Nutrition Risk Factors Manual

Inter Tribal Council of Arizona, Inc.
WIC Program
Revised September 2019

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High Risk Risk [B] = Both Manually Entered and Computer Generated Risk

Risks that are italicized and in parenthesis are the risk factor names that appear in STARS.

References for each risk are available from ITCA upon request.

Guidelines for Assigning Risks

Policy
Each applicant will be assigned all of the nutritional risk(s) that apply according to the definition in the Nutritional Risk Factors Manual at all certification and midcertification visits. Some nutritional risks will be automatically determined by the STARS system.

Documentation
Documentation required for each risk can be found in the Definition/cut-off value section of each risk. Risks requiring a physician's diagnosis may be self reported by the applicant, client or caregiver; or documented by a receptionist, nurse, physician's assistant, physician etc. on a referral form based on information found in the medical record. All nutritional risk(s) will be documented on the Assign Risk Screen in the STARS system. Risks identified during the certification period will be documented on the Assign Risk Factor Screen in the STARS system

Self reporting of Medical Diagnosis
Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis "My doctor says that I have/my son or daughter has…" Should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Self-reporting for "History of…"conditions should be treated in the same manner as self-reporting for current conditions requiring a physicians diagnosis, i.e., the applicant may report to the CPA that s/he was diagnosed by a physician with a given condition at some point in the past. As with current conditions, self-diagnosis of a past condition should never be confused with self-reporting.

Trimesters
The Centers for Disease Control and Prevention (CDC) defines a trimester as a term of three months in the prenatal gestation period with the specific trimesters defined as follows in weeks:

First Trimester: 0-13 weeks
Second Trimester: 14-26 weeks
Third Trimester: 27-40 weeks.

Further, CDC begins the calculation of weeks starting with the first day of the last menstrual period. If that date is not available, CDC estimates that date from the estimated date of confinement (EDC). This definition is used in interpreting CDC's Prenatal Nutrition Surveillance System data, comprised primarily of data on pregnant women participating in the WIC Program.

Underweight (Women)

Definition/ cut-off value

Pregnant Women
- prepregnancy Body Mass Index (BMI) <18.5

Non-Breastfeeding Women
- prepregnancy or current Body Mass Index (BMI) <18.5

Breastfeeding Women Who Are <6 months Postpartum
- prepregnancy or current Body Mass Index (BMI) <18.5

Breastfeeding Women Who Are > or equal to 6 months postpartum
- Current Body Mass Index (BMI) <18.5

Note: A BMI table is attached to assist in determining weight classification. Also, until research supports the use of different BMI cut-offs to determine weight status categories for adolescent pregnancies, the same BMI cut-offs will be used for all women, regardless of age, when determining WIC eligibility (1). (See justification for a more detailed explanation.)

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	VI

Justification

Underweight women who become pregnant are at a higher risk for delivery of low birth weight (LBW) infants, retarded fetal growth, and perinatal mortality. Prepregnancy underweight is also associated with a higher incidence of various pregnancy complications, such as antepartum hemorrhage, premature rupture of membranes, anemia, endometriosis, and cesarean delivery (2).

The goal in prenatal nutritional counseling provided by WIC is to achieve recommended weight gain by emphasizing food choices of high nutritional quality; and for the underweight woman, by encouraging increased consumption and/or the inclusion of some calorically dense foods.

The 2009 Institute of Medicine (IOM) report: *Weight Gain During Pregnancy: Reexamining the Guidelines* (1) updated the pregnancy weight categories to conform to the categories developed by the

World Health Organization and adopted by the National Heart, Lung and Blood Institute in 1998 (3). The reexamination of the guidelines consisted of a review of the determinants of a wide range of short-and long-term consequences of variation in weight gain during pregnancy for both the mother and her infant. The IOM prenatal weight gain recommendations based on pre-pregnancy weight status categories are associated with improved maternal and child health outcomes (1).

Included in the 2009 IOM guidelines is the recommendation that the BMI weight categories used for adult women be used for pregnant adolescents as well. More research is needed to determine whether special categories are needed for adolescents. It is recognized that both the IOM cut-offs for defining weight categories will classify some adolescents differently than the CDC BMI-for-age charts. For the purpose of WIC eligibility determination, the IOM cut-offs will be used for all women regardless of age. However, due to the lack of research on relevant BMI cut-offs for pregnant and postpartum adolescents, professionals should use all of the tools available to them to assess these applicants' anthropometric status and tailor nutrition counseling accordingly.

Weight during the early postpartum period, when most WIC certifications occur, is very unstable. During the first 4-6 weeks fluid shifts and tissue changes cause fluctuations in weight. After 6 weeks, weight loss varies among women. Pre-pregnancy weight, amount of weight gain during pregnancy, race, age, parity and lactation all influence the rate of postpartum weight loss. By 6 months postpartum, body weight is more stable and should be close to the pre-pregnancy weight. In most cases therefore, pre-pregnancy weight is a better indicator of weight status than postpartum weight in the first 6 months after delivery. The one exception is the woman with a BMI of <18.5 during the immediate 6 months after delivery. Underweight at this stage may indicate inadequate weight gain during pregnancy, depression, an eating disorder or disease, any or all of which need to be addressed. (4)

While being on the lean side of normal weight is generally considered healthy, being underweight can be indicative of poor nutritional status, inadequate food consumption, and/or an underlying medical condition. Underweight women who are breastfeeding may be further impacting their own nutritional status. Should she become pregnant again, an underweight woman is at a higher risk for delivery of low birth weight (LBW) infant(s), retarded fetal growth, and perinatal mortality. The role of the WIC Program is to assist underweight women in the achievement of a healthy dietary intake and body mass index.

BMI Table for Determining Weight Classification for Women (1)

Height (Inches)	Underweight BMI <18.5	Normal Weight BMI 18.5-24.9	Overweight BMI 25.0-29.9	Obese BMI ≥ 30.0
58”	<89 lbs	89-118 lbs	119-142 lbs	>142 lbs
59”	<92 lbs	92-123 lbs	124-147 lbs	>147 lbs
60”	<95 lbs	95-127 lbs	128-152 lbs	>152 lbs
61”	<98 lbs	98-131 lbs	132-157 lbs	>157 lbs
62”	<101 lbs	101-135 lbs	136-163 lbs	>163 lbs
63”	<105 lbs	105-140 lbs	141-168 lbs	>168 lbs
64”	<108 lbs	108-144 lbs	145-173 lbs	>173 lbs
65”	<111lbs	111-149 lbs	150-179 lbs	>179 lbs
66”	<115 lbs	115-154 lbs	155-185 lbs	>185 lbs
67”	<118 lbs	118-158 lbs	159-190 lbs	>190 lbs
68”	<122 lbs	122-163 lbs	164-196 lbs	>196 lbs
69”	<125 lbs	125-168 lbs	169-202 lbs	>202 lbs
70”	<129 lbs	129-173 lbs	174-208 lbs	>208 lbs
71”	<133 lbs	133-178 lbs	179-214 lbs	>214 lbs
72”	<137 lbs	137-183 lbs	184-220 lbs	>220 lbs

(1) Adapted from the Clinical Guidelines on the Identification, Evaluation and Treatment of Overweight and Obesity in Adults. National Heart, Lung and Blood Institute (NHLBI), National Institutes of Health (NIH). NIH Publication No. 98-4083.

Underweight or At Risk of Underweight (Infants and Children)

Definition/ cut-off value

Underweight

Birth to <24 months: ≤2.3rd percentile weight-for-length as plotted on the Centers for Disease Control and Prevent (CDC) Birth to 24 months gender specific growth charts*.

2 – 5 years: ≤5th percentile Body Mass Index (BMI)-for-age as plotted on the 2000 CDC age/gender specific growth charts.

At Risk of Underweight

Birth to <24 months: > 2.3rd percentile and ≤5th percentile weight-for-length as plotted on the CDC Birth to 24 months gender specific growth charts*.

