PART III: PLOTTING AND INTERPRETING GROWTH CHARTS AND PREGNANCY WEIGHT GAIN CHARTS

WHAT IS A GROWTH CHART?

The Centers for Disease Control and Prevention (CDC) growth charts illustrate how a child's growth in weight and length or height compares with that of other children in the United States. The charts are tools that help to identify children who may be at risk for overweight, underweight, or short stature, and those who fall within the average range of weight or height for their age and gender. This information, along with accurate dietary, health, and hematological information, can help you assess a child’s health and nutritional status. The growth charts that you will be using were developed by the CDC to represent patterns of growth in normal, healthy children. A growth chart can be used to monitor and assess a child's growth over time.

WHAT DO GROWTH CHARTS TELL US?

Growth charts show you how each child's measurements compare with children of the same gender and age. Each chart has smoothed curves or lines that represent growth percentiles. These curves (percentiles) serve as a reference for comparison. The height or weight of a child will be plotted on the grid and then compared to these percentiles.

For example, if a 3-year-old girl is below the 5th percentile weight-for-age, less than 5% of girls her age in the United States weigh less. Likewise, a 3-year-old girl at the 95th percentile weight-for-height weighs more than 95% of girls in the U.S. with the same height. Growth charts can be used to identify children who are potentially underweight or overweight as well as to describe children whose weights and heights fall in the average ranges.

Single measurements of height and weight, begin to provide clues about a child’s growth, but plotting measurements at two or more WIC visits begins to show the child's growth pattern. This pattern can then be compared to the expected pattern of growth. In other words, you can evaluate whether the child is growing at a rate similar to that of healthy peers. Unexpected increases or decreases in height-for-age, or weight-for-age, weight-for-length, or BMI can be assessed. For these reasons, growth charts are valuable tools to assess nutrition and health status.
PROCEDURE USING GROWTH CHARTS FOR INFANTS AND CHILDREN

If you are assessing children’s length, height or weight as part of a certification for the Minnesota WIC program, you will use the automated growth charts that are part of the clinic software. Based on the information entered into the height/weight tab, the software generates the CDC growth charts. The automated system eliminates the need for “hand-plotting” length or height and weight. The instructions for entering length or height and weight data into the WIC clinic software are described below.

(All CPAs should be able to use paper charts and do the required calculations. Instructions for “hand-plotting” the information on paper growth charts are described in Appendix A.)

PROCEDURES FOR PLOTTING CHILDREN’S HEIGHT, LENGTH AND WEIGHT IN THE WIC CLINIC SOFTWARE

Using equipment and procedures described in Part II of this manual, height or length and weight for infants and children will be collected and entered into the Height and Weight tab in the WIC clinic software.

Step # 1 -- Enter date of collection.

The first step is to enter the date on which the measurements were taken. Most often, this will be the date of the certification.

Enter the date the data was collected. If the data is collected on a date other than the current date (as happens with referral data), the actual date of collection must be entered.

Child’s Age at the time of measurement

The clinic software will calculate the child’s age based on the indicated date of collection and display this on the Height and Weight screen. The system defaults in today’s date because most often height and weight are measured during the certification appointment. However, WIC may use anthropometric measures collected by other medical providers at an earlier date. If such information is used, the actual date of the measurements must be entered so that the data will be plotted based on the child’s actual age at the time of measurement.
Step # 2 – Indicate whether the child was measured standing or recumbent.
It is essential to correctly indicate whether the child was measured standing or recumbent. The child’s length or height is assessed using the grid that matches the child’s measurement position.

- All children <2 years of age must be measured in the recumbent position. If the child is <2 years old, “recumbent” will be defaulted into the “measurement position” box.
- Children older than 3 years of age must be measured standing, “standing” is defaulted into the “measurement position” box.
- Children between 2 and 3 years may be measured either standing or recumbent (see page 9 for guidance on deciding the appropriate position). Standing will be defaulted and this must be changed to recumbent if the child was measured in the recumbent position.

Step # 3 – Enter height/length and weight into the Height and Weight tab in the clinic software

To enter height, length or weight, the CPA clicks on the “Add” button. After the Add button is selected, the screen opens to allow the CPA to add the anthropometric information.

