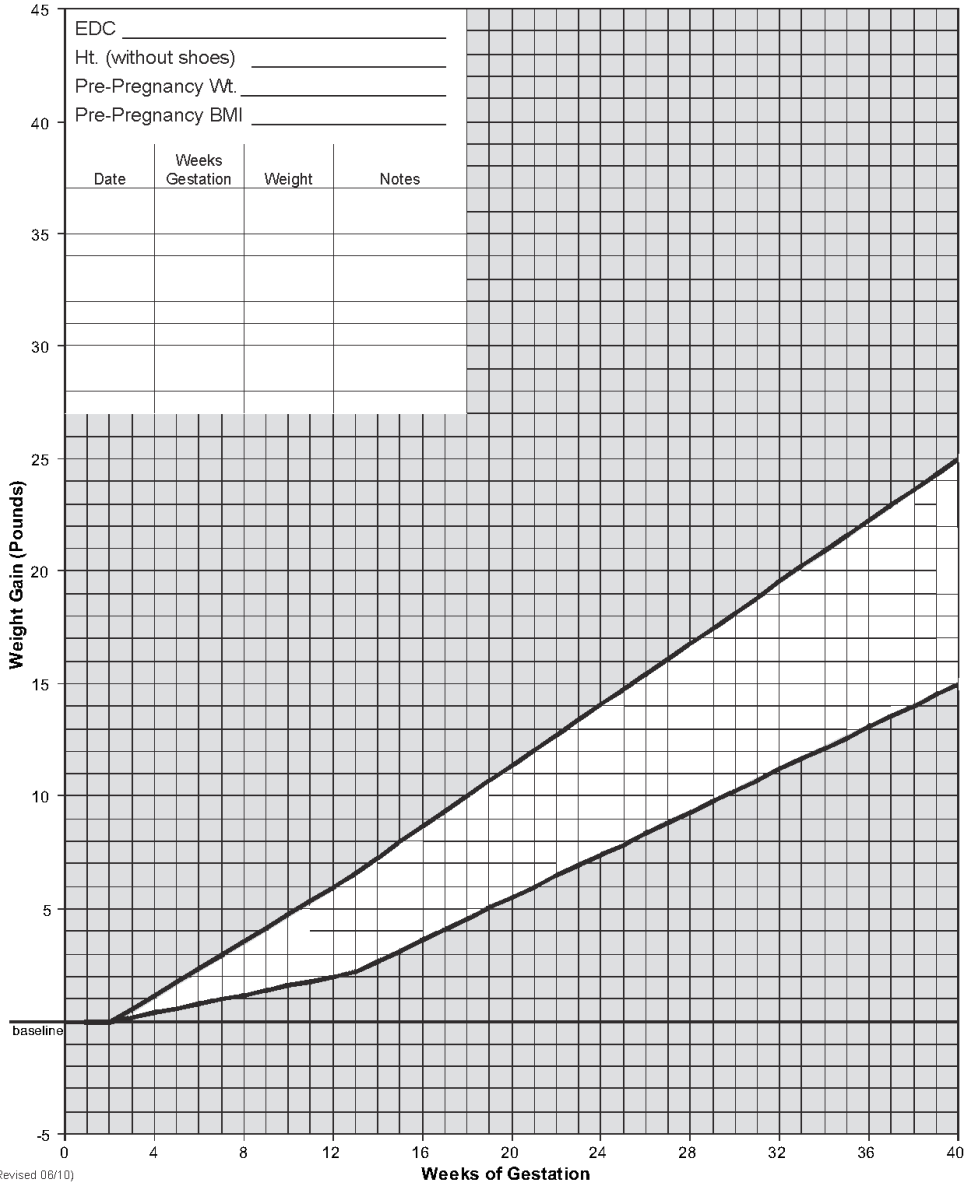
N.C. Department of Health and Human Services
 Women's and Children's Health Section

PRENATAL WEIGHT GAIN CHART

Pre-Pregnancy Overweight BMI 25.0–29.9

Weight Gain Recommendations (singleton):

- ◆ 2.2–6.6 lb. gain 1st trimester
- ◆ 0.6 lb. gain per week 2nd and 3rd trimesters
- ◆ 15–25 lb. total weight gain



DHHS 2388 (Revised 06/10)
 Women's and Children's Health Section (Review 06/13)
 Source: Institute of Medicine, 2009. *Weight Gain During Pregnancy: Reexamining the Guidelines*. Washington, DC: National Academies Press; Committee to Reexamine IOM Pregnancy Guidelines.