2 – 5 years: >5th percentile and ≤10th percentile Body Mass Index (BMI)-for-age as plotted on the 2000 CDC age/gender specific growth charts.

**Based on 2006 World Health Organization international growth standards.*

Participant category and priority level

Category	Priority
Infants	I
Children	III

Justification

The CDC uses the 2.3rd percentile weight-for-length (for birth to 24 months of age) and the 5th percentile BMI-for-age (for 2-5 years of age), as the cut-offs to define underweight in its Pediatric Nutrition Surveillance System (1, 2). However, CDC does not have a position regarding the cut-off percentile, which should be used to determine at risk of underweight as a nutrition risk in the WIC Program. At risk of underweight is included in this criterion to reflect the preventative emphasis of the WIC Program.

A review of literature on weight-for-length or stature cut-off percentiles indicates that: a) many children at or below the 5th percentile for weight are in need of nutritional intervention, and b) those at or below the 10th percentile may be at nutritional risk and in need of preventative nutritional intervention, or at least further evaluation (4).

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Weight-for-length/stature describes body proportionality and is sensitive to acute undernutrition, but can also reflect long-term status (5). Physical growth delay is used as a proxy for the deleterious effects undernutrition can have on immune function, organ development, hormonal function and brain development (6).

Weight-for-length/stature describes body proportionality and is sensitive to acute undernutrition, but can also reflect long-term status (2). Physical growth delay is used as a proxy for the deleterious effects undernutrition can have on immune function, organ development, hormonal function and brain development (3). Participation in WIC has been associated with improved growth in both weight and height in children (4).

Implications for WIC Nutrition Services

Participation in WIC has been associated with improved growth in both weight and height in children (7). An infant or child determined to be underweight at WIC certification should be monitored at regular intervals during the certification period, as appropriate. Through client-centered counseling, WIC staff can assist families in making nutritionally balanced food choices to promote adequate weight gain. Also, the foods provided by the WIC Program are scientifically-based and intended to address the supplemental nutritional needs of the Program's target population, and can be tailored to meet the needs of individual participants.

In addition, WIC staff can greatly assist families by providing referrals to medical providers and other services, in available, in their community. Such resources may provide the recommended medical assessments, in order to rule out or confirm medical conditions, and offer treatment when necessary and/or in cases where growth improvement is slow to respond to dietary interventions.

Clarification

The cut-off for underweight for infants and children <24 months is 2.3; however, for ease of use, CDC labels it as the 2nd percentile on the hard copy Birth to 24 months growth charts. Electronic charts should use the 2.3rd percentile as the cut-off.

Overweight (Women)

Definition/ cut-off value

Pregnant Women
- prepregnancy Body Mass Index (BMI) ≥25

Non-Breastfeeding Women
- prepregnancy Body Mass Index (BMI) ≥25

Breastfeeding Women less than 6 months postpartum
- prepregnancy Body Mass Index (BMI) ≥25

Breastfeeding Women 6 months postpartum or more
- Current Body Mass Index (BMI) ≥25

Note: A BMI table is attached to assist in determining weight classifications. Also, until research supports the use of different BMI cut-offs for adolescent pregnancies, the same BMI cut-offs will be used for all women, regardless of age, when determining WIC eligibility (1). (See Justification for a more detailed explanation.)

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	VI

Justification

Maternal overweight and obesity are associated with higher rates of cesarean delivery, gestational diabetes mellitus, preeclampsia and other pregnancy-induced hypertensive disorders, as well as postpartum anemia (2). Several studies have established an association between obesity and an increased risk for hypertension, dyslipidemia, diabetes mellitus, cholelithiasis, coronary heart disease, osteoarthritis, sleep apnea, stroke and certain cancers (1).

One goal of prenatal nutritional counseling is to achieve recommended weight gain during pregnancy. For the overweight woman, emphasis should be on selecting food choices of high nutritional quality and avoiding calorie-rich foods, thereby minimizing further risks associated with increased overweight and obesity.

The 2009 Institute of Medicine (IOM) report: *Weight Gain During Pregnancy: Reexamining the Guidelines* (1) updated the pregnancy weight categories to conform to the categories developed by the World Health Organization and adopted by the National Heart, Lung and Blood Institute in 1998 (3). The reexamination of the guidelines consisted of a review of the determinants of a

wide range of short-and long-term consequences of variation in weight gain during pregnancy for both the mother and her infant. The IOM prenatal weight gain recommendations based on prepregnancy weight status categories are associated with improved maternal and child health outcomes (1).

Included in the 2009 IOM guidelines is the recommendation that the BMI weight categories used for adult women be used for pregnant adolescents as well. More research is needed to determine whether special categories are needed for adolescents. It is recognized that the IOM cut-offs for defining weight categories will classify some adolescents differently than the CDC BMI-for-age charts. For the purpose of WIC eligibility determination, the IOM cut-offs will be used for all women regardless of age. However, due to the lack of research on relevant BMI cut-offs for pregnant and postpartum adolescents, professionals should use all of the tools available to them to assess these applicants' anthropometric status and tailor nutrition counseling accordingly.

Weight during the early postpartum period, when most WIC certifications occur, is very unstable. During the first 4-6 weeks fluid shifts and tissue changes cause fluctuations in weight. After 6 weeks, weight loss varies among women. Prepregnancy weight, amount of weight gain during pregnancy, race, age, parity and lactation all influence the rate of postpartum weight loss. By 6 months postpartum, body weight is more stable and should be close to the prepregnancy weight. In most cases, therefore, prepregnancy weight is a better indicator of weight status than postpartum weight in the first 6 months after delivery. (4)

The percentage of adolescents who are overweight has increased rapidly and more than 60% of adults in the US are overweight. Due to the significant impact that overweight and obesity have on morbidity and mortality, it is imperative that every effort be made to identify individuals who are overweight and to assist them in achieving a more healthful weight. The WIC Program is in a position to play an important role in helping to reduce the prevalence of overweight not only by working with postpartum women on improving their own weight status, but also by helping them to see their role in assisting their children to learn healthful eating and physical activity behaviors.

BMI Table for Determining Weight Classification for Women (1)

Height (Inches)	Underweight BMI <18.5	Normal Weight BMI 18.5-24.9	Overweight BMI 25.0-29.9	Obese BMI ≥ 30.0
58”	<89 lbs	89-118 lbs	119-142 lbs	>142 lbs
59”	<92 lbs	92-123 lbs	124-147 lbs	>147 lbs
60”	<95 lbs	95-127 lbs	128-152 lbs	>152 lbs
61”	<98 lbs	98-131 lbs	132-157 lbs	>157 lbs
62”	<101 lbs	101-135 lbs	136-163 lbs	>163 lbs
63”	<105 lbs	105-140 lbs	141-168 lbs	>168 lbs
64”	<108 lbs	108-144 lbs	145-173 lbs	>173 lbs
65”	<111lbs	111-149 lbs	150-179 lbs	>179 lbs
66”	<115 lbs	115-154 lbs	155-185 lbs	>185 lbs
67”	<118 lbs	118-158 lbs	159-190 lbs	>190 lbs
68”	<122 lbs	122-163 lbs	164-196 lbs	>196 lbs
69”	<125 lbs	125-168 lbs	169-202 lbs	>202 lbs
70”	<129 lbs	129-173 lbs	174-208 lbs	>208 lbs
71”	<133 lbs	133-178 lbs	179-214 lbs	>214 lbs
72”	<137 lbs	137-183 lbs	184-220 lbs	>220 lbs

(1) Adapted from the Clinical Guidelines on the Identification, Evaluation and Treatment of Overweight and Obesity in Adults. National Heart, Lung and Blood Institute (NHLBI), National Institutes of Health (NIH). NIH Publication No. 98-4083.

Obese (Children 2-5 years of age)

Definition/ cut-off value

2 to 5 years: ≥95th percentile Body Mass Index (BMI) or weight-for-stature as plotted on the 2000 Center for Disease Control and Prevention (CDC) 2-20 years gender specific growth charts.