Once the anthropometric information is entered into the child’s record, growth grids can be viewed by clicking on the Growth Grids button. This prompts the system to generate the appropriate growth grid so that the CPA can assess the child’s growth.
When a child’s measurements are plotted on the growth grids, the results are displayed as “percentiles”. The percentiles represent the normal distribution of weight, height, weight for height, or BMI for a nationally representative reference group of healthy children the same age and gender. Percentiles are represented by curved lines on the growth chart.

On each chart, the 5th, 10th, 25th, 50th, 75th, 90th, and 95th percentiles are indicated by lines. On the BMI/age chart, the 85th percentile is also shown. The 50th percentile is the mean; the top percentile shown is the 95th, and the lowest percentile displayed is the 5th percentile.

Children whose measurements are about average, will “plot” near the mean (or 50th percentile). For children who are larger than average, their measurements will be plotted above the mean, and smaller children’s measurements will be below the mean. As a child’s measurements deviate further above the mean, the percentile representing that measure will be larger. As measurements deviate further below the mean, the percentile will be smaller.

For example:

- For a child whose weight plots on the 50th percentile of the weight-for-age chart, we expect that half (50%) of all healthy children of the same gender and age weigh less than the measured child, and half weigh more.

- For a child whose height plots on the 25th percentile of the height-for-age chart, then we expect that 25% of all healthy children of the same age are shorter than the child, and 75% are taller.

- For a child whose BMI plots on at the 95th percentile on the BMI-for-age chart, we expect that 95% (or “most”) healthy children of the same height, age and gender will weigh less, and only 5% (or “not very many”) will weigh more than this child.
33. What do you need to mark on the height and weight screen when you use referral data?
   A. Enter the date the measurement was actually collected
   B. Select a reason from the “Possible Incorrect Measurement Position” drop-down list
   C. Enter an exception reason
   D. A and B
   E. All of the above

34. If a child is between two and three years what is the appropriate method of measuring?
   A. Always standing
   B. Always recumbent
   C. Depends on what parent prefers
   D. None of the above

35. If a child is greater than three years old, what is the appropriate method of measuring?
   A. Always standing
   B. Always recumbent
   C. Depends on if child is able to cooperate so that a good standing measurement can be obtained, otherwise should be recumbent.
   D. None of the above

36. What are the first steps to take if it appears that a child’s weight or height has changed drastically compared to previous plots on the growth charts?
   A. Make an immediate referral to the child’s health care provider.
   B. Begin further assessment by asking the parent assessment questions (e.g., does the parent think the child’s weight or height status has changed?).
   C. Look at the measures entered in the record to assure that the information was entered correctly (e.g., entered “42” when should have been “24”; or entered the decimal value when should have entered it’s ounce equivalent – e.g.: entered “6” in the ounce field because the read out was “.6” which should have been converted to “11 ounces”).
   D. Re-measure the child.
   E. First, C and if no errors found, D and if it appears that measures were correct, then B and if appropriate A.

37. Which of the following statements are false?
   A. Multiple (vs. single) plots of weight/height give a better picture of a child’s growth.
   B. It doesn’t matter if the length or height was measured (recumbent or standing).
   C. It is important to indicate the actual date measurements were taken so height and weight plots will be based on the child’s age at time of measurement

STOP
Now, check your answers against the Answer Key at the end of this module.
Assessing Growth and Weight Status

The following charts are used by the Minnesota WIC Program to assess growth.

**Birth-to-36 month Length-for-Age and Gender**

The birth-to-36 month length-for-age charts represent the normal distribution of length at specified ages for boys or girls in the nationally representative reference. These charts compare how long a child is to other children the same age and gender.

**WIC Risk Code 121, Short Stature or At Risk of Short Stature**

Length for Age ≤ the tenth percentile (10%) is the criteria for assigning Risk Code 121, Short Stature or At Risk of Short Stature.

- Length-for-Age ≤ the fifth percentile (5%) is criteria for Short Stature
- Length-for-Age ≤ the tenth (10%) but above the fifth, is criteria for At-Risk of Short Stature
The Birth-to-36 month weight-for-age charts represent the normal distribution of weight at specified ages for boys or girls in the nationally representative reference. These charts compare how heavy a child is compared to other children the same age and gender.

Weight for age is not used alone to classify infants and children as under- or overweight. However, it is important in early infancy for monitoring weight, and weight gain. Further, because weight for age is influenced by recent changes in health or nutritional status, it can be helpful in explaining changes in weight-for-length or BMI-for-age.
Birth-to-36 month Weight-for-Length and Gender

These charts compare the weight measures of all same gender children of a given length. Compared to other children the same gender, how does the child’s weight compare to other children this length? These charts do not include age as a factor, and are only used when length is measured in the recumbent position. These charts can be an indicator of overweight or underweight.