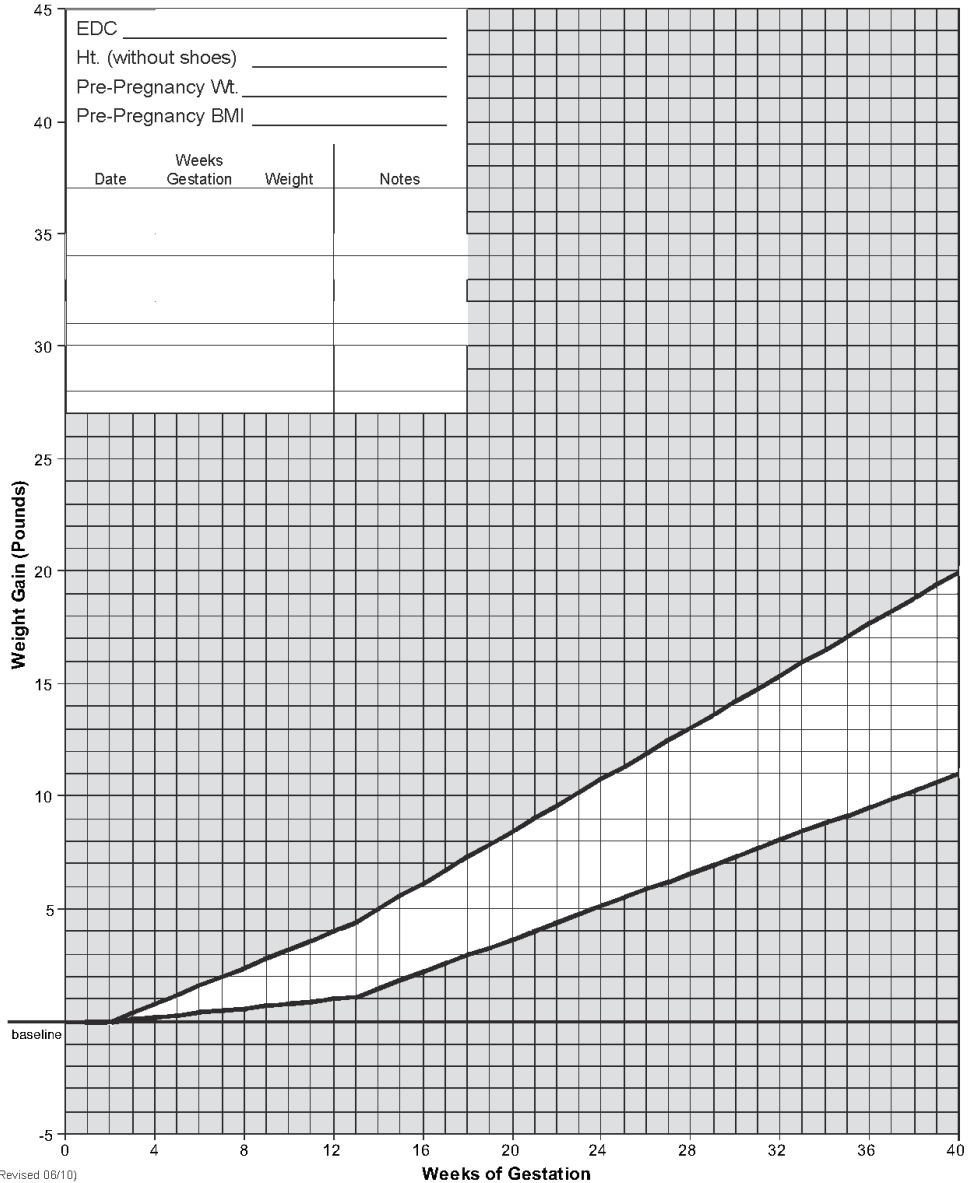
PRENATAL WEIGHT GAIN CHART

**Pre-Pregnancy Obese
BMI \geq 30.0**

Weight Gain Recommendations (singleton):