**The cut off is based on standing height measurements. Therefore, recumbent length measurements may not be used to determine this risk.*

Participant category and priority level

Category	Priority
Children 2-5 years	III

Justification

The rapid rise in the prevalence of obesity in children and adolescents is one of the most important public health issues in the United States today. The National Health and Nutrition Examination Survey (NHANES) from the mid-1960s to the early 2000s document a significant increase in obesity among children from preschool age through adolescence. These trends parallel a concurrent increase in obesity among adults, suggesting that fundamental shifts occurring in dietary and/or physical activity behaviors are having an adverse effect on overall energy balance (3).

The causes of increased obesity rates in the United States are complex. Both genetic make-up and environmental factors contribute to the obesity risk. Important contributors include a large and growing abundance of calorically dense foods and an increased sedentary lifestyle for all ages. Although obesity tends to run in families, a genetic predisposition does not inevitably result in obesity. Environmental and behavioral factors can influence the development of obesity in genetically at-risk people (3).

Use of the 95th percentile to define obesity identifies those children with a greater likelihood of being obese as adolescents and adults, with increased risk of obesity-related disease and mortality. It is recommended Use of the 95th percentile to define overweight identifies those children with a greater likelihood of being overweight as adolescents and adults, with increased risk of obesity-related disease and mortality. It is recommended that an overweight child (≥95th percentile) undergo an in-depth medical assessment and careful evaluation to identify any underlying syndromes or secondary complications. Overweight can result from excessive energy intake, decreased energy expenditure, or impaired regulation of energy

Justification	113 (continued)
	metabolism. In addition, overweight in early childhood may signify problematic feeding practices or evolving family behaviors that, if continued, may contribute to health risks in adulthood related to diet and inactivity. BMI is a measure of body weight adjusted for height. While not a direct measure of body fatness, BMI is a useful screening tool to assess adiposity (3). Children >2 years of age, with a BMI-for-age >85th and <95th percentile are considered overweight and those at or above the 95th percentile, obese (4). Research on BMI and body fatness shows that the majority of children with BMI-for-age at or above the 95th percentile have high adiposity and less than one-half of the children in the 85th to <95th percentiles have high adiposity (4). Although an imperfect tool, elevated BMI among children most often indicates increased risk for future adverse health outcomes and/or development of diseases (5). BMI should serve as the initial screen and as the starting point for classification of health risks (3).
Implications for WIC Nutrition Services	The WIC Program plays an important role in public health efforts to reduce the prevalence of obesity by actively identifying and enrolling young children who may be obese or at risk of overweight/obesity in later childhood or adolescence. When identifying this risk, it is important to communicate with parents/caregivers in a way that is supportive and nonjudgmental, and with a careful choice of words that convey an empathetic attitude and minimize embarrassment or harm to a child's self-esteem (4). In recognition of the importance of language, the 2007 American Medical Association Expert Committee Report recommends the use of the terms overweight and obese for documentation and risk assessment only and the use of more neutral terms (e.g., weight disproportional to height, excess weight, BMI) when discussing a child's weight with a parent/caregiver (3) . BMI is calculated and plotted on growth charts at each WIC certification. However, growth charts are meant to be used as a screening tool and comprise only one aspect of the overall growth assessment. A clinical assessment to determine if a child is at a healthy weight is more complex. Weight classification (derived from the growth chart) should be integrated with the growth pattern, familial obesity, medical risks, and dietary and physical activity habits to determine the child's obesity risk (1, 5). The goal in WIC nutrition counseling is to help the child achieve recommended rates of growth and development. WIC staff can frame the discussion to make achieving normal growth a shared goal of the WIC Program and the parent/caregiver and make clear that obesity is a medical condition that can be addressed (4). Parents/caregivers of children may need education on recognition of satiety cues and other physiological needs that lead to crying, and ways to comfort a child (holding, reading, rocking) other than by feeding. The foods provided by the WIC Program are scientifically-based and intended to address the supplemental nutritional needs of the

Implications for WIC Nutrition Services

Program's target population and can be tailored to meet the needs of individual participants. Emphasis can be placed on promoting food choices of high nutritional quality while avoiding unnecessary or excessive amounts of calorie rich foods and beverages, and reducing inactivity (like decreasing sedentary TV viewing).

Beliefs about what is an attractive or healthy weight, the importance of physical activity, what foods are desirable or appropriate for parents to provide to children, family mealtime routines, and many other lifestyle habits are influenced by different cultures, and should be considered during the nutrition assessment and counseling (6). The following resources for obesity prevention can be found at:

- Fit WIC Materials: http://www.nal.usda.gov/wicworks/Sharing_Center/gallery/foodfunfamilies.htm.
- ChooseMyPlate for Preschoolers: http://www.choosemyplate.gov/preschoolers.html

In addition, WIC staff can greatly assist families by providing referrals to medical providers and other services, if available, in their community. Such resources may provide the recommended medical assessments, in order to rule out or confirm medical conditions, and offer treatment when necessary and/or in cases where growth improvement is slow to respond to dietary interventions.

Clarification

The 2000 CDC Birth to 36 months growth charts cannot be used as a screening tool for the purpose of assigning this risk because these charts are based on recumbent length rather than standing height data. However, these charts may be used as an assessment tool for evaluating growth in children aged 24-36 months who are not able to be measured for the standing height required for the 2000 CDC 2-20 years growth charts.

Overweight At Risk of Overweight (Infants and Children)

Definition/ cut-off value

Overweight

- 2 – 5 years: ≥85th and <95th percentile Body Mass Index (BMI)-for-age or weight-for-stature as plotted on the on the 2000 Center for Disease Control and Prevention (CDC) 2-20 years gender specific growth charts.*

At Risk of Overweight

- <12 months (infant of obese mother): Biological mother with a BMI≥30 at the time of conception or at any point in the first trimester of the pregnancy.**

- ≥12 months (child of obese mother): Biological mother with a BMI ≥30 at the time of certification.** (If the mother is pregnant or has had a baby within the past 6 months, use her preconceptual weight to assess for obesity since her current weight will be influenced by pregnancy-related weight gain.)

- Birth to 5 years (infant or child of obese father): Biological father with a BMI ≥30 at the time of certification.**

**The cut off is based on standing height measurement. Therefore, recumbent length measurements may not be used to determine this risk.*

***BMI must be based on self-reported weight and height by the parent in attendance (i.e. one parent may not "self-report" for the other parent) or weight and height measurement taken by staff at the time of the certification.*

Participant category and priority level

Category	Priority
Infants	I
Children	III

Justification

The rise in the prevalence of overweight and obesity in children and adolescents is one of the most important public health issues in the United States today. The National Health and Nutrition Examination Survey (NHANES) from the mid-1960s to the early 2000s document a significant increase in overweight among children from preschool age through adolescence. These trends parallel a concurrent increase in obesity among adults, suggesting that fundamental shifts in dietary and/or physical activity behaviors are having an adverse effect on overall energy balance (3).

BMI is a measure of body weight adjusted for height. While not a direct measure of body fatness, BMI is a useful screening tool to assess adiposity (3). Children > 2 years of age, with a BMI-for-age > 85th and < 95th percentile are considered overweight and those at or above the 95th percentile, obese (4). Research on BMI and body fatness shows that the majority of children with BMI-for-age at or above the 95th percentile have high adiposity and less than one-half of the children in the 85th to < 95th percentiles have high adiposity (4). Although an imperfect tool, elevated BMI among children most often indicates increased risk for future adverse health outcomes and/or development of diseases (5). BMI should serve as the initial screen and as the starting point for classification of health risks (3).

Increasingly, attention is being focused on the need for comprehensive strategies that focus on preventing overweight/obesity and a sedentary lifestyle for all ages. Scientific evidence suggests that the presence of obesity in a parent greatly increases the risk of overweight in preschoolers, even when no other overt signs of increasing body mass are present (6). The presence of parental obesity should lead to greater efforts by nutrition services staff to assist families in establishing or improving healthy behaviors (3).