WIC Risk Code 103, Underweight or At Risk of Becoming Underweight

Weight-for-Length ≤ the tenth percentile (10%) is the criteria for assigning Risk Code 103, Underweight or At Risk of Becoming Underweight.

- Weight-for-length ≤ the fifth percentile (5%) is criteria for Underweight
- Weight-for-length ≤ the tenth (10%) but above the fifth criteria for At-Risk of Becoming Underweight

WIC Risk Code 113, Overweight (Children 2 to 5 years)

Weight-for-Length ≥ 95th percentile is criteria for assigning Risk Code 113 Overweight for children 2 to 3 years if they were measured in the recumbent position.
Two-to-six year Height-for-Age and Gender

The height-for-age charts represent a normal distribution of heights at specified ages for boys or girls in the nationally representative reference. These charts compare how tall a child is to the height of other children the same sex and age. These charts can be an indicator of short stature or growth faltering.

**WIC Risk Code 121, Short Stature or At Risk of Short Stature**

Height for Age ≤ the tenth percentile (10%) is the criteria for assigning **Risk Code 121, Short Stature or At Risk of Short Stature**.

- Height-for-Age ≤ the fifth percentile (5%) is used to screen for **Short Stature**
- Height-for-Age ≤ the tenth (10%) but above the fifth is used to screen for **At Risk of Short Stature**
Body-Mass-Index (BMI) for Age and Gender

The BMI-for-age charts represent a normal distribution of weight and height together, and compare BMI-to-age for boys and girls of the same age in the nationally representative reference. These charts compare the combined weight and height to other same age and gender children. BMI is used to classify children as underweight, overweight or obese.

**WIC Risk Code 103, Underweight or At-Risk-of-Becoming Underweight**

BMI for Age ≤ the tenth percentile (10%) is the criteria for assigning **Risk Code 103, Underweight or At Risk of Becoming Underweight**.

- BMI-for-Age ≤ the fifth percentile (5%) is used to screen for *Underweight*
- BMI-for-Age ≤ the tenth (10%) but above the fifth is used to screen for *At Risk of Becoming Underweight*

**WIC Risk Code 113, Overweight (Children 2 years and older)**:

BMI for Age ≥ 95th percentile is the criteria for assigning **Risk Code 113, Overweight for children 2 to 5 years**.

**WIC Risk Code 114, At-Risk-of-Becoming Overweight (Children 2 years and older)**:

BMI for Age ≥ 85th percentile up to the 95th percentile is the criteria for assigning **Risk Code 114, At-Risk-of-Becoming Overweight for children 2 to 5 years**.
In 2000, the CDC introduced BMI charts for children. The BMI for age charts are used to evaluate weight status compared to height and age.

Using BMI as a tool for evaluating weight status has a couple of advantages. One important advantage is that BMI can continue to be used to evaluate weight status through adolescence and into adulthood. This allows for tracking a child’s weight over time.

A second advantage of BMI for age chart is that age is included in the assessment of the child’s weight status. Including age in the assessment is important because children’s adiposity varies by their stage of development, which is reflected by the child’s age.

On the chart above, a child’s BMI is plotted for the child’s age. The child’s BMI can then be compared to the BMI of other children the same age and gender.

**Two-to-six year Weight-for-Age and gender:**

![Graph showing weight-for-age chart for two to six year olds.](image)

The two to six year weight for age charts represent a normal distribution of weights at specified ages for boys or girls in the nationally representative reference. These charts compare how heavy a child is to the weight of other children the same sex and age. Weight-for-Age alone is not used to classify children as over or underweight, but it often reflects recent changes in health or nutritional status and can be important in assessing changes in BMI status.
Two-to-Six Year Weight-for-Height and Gender

The two to six year weight-for-height charts represent a normal distribution of all the weights for a given height for boys or girls in the nationally representative reference. On this chart, a child’s weight is plotted according to his/her height, and compares the child’s weight with the weight of other children of the same gender and height. Age is not factored into the assessment. This chart can be used to assess overweight or underweight. However, this chart is used as a secondary assessment tool. The BMI-for-age chart is the primary tool for assessing weight status of children over two years of age measured standing.