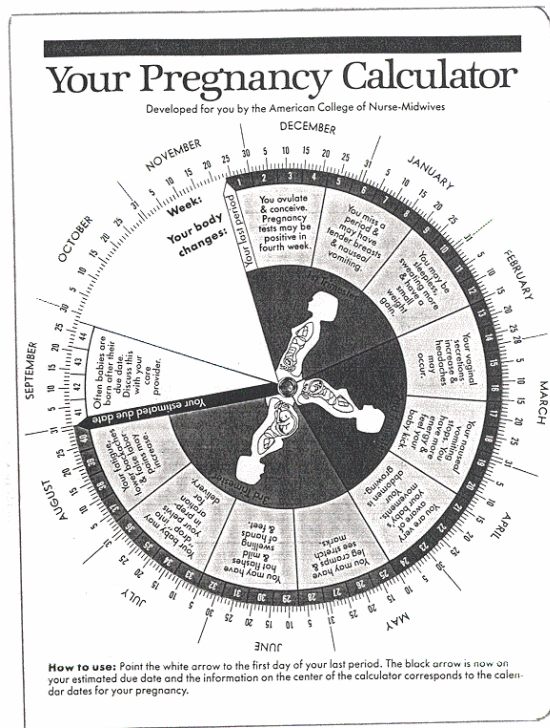
- ◆ 1.1–4.4 lb. gain 1st trimester
- ◆ 0.5 lb. gain per week 2nd and 3rd trimesters
- ◆ 11–20 lb. total weight gain

1. Last Name	First Name	MI
2. Patient Number		
3. Date of Birth (MM/DD/YYYY)	Month	Day Year
4. Race	<input type="checkbox"/> American Indian or Alaska Native <input type="checkbox"/> Asian <input type="checkbox"/> Black/African American <input type="checkbox"/> Native Hawaiian/Other Pacific Islander <input type="checkbox"/> Unknown <input type="checkbox"/> White	
5. Ethnic Origin	<input type="checkbox"/> Hispanic Cuban <input type="checkbox"/> Hispanic Mexican American <input type="checkbox"/> Hispanic Other <input type="checkbox"/> Hispanic Puerto Rican <input type="checkbox"/> Not Hispanic/Latino <input type="checkbox"/> Unreported	
6. Gender	<input type="checkbox"/> Female <input type="checkbox"/> Male	
7. County of Residence		



DHHS 2388 (Revised 08/10)
Women's and Children's Health Section (Review 06/13)
Source: Institute of Medicine, 2009. *Weight Gain During Pregnancy: Reexamining the Guidelines*. Washington, DC: National Academies Press; Committee to Reexamine IOM Pregnancy Guidelines.

APPENDIX K: EXHIBIT OF GESTATIONAL WHEELS



Sources: American College of Nurse-Midwives, 818 Connecticut Avenue, NW, Suite 900, Washington DC 20006;
https://member.midwife.org/members_online/members/createorder.asp?action=catalog&catalog=EDU&af=ACNM&token=

APPENDIX L: ANTHROPOMETRIC MEASUREMENT PROCEDURE CHECKLIST
WEIGHT

ADULT/CHILD

- ___ 1. Remove shoes and heavy outerwear and extra clothing of persons two years old or older.
- ___ 2. If zero balancing is necessary, move main beam and fractional weights to zero and see if indicator is reading zero. If not, adjust zeroing weight.
- ___ 3. Have the person step onto the **middle** of the scale platform covered with a paper towel.
- ___ 4. Adjust main beam weight one notch too heavy, then move it back (left) one notch. Adjust fractional beam weight to balance. State the measurement out loud.
- ___ 5. Record this weight reading to the nearest 1/4 pound.
- ___ 6. Have the person step off the scale, or return weights to zero.
- ___ 7. Return the main beam and fractional beam weights to zero.
- ___ 8. Re-weigh (repeat steps 3 through 6).
- ___ 9. Compare the first and second weights. If they are not within 1/4 pound of each other, repeat steps 3 through 6 until you have two weights within agreement.
- ___ 10. Record the final accepted (confirming) weight on the form.

INFANT

- ___ 1. Child is less than two years of age.
- ___ 2. Remove all clothing, except a dry diaper and light clothing such as one thin undershirt.
- ___ 3. Place a disposable sheet and medium dry diaper onto the scale and check the zero balance indicator, if necessary. Move the main beam and fractional beam weight to zero to check the balance. If it is not in balance, adjust the zero adjustment weight.
- ___ 4. Remove the dry diaper. Place the infant in the middle of the scale's pan on the sheet. **Do not touch the child. Do not allow the child to hold onto the part of the scale that would interfere with the accurate weight.**
- ___ 5. Adjust the main beam weight until the indicator goes all the way down, then move it back one notch.