Implications for WIC Nutrition Services

The WIC Program plays an important role in public health efforts to reduce the prevalence of obesity by actively identifying and enrolling infants and children who may be overweight or at risk of overweight in childhood or adolescence. When identifying this risk, it is important to communicate it in a way that is supportive, nonjudgmental, and with a careful choice of words to convey an empathetic attitude and to minimize embarrassment or harm to a child's self-esteem (4). In recognition of the importance of language, the 2007 American Medical Association expert committee report recommends the use of the terms overweight and obese for documentation and risk assessment only and the use of more neutral terms (e.g., weight disproportional to height, excess weight, BMI) when discussing a child's weight with a parent/caregiver (3).

BMI is calculated and plotted on growth charts at each WIC certification. However, growth charts are meant to be used as a screening tool and comprise only one aspect of the overall growth assessment. A clinical assessment to determine if a child is at a healthy weight is more complex. Weight

Implications for WIC Nutrition Services

114 (continued)

classification (derived from the growth chart) should be integrated with the growth pattern, familial obesity, medical risks, and dietary and physical activity habits to determine the child's obesity risk (1,5).

The goal in WIC nutrition counseling is to help the child achieve recommended rates of growth and development. WIC staff can frame the discussion to make achieving normal growth a shared goal of the WIC Program and the parent/ caregiver. Studies have shown that the early childhood eating environment provides a great opportunity for preventive intervention (7). Parents/caregivers of infants and toddlers may need education on recognition of satiety cues and other physiological needs that lead to crying, and ways to comfort a child (holding, reading, rocking) other than by feeding. Young children look upon their parents as role models for eating behaviors. Through client-centered counseling, WIC staff can emphasize the importance of prevention and can assist families in making changes that improve parenting skills that promote healthy eating, and physical activity behaviors and a healthy weight in children. Also, the foods provided by the WIC Program are scientifically-based and intended to address the supplemental nutritional needs of the Program's target population and can be tailored to meet the needs of individual participants.

Beliefs about what is an attractive or healthy weight, the importance of physical activity, what foods are desirable or appropriate for parents to provide to children, family mealtime routines, and many other lifestyle habits are influenced by different cultures, and should be considered during the nutrition assessment and counseling (8). The following resources for obesity prevention can be found at:

- Fit WIC Materials:
  http://www.nal.usda.gov/wicworks/Sharing_Center/gallery/foodfunfamilies.htm
- ChooseMyPlate for Preschoolers:
  http://www.choosemyplate.gov/preschoolers.html

In addition, WIC staff can greatly assist families by providing referrals to medical providers and other services, if available, in their community. Such resources may provide the recommended medical assessments, in order to rule out or confirm medical conditions, and offer treatment when necessary and/or in cases where growth improvement is slow to respond to dietary interventions.

Clarification

The 2000 CDC Birth to 36 months growth charts cannot be used as a screening tool for the purpose of assigning this risk because these charts are based on recumbent length rather than standing height data. However, these charts may be used as an assessment tool for evaluating growth in children aged 24-36 months who are not able to be measured for the standing height required for the 2000 CDC 2-20 years growth charts.

Abbreviated Body Mass Index (BMI) Table*

Height	Inches	Weight(lbs) = BMI 30
4’10”	**58**	**143**
4’11”	**59**	**148**
5’0”	**60**	**153**
5’1”	**61**	**158**
5’2”	**62**	**164**
5’3”	**63**	**169**
5’4”	**64**	**174**
5’5”	**65**	**180**
5’6”	**66**	**186**
5’7”	**67**	**191**
5’8”	**68**	**197**
5’9”	**69**	**203**
5’10”	**70**	**209**
5’11”	**71**	**215**
6’0”	**72**	**221**
6’1”	**73**	**227**
6’2”	**74**	**233**
6’3”	**75**	**240**
**This table may be used to determine parental (male or female) obesity (BMI > 30)*		

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High Weight-for-Length (Infants and Children <24 Months of Age)

Definition/ cut-off value

Birth to <24 months: ≥97.7th percentile weight-for-length as plotted on the Center for Disease Control and Prevention (CDC), birth to 24 months gender specific growth charts.

**Based on 2006 World Health Organization international growth standards.*

Participant category and priority level

Category	Priority
Infants	I
Children < 24 months of age	III

Justification

In 2006, WHO released international growth standards for infants and children aged 0-59 months (2), similar to the 2000 CDC growth references. Since then, the CDC has developed Birth to 24 months growth charts, based on the WHO growth standards, and recommends their use in the United States (1). For persons 2-20 years, the 2000 CDC growth charts will continue to be used (1).

The WHO and CDC growth charts are similar in that both describe weight-for-age, length (or stature)-for-age, weight-for-length (or stature) and body mass index (BMI) for age. However, they differ in the approach taken to create the growth charts. The WHO growth charts are growth standards that describe how healthy children grow under optimal environmental and health conditions. The 2000 CDC charts are a growth reference, not a standard, and describe how certain children grew in a particular place and time (2).

The WHO growth standards for children < 24 months are based on data collected from 1997-2003 in 6 countries (including the U.S.), from children who were born between 37 and 42 weeks gestation, breastfed for at least 12 months, and introduced to complementary food by at least 6 months but not before 4 months. Infants and children of low-income mothers and/or mothers who smoked were not included in the data sample (2).

The 2000 CDC charts for infants and children < 36 months are based on birth weight (from 1968 to 1980 and from 1985 to 1994) and birth length data (from 1989 to1994) obtained from U.S. birth certificates; National Health and Nutrition Examination Survey (NHANES) data; and, measurements from infants who had been breastfed and formula

Justification	115 (continued)
	fed (approximately 50% ever breastfed and approximately 33% who were still breastfeeding at 3 months). Very low birth weight infants were not included in the sample population. This was the only exclusion criterion applied to the sample population (2, 3). Prior to making its recommendation, CDC convened an Expert Panel with the National Institutes of Health and the American Academy of Pediatrics to review the scientific evidence and discuss the potential use of the WHO growth standards in the U.S. The recommendation to use WHO growth standards for infants and children < 24 months was made on the basis of input from the Expert Panel. In addition, CDC concluded that the WHO growth standards are based on a high quality study and, since breastfeeding is the recommended infant feeding practice, it is appropriate to use the breastfed infant as the standard against which all other infants are compared (2). The WHO growth standards use values of 2 standard deviations away from the median to identify children whose growth might be indicative of adverse health conditions (1). The CDC Birth to 24 months growth charts (based on the WHO growth standards) labels 2 standard deviations above the median as the 97.7th percentile. Thus, an infant or child (< 24 months) is categorized as high weight-for-length when plotted at or above the 97.7th percentile, labeled as the 98th percentile on the CDC Birth to 24 months growth charts. The CDC recommends that all infants and children < 24 months be assessed using the CDC Birth to 24 months growth charts regardless of type of feeding (formula or breastfed) (2). (See Clarification for information about standard deviations and the cut-off used to determine high weight-for-length.)
Implications for WIC Nutrition Services	The WIC Program plays an important role in public health efforts to reduce the prevalence of obesity by actively identifying and enrolling infants and young children who may be at risk of overweight/obesity in later childhood or adolescence. When identifying this risk, it is important to communicate with parents/caregivers in a way that is supportive and nonjudgmental, and with a careful choice of words that convey an empathetic attitude and minimize embarrassment or harm to a child's self-esteem (4). In recognition of the importance of language, the 2007 American Medical Association Expert Committee Report recommends the use of more neutral terms such as weight disproportional to height, excess weight, and high weight-for-length when communicating with a parent/caregiver (5). Height and weight measurements are plotted on growth charts at each WIC certification. However, growth charts are meant to be used as a screening tool and comprise only one aspect of the overall growth

Implications for WIC Nutrition Services

assessment. A clinical assessment to determine if a child is at a healthy weight is more complex. Weight classification (derived from the growth chart) should be integrated with the growth pattern, familial obesity, medical risks, and dietary and physical activity habits to determine the child's obesity risk (3, 6).