A critical aspect of the assessment done in WIC as part of the certification process is the assessment of the child’s length or height and weight. In order to assess an individual child’s growth, the child’s measurements are compared to those of a reference population of healthy peers. Multiple measures and plots are much better indicators than are single plots.

The goal is to identify early any growth or weight deviations. Because of WIC’s role in preventative health care, the WIC program uses less strict cut-offs as indicators of problems with weight and growth. These more generous margins are labeled “at-risk-of”. Based on all the assessment information gathered (i.e., anthropometric, hematologic, dietary and health) WIC staff can provide the most appropriate education and referrals.
Below are different illustrations of two young girls’ growth using the different growth charts. These examples were taken from the US Department of Health and Human Services: Health Resources Services Administration Maternal and Child Health Modules. (For more information, go to http://depts.washington.edu/growth/index.htm)

Please review these examples carefully.

Example 1, Part 1.

This child’s growth appears to be poor because for both length and weight, she is below the 5th percentile when compared to other girls her age.

However, accurately assessing a child’s growth involves more than simply identifying where the child’s indices fall on the grid. It is important to look at the child’s growth over time, since she might be growing at a normal rate.

Figure 1a. Weight-for-age and Length-for-age, birth to 36 months. For both weight-for-age and length-for-age this child is at the 5th percentile.
Figure 1b. Weight-for-length, birth to 36 months. Her weight-for-length is at the 25th percentile.
Example 1, Part 2.
Below is another look at the growth of the same child, over time.

Figure 1c. Weight-for-age and Length-for-age, birth to 36 months. Weight-for-age and length-for-age have consistently been at the 5th percentile.
Figure 1d. Weight-for-length, birth to 36 months. Weight-for-length has **consistently been at the 25th percentile.**

This child’s parents are both small, and it is likely that she is genetically predisposed to being short. By looking at her growth over time, the staff person and the parents can see that the child is progressing normally. There are other factors that can affect growth potential, including being born small for gestational age.
Example 2.
This child’s weight-for-age, length-for-age, and weight-for-length are also below the 5th percentile at 15 months of age. Further, by reviewing her growth over time, you can see that the rate of her growth has changed, and deviates from the normal pattern of growth for a child her age.

Such a deviation should raise questions about what might be affecting her growth. For example, has there been an illness, or change in dietary intake? By viewing several measures, we see that each --- length-for-age, weight-for-age, and weight-for-length -- dropped at about the same time.

Figure 2a. Weight-for-age and Length-for-age, birth to 36 months. Weight-for-age and length-for-age have decreased to below the 5th percentile.
Figure 2b. Weight-for-length, birth to 36 months. Weight-for-length has decreased to below the 5th percentile.

Additional assessment should be done and if appropriate, referrals should be made for this child.
Circle the following "T" (for True) or "F" (for False).

38. a. The pattern of growth reveals more about a child’s nutritional status than a measurement at one point in time.  
   T  F 

   b. Height or weight plotted at a certain age tells you how a child compares in size with other children of the same age and gender.  
   T  F 

   c. Percentiles are curved lines on the growth chart that are used to show how a child’s measurements compare with other children.  
   T  F 

   d. Short stature (low length or height for age) might indicate a growth problem, but it may simply reflect normal growth for that child.  
   T  F 

   e. To see if a child has an appropriate weight for his length, plot the measurement on the weight-for-height chart.  
   T  F 

39. Fill in the blanks with the appropriate percentiles:

   a. Children’s BMI for age ≤ the ___th percentile may indicate underweight. BMI for age measurements ≥ the ___th percentile may indicate overweight.

   b. Measurements > the ___th and ≤ ___th percentiles on the weight for height or the BMI for age charts indicate possible risk for becoming underweight, whereas measurements ≥ the ___ th and < ___th percentiles on the BMI for age chart indicate possible risk of becoming overweight.

40. Mark the following statements "T" (for True) and "F" (for False).

   ___ (a) Weight and length (or height) should be measured at every certification of all children.

   ___ (b) The growth chart should be reviewed at every certification for all children.

Now, check your answers against the Answer Key at the end of this module.
**Weight Gain in Pregnancy**

Appropriate weight gain is important to achieving a healthy pregnancy. WIC can have a critical role in facilitating appropriate weight gain among WIC participants by accurately assessing the rate of weight gain and by providing appropriate advice regarding the individual’s unique situation. Weight gain recommendations are based on a woman’s pre-pregnancy weight status (i.e., underweight, normal, overweight or obese), using her height and weight prior to the pregnancy. (For example, women who were underweight prior to the pregnancy should gain more weight than normal- or over-weight women.) By monitoring a woman’s weight gain over the course of the pregnancy, WIC can provide individualized nutrition information and support to improve the likelihood that she will gain a healthy amount of weight.