- ___ 6. Move the fractional beam weight until the indicator is centered. State the measurement out loud.
- ___ 7. Record the weight in pounds and ounces to the nearest 1/8 ounce, 1/4 ounce, or 1 ounce on the form.
- ___ 8. Keep the infant on the scale.
- ___ 9. Return the main beam and fractional beam to the zero position.
- ___ 10. Repeat steps 5 through 7.
- ___ 11. Compare the first weight with the second. If they are not within one ounce, repeat steps 4 through 7 until you have two (2) weights within agreement.
- ___ 12. Record the final accepted (confirming) weight on the form.

HEAD CIRCUMFERENCE

- ___ 1. Thread the flexible insertion tape so that all words on the wide end of the tape show.
- ___ 2. Place the infant flat on his/her back or in a sitting position. You may want someone to hold the infant.
- ___ 3. Position the tape on the infant's head covering the fullest circumference of the head: above the eyebrows, above the ears, over the fullest part of the head back.
- ___ 4. Position the tape so you are reading it at the side of the head or middle of the forehead.
- ___ 5. Pull the tape snug and recheck placement.
- ___ 6. Take the reading at the top line (inch marking) at the arrow indication. State the measurement out loud.
- ___ 7. Record the reading to the nearest 1/16 inch on the form immediately.
- ___ 8. Remove the tape from the baby's head without unthreading.
- ___ 9. Repeat the steps from 3 through 8. Record the second reading.
- ___ 10. Compare the first and second readings. If they are not within 2/16, repeat steps 3 through 8 until there is an agreement between the readings.
- ___ 11. Record the final accepted (confirming) reading on the form.

HEIGHT

STATURE

Tape Installation:

- ___ 1. Tape line is metal and readable to nearest 1/16 inch.
- ___ 2. Tape line is attached firmly to a flat surface with clear strapping tape in a straight line, on a wall without extending baseboard.
- ___ 3. Tape line is attached above an uncarpeted floor or one with indoor/outdoor hard surface.
- ___ 4. Tape line is attached with "0" at the heel position (at floor), extending upward 84 inches.
- ___ 5. Right angle headboard and recording form are available.

Positioning Person:

- ___ 6. Person is two years of age or older.
- ___ 7. Have person remove shoes and heavy coat, etc.
- ___ 8. Place person against the wall with heels, buttocks and shoulders touching wall. Cover area where client steps with a paper towel.
- ___ 9. Eyes straight ahead to prevent head tilt;
 - knees are not bent
 - arms are straight at sides
 - legs are straight
 - heels flat on floor
 - not leaning on tape line

Taking and Recording the Reading:

- ___ 10. Pick up right angle headboard.
- ___ 11. Place the headboard against the wall and lower it until it firmly touches the crown of the head. State the measurement out loud.
- ___ 12. Recheck that the person has not bent knees or lifted heels off the floor.
- ___ 13. Hold the headboard in place and with the other hand, push down on person's shoulder; ask him/her to bend knees and step away.
- ___ 14. Read measurement to the nearest 1/16 inch and record immediately on the form.
- ___ 15. Repeat steps 8 through 14.

___ 16. Compare the first and second readings. If the second reading agrees within 2/16 of the first reading, record it as the official reading. If the two readings are not within 2/16 of each other, repeat steps 8 through 14 until you have two readings within agreement.

___ 17. Record the final accepted (confirming) reading.

LENGTH

___ 1. Check the equipment for ease of operation, etc.

___ 2. Spread disposable sheet on the recumbent length board.

___ 3. Remove shoes and have feet bare.

___ 4. Place the infant flat on back in the middle of the board with the head at the fixed board position.

___ 5. Position the crown of the head against fixed headboard, with vision upward. Have mom or an assistant help you. Demonstrates how to hold head.

___ 6. Hold knees together and firmly press downward to fully extend the infant.

___ 7. With the infant held in position, slide the footboard up until both heels touch and feet are flat against board.

___ 8. Immediately read measurement out loud and record to nearest 1/16 inch or 1/8 inch on the form.

___ 9. Keep the child in the middle of the board and slide the foot board away from the feet.

___ 10. Repeat steps 5 through 8. Record the second reading.

___ 11. Compare the first and second readings. If the second reading is within 2/16 or 1/8 inch of the first, record it as the official reading. If the two readings are not within 2/16 or 1/8 inch of each other, repeat steps 4 through 8 until two readings are within 2/16 inch or 1/8 inch of each other.