The goal in WIC nutrition counseling is to help the child achieve recommended rates of growth and development. WIC staff can frame the discussion to make achieving normal growth a shared goal of the WIC Program and the parent/caregiver. Studies have shown that the early childhood eating environment provides a great opportunity for preventive intervention (7). Parents/caregivers of infants and toddlers may need education on recognition of satiety cues and other physiological needs that lead to crying, and ways to comfort a child (holding, reading, rocking) other than by feeding. Young children look upon their parents as role models for eating behaviors. Through client-centered counseling, WIC staff can emphasize the importance of prevention and can assist families in making changes that improve parenting skills that promote healthy eating, physical activity behaviors and a healthy weight in children. Also, the foods provided by the WIC Program are scientifically-based and intended to address the supplemental nutritional needs of the Program's target population and can be tailored to meet the needs of individual participants.

Beliefs about what is an attractive or healthy weight, the importance of physical activity, what foods are desirable or appropriate for parents to provide to children, family mealtime routines, and many other lifestyle habits are influenced by different cultures, and should be considered during the nutrition assessment and counseling (8). The following resources for obesity prevention can be found at:

- Fit WIC Materials: http://www.nal.usda.gov/wicworks/Sharing_Center/gallery/foodfunfamilies.htm.
- MyPyramid for Preschoolers: http://www.choosemyplate.gov/preschoolers.html

In addition, WIC staff can greatly assist families by providing referrals to medical providers and other services, if available, in their community. Such resources may provide the recommended medical assessments, in order to rule out or confirm medical conditions, and offer treatment when necessary and/or in cases where growth improvement is slow to respond to dietary interventions.

Clarification

Standard deviation is a measurement widely used in statistical analysis. It shows how much variation there is from the median. The WHO growth charts use standard deviations to illustrate the proximity of a given child's growth from that of the average child of the same age and gender. For infants and children < 24 months of age, 2 standard deviations above the median indicates high weight-for-length. A measurement of 2 standard deviations below the median indicates underweight. Since most health care providers in the U.S. are more familiar with percentiles, the CDC developed growth charts based on the WHO growth standards, but converted standard deviations into percentile readings. Two standard deviations above the median is the 97.7th percentile; however, for ease of use, CDC labels it as the 98th percentile on the hard copy Birth to 24 months growth charts. Electronic charts should use the 97.7th percentile as the cut-off.

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Short Stature or At Risk of Short Stature (Infants and Children)

Definition/ Cut-off value

Short Stature

Birth to 24 months: ≤2.3th percentile length-for-age as plotted on the Centers for Disease Control and Prevention (CDC) Birth to 24 months gender specific growth charts*.

2 – 5 years: ≤5th percentile stature-for-age as plotted on the 2000 CDC age/gender specific growth charts.

At Risk of Short Stature

Birth to <24 months: >2.3rd percentile and ≤5th percentile length-for-age as plotted on the CDC Birth to 24 months gender specific growth charts*.

2 - 5 years: >5th percentile and ≤10th percentile stature-for-age as plotted on the 2000 CDC age/gender specific growth charts.

**Based on 2006 World Health Organization international growth standards.*

Note: For premature infants and children (with a history of prematurity) up to 2 years of age, assignment of this risk criterion will be based on adjusted gestational age. For information about adjusting for gestational age see: Guidelines Calculating Gestational – Adjusted Age (Risk 141 – Low Birth Weight / Very Low Birth Weight)

Participant category and priority level

Category	Priority
Infants	I
Children	III

Justification

The CDC uses the 2.3rd percentile (for birth to 24 months of age) and the 5th percentile (for 2-5 years of age) stature-for-age, as the cut-offs to define short stature in its Pediatric Nutrition Surveillance System (1, 2). However, CDC does not have a position regarding the cut-off percentile which should be used to determine at risk of short stature as a nutritional risk in the WIC Program. At risk of short stature is included in this criterion to reflect the preventive emphasis of the WIC Program.

Justification

Abnormally short stature in infants and children is widely recognized as a response to an inadequate nutrient supply at the cellular level (4). This indicator can help identify children whose growth is stunted due to prolonged undernutrition or repeated illness (3). Short stature is related to a lack of total dietary energy and to poor dietary quality that provides inadequate protein, particularly animal protein, and inadequate amounts of micronutrients such as zinc, vitamin A, iron, copper, iodine, calcium, and phosphorus (4). In these circumstances, maintenance of basic metabolic functions takes precedence, and thus resources are diverted from linear growth.

Demonstrable differences in stature exist among children of different ethnic and racial groups. However, racial and ethnic differences are relatively minor compared with environmental factors (1). Growth patterns of children of racial groups whose short stature has traditionally been attributed to genetics have been observed to increase in rate and in final height under conditions of improved nutrition (5, 6). Short stature may also result from disease conditions such as endocrine disturbances, inborn errors of metabolism, intrinsic bone diseases, chromosomal defects, fetal alcohol syndrome, and chronic systemic diseases (4).

Implications for WIC Nutrition Services

Participation in WIC has been associated with improved growth in both weight and height in children (7). A more in-depth dietary assessment and/or referral to a health care provider may be necessary to determine if short stature is a result of dietary inadequacy or a disease condition. Also, more frequent follow-up to monitor growth is appropriate for children in these categories. Through client-centered counseling WIC staff can assist families in improving dietary intake to promote healthy growth and development. In addition, the foods provided by the WIC Program are scientifically-based and intended to address the supplemental nutritional needs of the Program's target population, and can be tailored to meet the needs of individual participants.

In addition, WIC staff can greatly assist families by providing referrals to medical providers and other services, if available, in their community. Such resources may provide the recommended medical assessments, in order to rule out or confirm medical conditions, and offer treatment when necessary and/or in cases where growth improvement is slow to respond to dietary interventions.

Clarification

The cut-off for short stature for infants and children > 24 months is 2.3; however, for ease of use, CDC labels it as the 2nd percentile on the Birth to 24 months hard copy growth charts. Electronic charts should use the 2.3rd percentile as the cut-off.

Low Maternal Weight Gain

Definition/ cut-off value

Low maternal weight gain is defined as follows:

1. A low rate of weight gain, such that in the 2nd and 3rd trimesters, for singleton pregnancies (1):

Prepregnancy Weight Classification	BMI	Total Weight Gain (lbs)/Week
Underweight	<18.5	<1
Normal Weight	18.5 to 24.9	<0.8
Overweight	25.0 to 29.9	<0.5
Obese	≥30.0	<0.4
Multi-fetal Pregnancies	See Justification for more information	
Note: A BMI table attached to assist in determining weight classifications. Also, until research supports the use of different BMI cut-offs to determine weight categories for adolescent pregnancies, the same BMI cut-offs will be used for all women, regardless of age, when determining WIC eligibility. (See Justification for a more detailed explanation		

2. Low weight gain at any point in pregnancy, such that using a National Academies of Sciences, Medicine, and Engineering (formerly known as the Institute of Medicine)-based weight gain grid, a pregnant woman's weight plots at any point beneath the bottom line of the appropriate weight gain range for her respective prepregnancy weight category as follows (1,2):

Prepregnancy Weight Classification	BMI	Total Weight Gain Range (lbs)
Underweight	<18.5	28-40
Normal Weight	18.5 to 24.9	25-35
Overweight	25.0 to 29.9	15-25
Obese	≥30.0	11-20
Multi-fetal Pregnancies	See Justification for more information	
Note: A BMI table attached to assist in determining weight classifications. Also, until research supports the use of different BMI cut-offs to determine weight categories for adolescent pregnancies, the same BMI cut-offs will be used for all women, regardless of age, when determining WIC eligibility. (See Justification for a more detailed explanation		