**WHAT IS A PREGNANCY WEIGHT GAIN CHART?**

The pregnancy weight gain chart is a tool used to plot a woman’s weight gain (or loss) over the course of her pregnancy to monitor the amount and rate of weight gain throughout the pregnancy. Weeks gestation -- from 0 to 40 -- are shown on a horizontal axis moving left to right. Each grid line represents one week of gestation.

Weight gain or loss from the pre-pregnancy weight is depicted on the vertical axis along the left hand side of the chart. The pre-pregnancy weight is plotted at “zero” (the starting point on the graph). Weight gain is depicted by grid lines above zero; and weight loss is shown by increments below zero. Each grid line represents five pounds.

The chart displays a recommended range of weight gain for each week of gestation. The actual weight change (today’s weight less the pre-pregnancy weight) is plotted against the weeks gestation. Tracking the weight change and comparing it to the recommended weight change, helps identify deviations from the expected rate of change. This information, along with accurate dietary information, can help you assess a woman’s health and nutritional status.
In the example below, the woman was assessed to be “overweight” prior to the pregnancy. On the date of the measurement, it was estimated that she was at twenty seven weeks gestation, and she had gained approximately 23 pounds.

The pregnancy weight gain charts used in the Minnesota WIC Program were developed based on the recommendations from the Institute of Medicine (Nutrition During Pregnancy, Institute of Medicine, National Academy of Sciences, National Academy Press, 2009). IOM published recommended amounts of weight gain based on pre-pregnancy weight status -- underweight, normal weight, overweight, and obese -- reflecting the different recommended amounts of weight gain based on pre-pregnancy weight status.

A woman’s pre-pregnancy weight status is assessed using Body-Mass-Index (BMI), and determined to be either underweight, normal weight, overweight or obese.
Procedures for determining recommended weight gain

Step #1: Determine the woman’s pre-pregnancy BMI.

You can use the system calculated BMI, a BMI chart or a calculator.

BMI Chart

<table>
<thead>
<tr>
<th>Height in inches</th>
<th>Weight in pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>58”</td>
<td>88  89  91  100  118  119  129  143  144</td>
</tr>
<tr>
<td>59”</td>
<td>91  92  94  104  123  124  133  148  149</td>
</tr>
<tr>
<td>60”</td>
<td>94  95  97  107  127  129  138  153  154</td>
</tr>
<tr>
<td>61”</td>
<td>97  98  100  111  131  133  143  158  159</td>
</tr>
<tr>
<td>62”</td>
<td>100  101  104  115  135  137  147  163  164</td>
</tr>
<tr>
<td>63”</td>
<td>104  105  107  118  140  141  152  169  170</td>
</tr>
<tr>
<td>64”</td>
<td>107  108  110  122  144  146  157  174  175</td>
</tr>
<tr>
<td>65”</td>
<td>110  111  114  126  149  150  162  179  180</td>
</tr>
<tr>
<td>66”</td>
<td>114  115  118  130  154  155  167  185  186</td>
</tr>
<tr>
<td>67”</td>
<td>117  118  121  134  158  159  172  191  192</td>
</tr>
<tr>
<td>68”</td>
<td>121  122  125  138  164  165  177  196  197</td>
</tr>
<tr>
<td>69”</td>
<td>124  125  128  142  168  169  182  202  203</td>
</tr>
<tr>
<td>70”</td>
<td>128  129  132  146  173  174  188  208  209</td>
</tr>
<tr>
<td>71”</td>
<td>132  133  136  150  178  179  193  214  215</td>
</tr>
<tr>
<td>72”</td>
<td>136  137  140  154  183  184  199  220  221</td>
</tr>
</tbody>
</table>

In establishing an estimated pre-pregnancy weight, the CPA must use professional judgment, and their assessment and interviewing skills. The CPA may begin by asking the woman what she estimates her pre-pregnancy weight to have been. Some women will know but many will not. Further, many women will not have had access to a reliable balance beam scale. The CPA must keep these things in mind when determining what weight to use as her pre-pregnancy weight estimate.