___ 12. Record the final accepted (confirming) reading.

APPENDIX M: INSTRUCTIONS FOR USING "MINIMUM EXPECTED WEIGHT GAIN TABLES" ALOOKUP METHOD@ FOR INADEQUATE GROWTH

Note: Tables adapted from Colorado WIC

The following tables are used to determine the "minimal expected weight gain" for an infant or child. If an infant or child has a weight gain for a period of time that is less than the number derived from the chart, then they should be risked with **Slow/Faltering Growth**. All numbers in the tables are given in ounces.

NOTE: If an infant or child is maintaining their growth percentile without a decrease, there is no reason to do the following calculation. An infant or child maintaining their growth percentile has adequate growth (with respect to the nutrition risk factors).

Step 1: Determine the infant/child's actual weight gain since their last visit.

Convert this number to ounces using the conversion table. Convert today's weight to ounces using the conversion table. Convert the previous weight to ounces using the conversion table. Subtract the previous weight from today's weight.

Step 2: Find the table that has this infant/child's age at their previous weight on the top line and their current age on the left hand side. Ages should be in months and weeks. The tables use an abbreviation for months and weeks that shows month followed by a decimal and then the number of weeks. For example: 2.3 would indicate an age of 2 months and 3 weeks.

Go down from the age at the previous weight and across from age at the current weight and the number you find is the "minimal expected weight gain." If the number in the box is greater than the actual weight gain, then Slow/Faltering Growth Risk Code 135 should be assigned to the infant/child. If the number is less, then the Risk Code for Slow/Faltering Growth does not apply. If the box is blank where the lines intersect, this method may not be used to determine Inadequate Growth.

The time between weight measurements must be at least one month for infants under 6 months of age, and at least 3 months for infants/children over 6 months of age. Previous weights may not be used if they are more than 7 months old. The weight gain tables are designed so that the boxes are blank for time intervals that do not meet these requirements.

If the time interval from the current weight to the previous weight is too short to meet the minimal interval, you may skip over the previous weight and go to the next previous weight that meets the time interval. You must, however, always use the **current weight** and the **most recent previous weight** that **meets the minimal time interval**. You may not skip weights that meet the interval in order to find a weight that will risk the infant/child.

Example 1

An infant is originally weighed for certification on the WIC Program at 2 weeks (0.2) of age. The infant is now in the clinic at 3 months and 1 week of age (3.1).

Weight at 3.1 = 12 pounds 8 ounces = 200 ounces

Weight at 0.2 = 8 pounds 2 ounces = 130 ounces

Weight gain 70 ounces actual weight gain

Table # 1: Go across the top of the chart until you find 0.2. Go down this column until you intersect with the row for 3.1. The minimal expected weight gain is 59 ounces. Because the actual weight gain is greater, the Inadequate Growth Risk Code does not apply.

Minimal Expected Weight Gain

Table #1

	0	0.1	0.2	0.3	1.0	1.1	1.2	1.3	2.0	2.1	2.2	2.3	3.0	3.1	3.2	3.3	4.0	4.1	4.2	4.3	5.0	5.1	5.2	5.3	6.0
1.0	19																								
1.1	25	19																							
1.2	31	26	21																						
1.3	37	32	27	23																					
2.0	46	40	36	31	27																				
2.1	50	45	40	36	31	23																			
2.2	55	49	45	40	36	27	21																		
2.3	59	54	49	45	40	32	26	19																	
3.0	65	59	55	50	46	37	31	25	19																
3.1	69	63	59	54	50	41	35	29	23	17															
3.2	73	67	63	58	54	45	39	33	27	21	17														
3.3	77	71	67	62	58	49	43	37	31	25	21	16													
4.0	82	76	72	67	63	54	48	42	36	30	26	21	17												
4.1	85	80	75	71	66	58	52	45	39	34	29	25	20	15											
4.2	89	83	79	74	70	61	55	49	43	37	33	28	24	19	15										
4.3	92	87	82	78	73	65	59	52	46	41	36	32	27	22	18	14									
5.0	97	91	87	82	78	69	63	57	51	45	41	36	32	27	23	19	15								
5.1	100	94	90	85	81	72	66	60	54	48	44	39	35	30	26	22	18	13							
5.2	103	97	93	88	84	75	69	63	57	51	47	42	38	33	29	25	21	16	13						
5.3	106	100	96	91	87	78	72	66	60	54	50	45	41	36	32	28	24	19	16	12					
6.0	110	104	100	95	91	82	76	70	64	58	54	49	45												
6.1	112	106	102	97	93	85	78	72	66	60	56	51	47	42											
6.2	114	109	104	100	95	87	81	74	68	63	58	54	49	44	40										
6.3	116	111	106	102	97	89	83	77	70	65	60	56	51	46	42	38									
7.0	119	114	109	105	100	92	86	79	73	68	63	59	54	49	45	41	37								

Age at first weight is along the top of the table. Age at current weight is along the left side of the table.
 (Month. Week) First number is the months. The number of weeks follows the decimal.