Justification

The amount of weight gained during pregnancy has both immediate and long term implications for both mother and infant. In the short term, maternal weight gain during the 2nd and 3rd trimesters is an important determinant of fetal growth. In fact, low maternal weight gain is associated with an increased risk of small for gestational age (SGA) infants especially in underweight and normal-weight women. Moreover, it is associated with preterm birth among underweight women and, to a lesser extent, normal weight women. Low maternal weight gain is also associated with failure to initiate breastfeeding. (1)

In the long term, evidence shows that poor maternal nutrition during pregnancy can have permanent, detrimental effects on the child's health in later years. These effects include an increased risk for obesity, impaired glucose tolerance, and cardiovascular disease. Research suggests that early gestation may be a particularly sensitive period wherein inadequate weight gain can have long term impacts on the cardiometabolic health of the child later in life. This most likely results from suboptimal maternal nutrition that affects developing fetal organs thereby leading to permanent alterations. (3)

Nationally representative data indicates that inadequate gestational weight gain is most prevalent among Asian, Hispanic, and black mothers. Furthermore, a multivariable-adjusted analysis of >52,000 women who participated in the 2004–2005 Pregnancy Risk Assessment Monitoring System confirmed that Hispanic, black, and women who identified as "other" regarding race gain significantly less weight than white women after adjusting for pre-pregnancy BMI, age, parity, and education (4). Reports of multivariable-adjusted analyses of both national studies and smaller cohorts since 1980 confirm that black and Hispanic women compared to white women are more likely to have inadequate weight gain as opposed to excessive gestational weight gain (4). Research shows that black women in the U.S. are more likely to gain less than the recommended amount of weight during pregnancy and more likely to lose weight during pregnancy compared to white women (5). Contributing factors include the decreased access that socioeconomically disadvantaged neighborhoods have to vital resources that help ensure the good health of the mother prior to and during pregnancy. Additionally, place of work and exposure to other harmful environments are also factors (6).

The 2009 NASEM prenatal weight gain recommendations based on prepregnancy weight status categories are associated with improved maternal and child health outcomes (1). Included in these guidelines is the recommendation that the BMI weight categories used for adult women be used for pregnant adolescents as well. More research is needed to determine whether special categories are needed for

adolescents. It is recognized that the NASEM cut-offs for defining weight categories will classify some adolescents differently than the CDC BMI-for-age charts. For the purpose of WIC eligibility determination, the NASEM cut-offs will be used for all women regardless of age. However, due to the lack of research on relevant BMI cut-offs for pregnant and postpartum adolescents, professionals should use all of the tools available to them to assess an individual's anthropometric status and tailor nutrition counseling accordingly.

Multi-fetal Pregnancies

For twin gestations, the NASEM recommendations provide provisional guidelines as follows: normal weight women should gain 37-54 pounds; overweight women, 31-50 pounds; and obese women, 25-42 pounds. There was insufficient information for the NASEM committee to develop even provisional guidelines for underweight women with multiple fetuses (1). However, a consistent rate of weight gain is advisable. A gain of 1.5 pounds per week during the second and third trimesters has been associated with a reduced risk of preterm and low-birth weight delivery in twin pregnancy (7). In triplet pregnancies, the overall gain should be around 50 pounds with a steady rate of gain of approximately 1.5 pounds per week throughout the pregnancy (7). Education by the WIC nutritionist should address a steady rate of weight gain that is higher than for singleton pregnancies. For WIC nutrition risk assignment, multi-fetal pregnancies are considered a nutrition risk in and of themselves (see Risk 335 - *Multi-Fetal Gestation*), aside from weight gain.

Weight Loss During Pregnancy

Weight loss during pregnancy can result in SGA infants, stillbirth, and neonatal death (8). In addition, surviving children are at risk for poor growth and infection during infancy. Weight loss during pregnancy may indicate underlying dietary or health practices. It may also indicate underlying health or social conditions associated with poor pregnancy outcomes. Common causes of unintended weight loss during pregnancy include food insecurity, substance misuse, housing insecurity, infection, food-borne illness, and symptoms associated with pregnancy such as hyperemesis gravidarum (9). Please refer to Risk 301 -*Hyperemesis Gravidarum* for additional information.

Weight Loss during Pregnancy in Obese Women

The recommended amount of weight gain in obese women during pregnancy remains controversial (10). Research demonstrates that it may be beneficial for the mother, and not harmful for the infant, to lose weight during pregnancy. The benefits of weight loss among obese pregnant women include decreased rates of caesarian delivery, large-for-gestational-age infants, and postpartum weight retention (11). As a result, some scientists are now suggesting that the NASEM recommendations for weight gain in obese pregnant women be re-evaluated (12). Although controversy remains regarding weight loss during pregnancy among obese women, if a pregnant woman was obese prior to pregnancy, she should follow the advice of her health care provider regarding weight

recommendations. For WIC nutrition risk assignments, WIC staff should follow the NASEM recommendations.

Implication for WIC Nutrition Services

WIC services can improve the birth outcomes for women who experience low maternal weight gain during pregnancy. These outcomes can be improved by the supplemental food, nutrition education, and referrals provided to participants by the WIC Program. The WIC food prescription helps provide pregnant women with foods that reflect their nutritional needs during pregnancy. The tailored nutrition education given to pregnant women helps ensure that they receive nutrition support that is relevant to their concerns and lifestyle factors. Staff can assist pregnant women in the following ways:

- Carefully assessing the health status, dietary intake, and concerns of the woman in a participant-centered manner to find out possible factors contributing to low weight gain.
- Encouraging women to eat smaller, more frequent meals with snacks if they are struggling with appetite or nausea.
- Discussing healthy, high calorie snack options, if appropriate. To include nutrition tailoring of the food package for higher caloric WIC foods, e.g., peanut butter instead of legumes.
- Educating pregnant women on the importance of appropriate weight gain during pregnancy.
- If allowable, providing pregnant women with medical foods as prescribed by their medical provider to support appropriate weight gain.
- Referring to the health care provider if the pregnant woman has been diagnosed with, or is suspected of having, hyperemesis gravidarum.
- Providing additional referrals to health care providers and/or other services based on interests and concerns of the woman.

Clarification

The Centers for Disease Control and Prevention (CDC) defines a trimester as a term of three months in the prenatal gestation period with the specific trimesters defined as follows in weeks:

- First Trimester: 0-13 weeks
- Second Trimester: 14-26 weeks
- Third Trimester: 27-40 weeks

Further, CDC begins the calculation of weeks starting with the first day of the last menstrual period. If that date is not available, CDC estimates that date from the estimated date of confinement (EDC). This definition is used in interpreting CDC's Prenatal Nutrition Surveillance System data, comprised primarily of data on pregnant women participating in the WIC Program.

BMI Table for Determining Weight Classification for Women (1)

Height (Inches)	Underweight BMI <18.5	Normal Weight BMI 18.5-24.9	Overweight BMI 25.0-29.9	Obese BMI ≥ 30.0
58”	<89 lbs	89-118 lbs	119-142 lbs	>142 lbs
59”	<92 lbs	92-123 lbs	124-147 lbs	>147 lbs
60”	<95 lbs	95-127 lbs	128-152 lbs	>152 lbs
61”	<98 lbs	98-131 lbs	132-157 lbs	>157 lbs
62”	<101 lbs	101-135 lbs	136-163 lbs	>163 lbs
63”	<105 lbs	105-140 lbs	141-168 lbs	>168 lbs
64”	<108 lbs	108-144 lbs	145-173 lbs	>173 lbs
65”	<111lbs	111-149 lbs	150-179 lbs	>179 lbs
66”	<115 lbs	115-154 lbs	155-185 lbs	>185 lbs
67”	<118 lbs	118-158 lbs	159-190 lbs	>190 lbs
68”	<122 lbs	122-163 lbs	164-196 lbs	>196 lbs
69”	<125 lbs	125-168 lbs	169-202 lbs	>202 lbs
70”	<129 lbs	129-173 lbs	174-208 lbs	>208 lbs
71”	<133 lbs	133-178 lbs	179-214 lbs	>214 lbs
72”	<137 lbs	137-183 lbs	184-220 lbs	>220 lbs

(1) Adapted from the Clinical Guidelines on the Identification, Evaluation and Treatment of Overweight and Obesity in Adults. National Heart, Lung and Blood Institute (NHLBI), National Institutes of Health (NIH). NIH Publication No. 98-4083.