The CPA may need to help her estimate the pre-pregnancy weight by asking her if she thinks she has gained or lost weight, consider asking her things such as: if and how her clothes fit differently? does she sense a physical change? have there been measurements done at her clinic visits?

If for example, she states that her pre-pregnancy weight was 125 pounds, she is currently at 8 weeks gestation, and she states that her clothes mostly still fit – with minor changes in the snugness of the waist band of her jeans, and you measure her weight at the clinic as 135 pounds, you may wish to change the estimate to a number closer to 135 pounds.
Step #2: Determine the woman’s recommended weight gain amount and pattern.

The following table lists pre-pregnancy BMI values, and the corresponding weight gain recommendations. The clinic software will display the appropriate chart based on information entered into the health information and height/weight/blood tabs.

<table>
<thead>
<tr>
<th>BMI prior to pregnancy</th>
<th>Pre-pregnancy weight status</th>
<th>Recommended total weight gain</th>
<th>Weight Gain Chart used to plot weight in pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 18.5</td>
<td>Underweight</td>
<td>28 to 40 pounds</td>
<td>Underweight chart</td>
</tr>
<tr>
<td>18.5 to 24.9</td>
<td>Normal weight</td>
<td>25 to 35 pounds</td>
<td>Normal weight chart</td>
</tr>
<tr>
<td>25 to 29.9</td>
<td>Overweight</td>
<td>15 to 25 pounds</td>
<td>Overweight chart</td>
</tr>
<tr>
<td>≥ 30.0</td>
<td>Obese</td>
<td>11 to 20 pounds</td>
<td>Obese chart</td>
</tr>
</tbody>
</table>

Weight Gain in Pregnancy – Underweight Women

This chart is used for women who were underweight prior to the pregnancy. The total amount of recommended weight gain is greater for women who began their pregnancy underweight. In order to achieve a greater total weight gain, the weight gain pattern will be slightly different. By plotting the changes in her weight by the week’s gestation, it is possible to see if her current rate and amount of weight gain is on target to achieve the total recommended amount of weight gain. For women who were underweight prior to the pregnancy, the recommended range of weight gain is 28 to 40 pounds.

This chart is used when a woman’s pre-pregnancy BMI is less than 18.5.

This woman was underweight prior to pregnancy. She is currently at 8 weeks gestation and has gained five and a half pounds. It is recommended that she gain is at least 28 pounds but less than 40 pounds.
Weight Gain in Pregnancy – Normal Weight Women

This chart is used for women who were classified as “normal” weight prior to pregnancy, (i.e., the BMI was between 18.5 and 24.9). As with underweight women, by plotting the changes in weight by weeks gestation, it is possible to see if the current rate and amount of weight gain is on target to achieve the total recommended amount of weight gain. For women who were normal weight prior to the pregnancy, the recommended range of weight gain is **25 to 35 pounds**.

This woman’s weight status was “normal” prior to her pregnancy. She is currently at 20 weeks gestation and has gained about eleven pounds.
Weight Gain in Pregnancy – Overweight Women

This chart is used for women who were classified as overweight prior to pregnancy. As with underweight and normal weight women, by plotting the change in weight by weeks gestation, it is possible to see if the current rate and amount of weight gain is on target to achieve the total recommended amount of weight gain. For women who were overweight prior to the pregnancy, the recommended range of weight gain is **15 to 25 pounds**.

This chart is used for women whose pre-pregnancy BMI is greater than or equal to 25, but less than 30.

This woman’s weight status was “overweight” prior to her pregnancy. She is currently at 26 weeks gestation and has gained about 23 pounds.
Weight Gain in Pregnancy – Obese Women

This chart is used for women who were classified as obese prior to pregnancy. As with overweight, underweight and normal weight women, by plotting the change in weight by weeks gestation, it is possible to see if the current rate and amount of weight gain is on target to achieve the total recommended amount of weight gain. For women who were obese prior to the pregnancy, the recommended range of weight gain is **11 to 20 pounds**.

This chart is used for women whose pre-pregnancy BMI is greater than or equal to 30.

This woman’s weight status was “obese” prior to her pregnancy. She is currently at 13 weeks gestation and has gained very little weight.
What do the Weight Gain in Pregnancy Charts Tell Us?