Minimal Expected Weight Gain

Table #2

	0.1	0.2	0.3	1.0	1.1	1.2	1.3	2.0	2.1	2.2	2.3	3.0	3.1	3.2	3.3	4.0	4.1	4.2	4.3	5.0	5.1	5.2	5.3	6.0	
7.0	114	109	105	100	82	86	79	73	68	63	59	54	49	45	41	37									
7.1	116	111	107	102	94	88	82	75	70	65	61	56	51	47	43	39	35								
7.2		114	109	105	96	90	84	78	72	68	63	59	54	50	46	42	37	34							
7.3			111	107	99	92	86	80	74	70	65	61	56	52	48	44	39	36	32						
8.0				110	101	95	89	83	77	73	68	64	59	55	51	47	42	39	35	32					
8.1					104	97	91	85	79	75	70	66	61	57	53	49	44	41	37	34	30				
8.2						100	93	87	82	77	73	68	63	59	55	51	47	43	40	36	32	29			
8.3							96	89	84	79	75	70	65	61	57	53	49	45	42	38	34	31	28		
9.0								92	87	82	78	73	68	64	60	56	52	48	45	41	37	34	31	28	

Table #3

	2.0	2.1	2.2	2.3	3.0	3.1	3.2	3.3	4.0	4.1	4.2	4.3	5.0	5.1	5.2	5.3	6.0	6.1	6.2	6.3	7.0	7.1	7.2	7.3	8.0	
9.0	92	87	82	78	73	68	64	60	56	52	48	45	41	37	34	31	28									
9.1		89	84	80	75	70	66	62	58	54	50	47	43	39	36	33	30	28								
9.2			87	82	78	73	69	65	61	56	53	49	46	42	39	36	33	30	28							
9.3				84	80	75	71	67	63	58	55	51	48	44	41	38	35	32	30	28						
10.0					83	78	74	70	66	61	58	54	51	47	44	41	38	35	33	30	28					
10.1						80	76	72	68	63	60	56	53	49	46	43	40	37	35	33	30	28				
10.2							78	74	70	66	62	59	55	51	48	45	42	39	37	35	33	30	28			
10.3								76	72	68	64	61	57	53	50	47	44	42	39	37	35	32	30	28		
11.0									75	71	67	64	60	56	53	50	47	44	42	40	38	35	33	30	28	

Age at first weight is along the top of the table. Age at current weight is along the left side of the table.
 (Month.Week) First number is the months. The number of weeks follows the decimal.

	4.0	4.1	4.2	4.3	5.0	5.1	5.2	5.3	6.0	6.1	6.2	6.3	7.0	7.1	7.2	7.3	8.0	8.1	8.2	8.3	9.0	9.1	9.2
	75	71	67	64	60	56	53	50	47	44	42	40	38	35	33	30	28						
		73	69	66	62	58	55	52	49	47	44	42	40	37	35	33	30	28					
			72	68	65	61	58	55	52	49	47	44	42	39	37	35	33	30	28				
				70	67	63	60	57	54	51	49	47	44	42	39	37	35	33	30	28			
					71	67	64	61	58	54	52	49	47	44	42	40	38	35	33	30	28		
						67	64	61	58	54	52	50	48	45	43	40	38	35	33	31	29	26	
							65	62	59	55	53	50	48	45	43	41	39	36	34	31	29	26	24
								62	59	56	53	51	49	46	44	42	39	37	34	32	30	27	25
									60	56	54	52	50	47	45	42	40	37	35	33	31	28	26

Table #5

0.0	6.1	6.2	6.3	7.0	7.1	7.2	7.3	8.0	8.1	8.2	8.3	9.0	9.1	9.2	9.3	10.0	10.1	10.2	10.3	11.0	11.1	11.2
0	56	54	52	50	47	45	42	40	37	35	33	31	28	26	23	21						
	57	55	53	50	48	45	43	41	38	36	34	31	29	26	24	22	19					
		55	53	51	48	46	44	41	39	36	34	32	29	27	25	22	20	17				
			54	52	49	47	44	42	39	37	35	33	30	28	25	23	20	18	16			
				52	50	47	45	43	40	38	36	33	31	28	26	24	21	19	17	14		
					50	48	46	44	41	39	36	34	31	29	27	25	22	20	17	15	12	
						49	46	44	41	39	37	35	32	30	27	25	22	20	18	16	13	11
							47	45	42	40	37	35	32	30	28	26	23	21	18	16	13	11
								46	43	41	38	36	33	31	29	27	24	22	19	17	14	12

Age at first weight is along the top of the table. Age at current weight is along the left side of the table. (Month.Week)
 First number is the months. The number of weeks follows the decimal.