High Maternal Weight Gain

Definition/ cut-off value

Pregnant Women:

1. A high rate of weight gain, such that in the 2nd and 3rd trimesters, for singleton pregnancies (1):
   - Underweight women gain more than 1.3 pounds per week
   - Normal weight women gain more than 1 pound per week
   - Overweight women gain more that .7 pounds per week
   - Obese women gain more than .6 pounds per week

2. High weight gain at any point in pregnancy, such that using an Institute of Medicine (IOM)-based weight gain grid, a pregnant woman's weight plots at any point above the top of the appropriate weight gain range for her respective prepregnancy weight category (see below).

Breastfeeding or Non-Breastfeeding Women (most recent pregnancy only): total gestational weight gain exceeding the upper limit of the IOM's recommended range (2) based on Body Mass Index (BMI) for singleton pregnancies, as follows (1):

Prepregnancy Weight Groups	Definition (BMI)	Cut-off Value
Underweight	< 18.5	>40 lbs
Normal Weight	18.5 to 24.9	>35 lbs
Overweight	25.0 to 29.9	>25 lbs
Obese	> 30.0	>20 lbs

Multi-fetal Pregnancies: See Justification for information.

Note: A BMI table is attached to assist in determining weight classification. Also, until research supports the use of different BMI cut-offs to determine weight categories for adolescent pregnancies, the same BMI cut-offs will be used for all women, regardless of age, when determining WIC eligibility. (See Justification for a more detailed explanation.)

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	VI

Justification	133 (continued)
	Women with excessive gestational weight gains are at increased risk for cesarean delivery and delivering large for gestational age infants that 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. (1) 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. (1) The 2009 Institute of Medicine (IOM) report: *Weight Gain During Pregnancy: Reexamining the Guidelines* (1) updated the pregnancy weight categories to conform to the categories developed by the World Health Organization and adopted by the National Heart, Lung and Blood Institute in 1998 (3). The reexamination of the guidelines consisted of a review of the determinants of a wide range of short-and long-term consequences of variation in weight gain during pregnancy for both the mother and her infant. The IOM prenatal weight gain recommendations based on prepregnancy weight status categories are associated with improved maternal and child health outcomes (1). Included in the 2009 IOM guidelines is the recommendation that the BMI weight categories used for adult women be used for pregnant adolescents as well. More research is needed to determine whether special categories are needed for adolescents. It is recognized that the IOM cut-offs for defining weight categories will classify some adolescents differently than the CDC BMI-for-age charts. For the purpose of WIC eligibility determination, the IOM cut-offs will be used for all women regardless of age. However, due to the lack of research on relevant BMI cut-offs for pregnant and postpartum adolescents, professionals should use all of the tools available to them to assess these applicants' anthropometric status and tailor nutrition counseling accordingly. For twin gestations, the 2009 IOM recommendations provide provisional guidelines: normal weight women should gain 37-54 pounds; overweight women, 31-50 pounds; and obese women, 25-42 pounds. There was insufficient information for the IOM committee to develop even provisional guidelines for underweight women with multiple fetuses (1). A consistent rate of weight gain is advisable. A gain of 1.5 pounds per week during the second and third trimesters has been associated with a reduced risk of preterm and low-birth weight delivery in twin pregnancy (4). In triplet pregnancies the overall gain should be around 50 pounds with a steady rate of gain of approximately 1.5 pounds per week throughout the pregnancy (4). Education by the WIC nutritionist should address a steady rate of weight gain that is higher than for singleton pregnancies. For WIC eligibility determinations, multi-fetal pregnancies are considered a nutrition risk in and of themselves (Risk #335, Multi-Fetal Gestation), aside from the weight gain issue.

The supplemental foods, nutrition education, and counseling related to the weight gain guidelines provided by the WIC Program may improve maternal weight status and infant outcomes (1). In addition, WIC nutritionists can play an important role, through nutrition education and physical activity promotion, in assisting postpartum women achieve and maintain a healthy weight.

BMI Table for Determining Weight Classification for Women (1)

Height (Inches)	Underweight BMI <18.5	Normal Weight BMI 18.5-24.9	Overweight BMI 25.0-29.9	Obese BMI ≥ 30.0
58”	<89 lbs	89-118 lbs	119-142 lbs	>142 lbs
59”	<92 lbs	92-123 lbs	124-147 lbs	>147 lbs
60”	<95 lbs	95-127 lbs	128-152 lbs	>152 lbs
61”	<98 lbs	98-131 lbs	132-157 lbs	>157 lbs
62”	<101 lbs	101-135 lbs	136-163 lbs	>163 lbs
63”	<105 lbs	105-140 lbs	141-168 lbs	>168 lbs
64”	<108 lbs	108-144 lbs	145-173 lbs	>173 lbs
65”	<111lbs	111-149 lbs	150-179 lbs	>179 lbs
66”	<115 lbs	115-154 lbs	155-185 lbs	>185 lbs
67”	<118 lbs	118-158 lbs	159-190 lbs	>190 lbs
68”	<122 lbs	122-163 lbs	164-196 lbs	>196 lbs
69”	<125 lbs	125-168 lbs	169-202 lbs	>202 lbs
70”	<129 lbs	129-173 lbs	174-208 lbs	>208 lbs
71”	<133 lbs	133-178 lbs	179-214 lbs	>214 lbs
72”	<137 lbs	137-183 lbs	184-220 lbs	>220 lbs

(1) Adapted from the Clinical Guidelines on the Identification, Evaluation and Treatment of Overweight and Obesity in Adults. National Heart, Lung and Blood Institute (NHLBI), National Institutes of Health (NIH). NIH Publication No. 98-4083.

Failure to Thrive

Definition/ cut-off value

Presence of failure to thrive (FTT) diagnosed by a physician as self reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Note: For premature infants with a diagnosis of FTT also see: "Guidelines for Growth Charts and Gestational Age Adjustment for Low Birth Weight and Very Low Birth Weight Infants" (FNS Policy Memorandum 98-9, Revision 7, April 2004).

Participant category and priority level

Category	Priority
Infants	I
Children	III

Justification

Failure to thrive (FTT) is a serious growth problem with an often complex etiology. Some of the indicators that a physician might use to diagnose FTT include:

- weight consistently below the 3rd percentile for age;
- weight less than 80% of ideal weight for height/age;
- progressive fall-off in weight to below the 3rd percentile; or
- a decrease in expected rate of growth along the child's previously defined growth curve irrespective of its relationship to the 3rd percentile (1).

FTT may be a mild form of Protein Energy Malnutrition (PEM) that is manifested by a reduction in rate of somatic growth. Regardless of the etiology of FTT, there is inadequate nutrition to support weight gain (2).

Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…" Should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Slowed/Faltering Growth Pattern

Definition/ cut-off value

Slowed/Faltering Growth is defined as:

A. Infants Birth to 2 Weeks:

Excessive weight loss after birth, defined as ≥ 7% birth weight.

B. Infants 2 Weeks to 6 Months of Age:

Any weight loss. Use two separate weight measurements taken at least eight weeks apart.

Participant category and priority level

Category	Priority
Infants ≤ 6 Months of Age	I

Justification

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 (4).

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 (5, 6). Normal growth is also pulsatile, with periods of rapid growth or growth spurts followed by periods of slower or no measurable growth (5-8). 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 (10). 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 (11). 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 (11).

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 (12). 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 (13, 14).