The weight-gain-in-pregnancy-chart allows comparison of a woman’s weight gain to a standard recommended weight gain, based on the pre-pregnancy weight status. The recommended standards provide a range of weight gain for given pre-pregnancy weight status. The standards are based on recommendations made by the Institute of Medicine (IOM), and are based on the best available scientific evidence. Low maternal weight gain is associated with an increased risk of small for gestational age (SGA) infants, especially in underweight and normal weight women. (IOM. Weight gain during pregnancy: reexamining the guidelines. National Academy Press Washington, D.C.; 2009)

Likewise, women with excessive gestational weight gains are at increased risk for cesarean delivery and delivering large for gestational age infants and this can secondarily lead to complications during labor and delivery. There is a strong association between higher maternal weight gain and both postpartum weight retention and subsequent maternal obesity. High maternal weight gain may be associated with glucose abnormalities and gestational hypertension disorders, but the evidence is inconclusive. Obesity is one of the most important long-term child outcomes related to high maternal weight gain. A small number of relatively large and recent epidemiologic studies show that higher maternal weight gain is associated with childhood obesity as measured by BMI. (IOM. WIC nutrition risk criteria: a scientific assessment. National Academy Press, Washington D.C.; 1996)

If a woman’s weight gain falls within the recommended range, it is assumed that her weight gain is appropriate and healthy. If the weight gain is greater than the recommended range, she may be gaining too much weight or gaining too quickly. If the weight gain is less than the recommended range, she may not be gaining enough for the best pregnancy outcome. A pregnant woman’s rate of weight gain, reviewed together with information obtained from a dietary assessment, can help focus the nutrition education and counseling.

It is very important to keep in mind that a single plot can be deceiving. Staff should avoid drawing conclusions from a single weight measurement. Serial measurements during pregnancy illustrate the pattern (rate and amount) of the weight gain. Wherever on the grid the weight plots, continued gradual weight gain should be encouraged. For women who have gained more than the recommended amount, the goal should be to slow the rate of gain, but not to stop gaining. For women who have gained less than the recommended amount, a faster rate of weight gain is recommended.

Pre-pregnancy weight: Many pregnant women won’t know what they weighed before they were pregnant, so it is often only an estimate and prone to error. If the estimate of pre-pregnancy weight is off, the chart used to plot her weight might be inappropriate, and assessed weight gained or lost will be incorrect.

Excessive weight gains and serious weight losses should be evaluated, first to verify that the weight change is accurate (i.e., that no measurement errors occurred). Whenever large deviations from the expected rate of change are identified, it is essential to determine whether it reflects measurement error or actual weight changes.

If the weight changes seem to be accurate, the CPA should explore possible explanations for the weight gain or loss. The CPA should review recent dietary intake, exercise habits, as well as other aspects of the woman’s health and home situation.
I. ANTHROPOMETRIC ASSESSMENT QUESTIONS

41. Obese women should be encouraged to:
   a. lose weight early in the pregnancy to avoid excess total amount of weight gain
   b. gain approximately 8 to 15 pounds during the entire pregnancy
   c. all of the above
   d. none of the above

42. Which of the following is true?
   a. It is easy to assess women’s weight gain at their first visit because you can compare her weight gain at this visit compared to their pre-pregnancy weight.
   b. If a woman is gaining too slowly, she should be encouraged to stop doing any exercise or activity that burns extra calories
   c. If a woman is gaining too slowly, the WIC CPA should assess why this might be the case. For example: does she have nausea or heartburn that might inhibit her desire to eat, what was her usual meal pattern before the pregnancy what is it now, what does she usually eat, is she eating foods from all the important food groups?

43. Mark the following statements "T" (for True) and "F" (for False).

   True     False
   _____   _____  Even obese women are encouraged to gain small amounts of weight each week with a goal of 11 to 20# total weight gain.
   _____   _____  Weight gains far above or far below the amount and rates suggested on the weight gain charts are associated with less favorable pregnancy outcomes.
   _____   _____  A woman who is currently at 28 weeks gestation, had a pre-pregnancy BMI in the normal range, and who has already gained 40 pounds should be encouraged to stop gaining weight, and to try to stay at her current weight until the recommended weight gain range “catches” up with her current weight gain.
   _____   _____  The recommended weight gain depends on what the woman gained in her last pregnancy. If she gained 25# and the baby was healthy that is what she should gain with this pregnancy.
   _____   _____  Women almost always know their pre-pregnancy weight within a couple of pounds.

44. A 5’2” woman who weighed 100 # prior to the pregnancy has a pre-pregnancy BMI of _____ and should be encouraged to gain a total of _____ to _____ pounds

Now, check your answers against the Answer Key at the end of this module.