Slow/Faltering Growth Risk

Growth faltering is defined as a growth rate below that which is appropriate for an infant's age and sex. It can effect length, weight, and head circumferences resulting in values lower than expected. Growth faltering may include weight faltering (a drop in weight-for-age) or slowed growth where both weight and length growth are slower than expected. An example of weight faltering is a drop in weight after a minor illness or a measurement/plotting error.

Growth in infants is steady and predictable. It is a reflection of health and nutritional status and the overwhelming majority of infants have no growth problems. Normal growth is also pulsatile, with periods of rapid growth or growth spurts followed by periods of slower or no measurable growth. Catch-up and catch-down growth during early childhood are normal phenomena that affect large numbers of children, particularly during infancy, and may merely be an adjustment to the genetic potential for growth (9). Growth is also seasonal, with length velocities (the change in growth over time) increased during the spring and summer months and stagnant other months. Weight may vary depending on the time of day and infant feeding schedule. Growth may be increased or slowed by a variety of conditions, with changes in growth as the first sign of a pathological condition. Such conditions include: undernutrition, hypothyroidism, iron deficiency, human immunodeficiency virus (HIV), inborn errors of metabolism, lead toxicity, zinc deficiency, immune deficiency, failure of a major organ system such as the gastrointestinal digestive system, renal, cardiovascular, and pulmonary. Infants that do not follow a steady predictable pattern, such as those with short stature or decreased growth rate, should be the focus of concern.

The timely detection of poor growth in early life is a way to identify infants who may be at risk for growth faltering, and intervene before undernutrition has detrimental health outcomes, such as growth retardation, when incurred early are irreversible. It can help prevent short stature and adverse functional and deleterious long term consequences, such as poor cognition and educational performance, low adult wages, lost productivity, and when accompanied by weight gain later in childhood, an increased risk of nutrition-related chronic diseases.

Excessive Weight Loss After Birth

Infant weight loss in the early postpartum period is physiologically normal, and nearly universal but the amount of weight loss varies. Weight loss of 5% and 7% of birth weight is not unusual for formula-fed or breastfed infants, respectively. Healthy infants are expected to regain their birth weight within 8-10 days after birth. However, if a breastfed infant loses 7% of birth weight in the first 72 hours after birth, an evaluation and review of the mother-infant dyad is needed and any problems resolved immediately. Risk of dehydration and failure to thrive in breastfed newborns can be mitigated by early screening and providing lactation support in the early postpartum period.

A weight loss of up to 10% of birth weight is the maximum acceptable weight loss for newborn infants, with any additional loss a potential emergency. Contributing factors include:

- Hospital practices like epidurals, pacifier use, low or non-nutritive feedings, or strict feeding schedules.
- Maternal factors such as retained placenta, parity, anxiety, and poor maternal knowledge.
- Infant factors such as birth weight, gestational age, gender, and feeding method.
- Breastfed infants with poor positioning, latch and/or milk transfer.

WIC staff should identify and address any potential underlying feeding issues causing newborn weight loss. An infant with a weight loss of greater or equal to seven percent signals the need for careful evaluation and intervention, infants with a weight loss of ten percent or more is a marker for a medical referral.

Any Weight Loss 2 Weeks to 6 Months

While the 2006 CDC/WHO growth charts show slower growth from 3 – 18 months of age as a normal growth pattern, weight loss is not expected beyond the first two weeks of life and requires follow-up. After birth, growth faltering is caused by inadequate caloric intake, normal caloric intake in an environment of excessive loss or malabsorption; or increased metabolic needs. In cases of dehydration or acute illnesses like gastroenteritis, fluid loss that exceeds fluid intake may also lead to significant weight loss. Weight loss in young infants is commonly caused by acute infections, feeding problems, allergy to milk protein, lead poisoning, HIV, malnutrition, pyloric stenosis, gastrointestinal reflux, celiac disease, cystic fibrosis, neglect, growth failure, congenital heart disease, and inborn errors of metabolism.

The primary goal of the intervention is to enhance infant health outcomes by addressing causes of slowed growth and keeping vulnerable infants tracking along growth percentiles established in infancy. In some cases, it may be important to intervene quickly, while in other cases a period of frequent growth monitoring would be more appropriate to prevent too rapid refeeding and subsequent increased risk of type 2 diabetes, obesity, and cardiovascular disease later in life.

If faltering growth is suspected, maternal neglect and inadequate caloric intake due to inappropriate formula mixing, breastfeeding problems, early introduction of solid food, maternal depression, and emotional deprivation, must be ruled out and addressed. Growth monitoring should occur on a monthly basis – utilizing two separate weight measurements taken at least eight weeks apart as data markers. It is imperative that WIC staff involved in measuring infant growth use standardized equipment and receive adequate training prior to conducting infant measurements to increase reliability between measures. If the participant does not respond to nutritional management (i.e. weight continues to falter) or if other markers falter (such as length for age or stagnant head circumference), then the infant should be referred to their health care provider for assessment.

Normal Growth Patterns

Understanding normal growth patterns in infants is important. The pattern of weight gain during infancy varies depending on the method of feeding. Compared to formula-fed infants, breastfed infants gain weight rapidly in the first three to four months of life and relatively slowly thereafter. Although the weights of formula-fed and breastfed infants are similar by one to two years of age, the typical pattern of slowed weight gain after three to four months among breastfed infants may lead to unnecessary early introduction of solid foods or cessation of breastfeeding if the slowed weight gain is perceived as lactational inadequacy.

Table #6

8.1	8.2	8.3	9.0	9.1	9.2	9.3	10.0	10.1	10.2	10.3	11.0	11.1	11.2	11.3	12.0	12.1	12.2	12.3	13.0	13.1	13.2	13.3
43	41	38	36	33	31	29	27	24	22	19	17	14	12	10	8							
43	41	39	37	34	32	29	27	24	22	20	18	15	13	10	8	7						
	42	40	37	35	32	30	28	25	23	21	18	16	13	11	9	8	7					
		40	38	35	33	31	28	26	23	21	19	16	14	12	9	9	8	7				
			39	36	34	32	29	27	24	22	20	17	15	13	10	9	9	8	8			
				37	34	32	30	27	25	23	20	18	15	13	11	10	9	9	8	7		
					35	33	31	28	26	23	21	18	16	14	12	11	10	9	9	8	7	
						33	31	28	26	24	22	19	17	14	12	11	11	10	9	9	8	7
							32	29	27	25	23	20	18	15	13	12	12	11	10	9	9	8

Table #7

10.1	10.2	10.3	11.0	11.1	11.2	11.3	12.0	12.1	12.2	12.3	13.0	13.1	13.2	13.3	14.0	14.1	14.2	14.3	15.0	15.1	15.2
29	27	25	23	20	18	15	13	12	12	11	10	9	9	8	8						
30	28	25	23	20	18	16	14	13	12	12	11	10	9	9	8	7					
	28	26	24	21	19	16	14	13	13	12	12	11	10	9	9	8	7				
		27	24	22	19	17	15	14	13	13	12	11	11	10	9	9	8	7			
			25	22	20	18	16	15	14	14	13	12	12	11	10	9	9	8	8		
				23	21	18	16	15	15	14	14	13	12	12	11	10	9	9	8	7	
					21	19	17	16	15	15	14	13	13	12	12	11	10	9	9	8	7
						20	17	17	16	15	15	14	13	13	12	11	11	10	9	9	8
							18	18	17	16	16	15	14	14	13	12	12	11	10	9	9

Age at first weight is on the top of the table. Age at current weight is at the left side of the table. (Month.Week)
 First number is the months, number of weeks follows the decimal.

Table 8

Use this table for children whose current age is greater than 19 months of age. The first column is the amount of time between weights, and the second column is the "minimal expected weight gain" for that time period. The period of time between weights may not be more than 7 months or less than 3 months.

(Months.Weeks) First number is month. Second number after the decimal is number of weeks.

3.0	½ pound
3.1	½ pound
3.2	½ pound
3.3	½ pound
4.0	½ pound
4.1	½ pound
4.2	½ pound
4.3	½ pound
5.0	¾ pound
5.1	¾ pound
5.2	¾ pound
5.3	¾ pound
6.0	1 pound
6.1	1 pound
6.2	1 pound
6.3	1 pound
7.0	1 pound