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 (15). Weight loss of 5% and 7% of birth weight is not unusual for formula-fed or breastfed infants, respectively (16). Healthy infants are expected to regain their birth weight within 8-10 days after birth (17). 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 (18).

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 (17, 19). Contributing factors include (2, 16, 17, 20):

- 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 (21). 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 (22).

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 (23). 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 (24, 25).

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 (6). 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 (26). 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. (27, 28, 29) The table below shows the average mean values for weight gain for healthy exclusively breastfed infants:

Average Of Mean Values for Gains in Weight for Healthy Exclusively Breastfed Infants (30)

Interval (mo)	Girls (g/day)	Boys (g/day)
0-1	30	33
1-2	28	34
2-3	22	23
3-4	19	20
4-5	15	16
5-6	13	14
6-7	12	11

Screening for Slow or Faltering Growth Patterns

Screening for slow or faltering growth patterns is a preventive health measure which requires careful growth monitoring and critical thinking skills. And while a single measure of weight-for-age may be cause for concern, it cannot be interpreted to show growth faltering. No single measurement on its own is adequate for identifying nutritional growth delay (31). As stated earlier, 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 (26).

Growth faltering is a reflection of two weight measures, preferably eight weeks (two months) apart, to calculate an increment in growth. It is possible to use four week (one month) intervals for the assessment of slow growth patterns, but since there may be errors in clinical measurement, it is more prudent to use eight weeks as the minimum time interval between measurements. Infant weight will fluctuate over the course of the day and length growth may occur in discrete periods lasting no more than 24 hours separated by growth-free intervals lasting as long as two months. Thus, growth that seems abnormal may be nothing more than a growth-free period in a child's life (10).

Screening for early growth failure should be done using multiple growth indicators, including risks for underweight (Risk #103), short stature (Risk #121), failure to thrive (Risk #134) and low head circumference (Risk #152) to allow for timely remedial interventions and prevention of further growth failure.

In summary, a three-step approach should be considered for evaluation of infants with suspected abnormal growth. First, growth data should be assessed for accuracy. Second, feeding problems, improper formula preparation, etc. should be assessed to determine if calorie intake is insufficient for growth and development. Third, the infant should be assessed for other medical conditions or developmental delay.

Implications for WIC Services

In most situations, growth may not simply be a factor of undernutrition, but rather a combination of environmental and other factors which will

require a broad intervention strategy for successful health outcomes (32). In general, intervention strategies may include screening for environmental health factors such as (25, 32):

- Adequate nutrition and nutrient dense foods, including a history of human milk or formula feeding.
- Appropriate introduction of complementary foods.
- Maternal conditions that impact lactation performance: mastitis, prolonged labor, C-Section, hypo or hyperthyroidism, Diabetes, low birth weight infant, pregravida BMI >27, pregnancy-induced hypertension, flat/inverted nipples, vitamin B12 deficiency.
- Meal time routine and eating/feeding behavior.
- Growth faltering in light of familial growth patterns.
- Neglect.
- Lack of social support.
- Adverse social and psychological environment.
- Depressed or poor mental abilities of parent/caregiver. It may manifest as dressing inappropriately for the weather; looking disheveled and lacking in hygiene; or making inappropriate faces or reactions like laughing.
- Lack of parental education and nutrition knowledge.

Nutrition counseling for this risk would ideally be provided by staff with specialized education and training to assess growth parameters and identify causative factors accurately. Intervention strategies to address this criterion include:

- Appropriate timing and type of participant intervention.
- Effective participant-centered nutrition counseling.
- Early postpartum breastfeeding support to minimize risk of dehydration and/or failure to thrive.
- Review of baby behavior hunger and satiety cues. (For more information see WIC Baby Behavior Basics, WIC Online Learning Module available on the WIC Works Resource System: https://wicworks.fns.usda.gov/wic-learning-online.)
- Review/adjustment to breastfeeding/formula feeding schedule.
- Review/adjustment of formula mixing technique.
- Referral to lactation specialist for latch and position assistance.
- Tailored food package prescription.
- Review accuracy of weight, length, and head circumference measurements.

Referral to allied health professionals such as: physician, early childhood intervention, social services, and home visiting program.

A variety of intervention strategies can help infants establish and maintain individual growth patterns. The desired outcome is one where the infant's own growth curve tracks within the channel established in early infancy. Also, because growth monitoring is an intervention that happens largely after the fact, there may be benefit to anticipatory guidance that provides prevention rather than crisis management of this problem (33). It is suggested that when feeding is going well, the baby will eat as much as she needs and grow in the way that is right for her if parents maintain a division of responsibility in feeding (34).

Low Birth Weight and Very Low Birth Weight

Definition/ cut-off value

Low Birth Weight (LBW)

Birth weight defined as less than or equal to 5 pounds 8 ounces (less than or equal to 2500 g), for infants and children less than 24 months old.

Very Low Birth Weight (VLBW)

Birth weight defined as less than or equal to 3 pounds 5 ounces (less than or equal to 1500 g), for infants and children less than 24 months old.

Note: See "Guidelines for Growth Charts and Gestational Age Adjustment for Low Birth Weight and Very Low Birth Weight Infants" (FNS Policy Memorandum 98-9, Revision 7, April 2004) for more information about the anthropometric assessment and nutritional care of LBW and VLBW infants.

Participant category and priority level

Category	Priority
Infants	I
Children less than 24 months old	III

Justification

Low birth weight is one of the most important biologic predictors of infant death and deficiencies in physical and mental development during childhood among those babies who survive and continues to be a strong predictor of growth in early childhood. Infants and children born with LBW/VLBW, particularly if caused by fetal growth restriction, need an optimal nutrient intake to survive, meet the needs of an extended period of relatively rapid postnatal growth, and complete their growth and development. (1)

Calculating Gestation-Adjusted Age

INSTRUCTIONS*:

- Document the infant's gestational age in weeks. (Mother/caregiver can self-report, or referral information from the medical provider may be used.)

- Subtract the child's gestational age in weeks from 40 weeks (gestational age of term infant) to determine the adjustment for prematurity in weeks.

- Subtract the adjustment for prematurity in weeks from the child's chronological postnatal age in weeks to determine the child's gestation-adjusted age.

* For WIC nutrition risk determination, adjustment for gestational age should be calculated for all premature infants for the first 2 years of life.

EXAMPLE:

Randy was born prematurely on March 19, 2001. His gestational age at birth was determined to be 30 weeks based on ultrasonographic examination. At the time of the June 11, 2001, clinic visit, his chronological postnatal age is 12 weeks. What is his gestation-adjusted age?

- 30 = gestational age in weeks
- 40 - 30 = 10 weeks adjustment for prematurity
- 12 - 10 = 2 weeks gestation-adjusted age

His measurements would be plotted on a growth chart as a 2-week-old infant.

Preterm Delivery

Definition/ cut-off value

Delivery of an infant born ≤36 weeks gestation.

Note: See Clarification section for information on plotting growth measurements for preterm infants.

Participant category and priority level

Category	Priority
Infants	I
Children less than 24 months old	III

Justification

Preterm birth is a significant cause of newborn morbidity and mortality. Preterm and early term deliveries strain society's healthcare resources due to the longer hospital stays for the infant and the long-term effects on the health of the newborn (3, 4).

Typically, a pregnancy lasts about 40 weeks. Premature or preterm birth, however, is defined as a birth that occurs between 20 and 37 weeks of pregnancy, according to the American College of Obstetricians and Gynecologists (ACOG) (5). In the past, the period from 3 weeks before until 2 weeks after the estimated date of delivery was considered a "term" pregnancy, with the expectation that a baby would have similar health outcomes if they were born any time during this interval. In 2013, ACOG released a committee opinion that the label "term" should be replaced with the designations *early term* (≥37 0/7 weeks and ≤38 6/7 weeks gestation) and *full term* (≥39 0/7 weeks and ≤40 6/7 weeks gestation) to more accurately describe these groups of infants (1).

Prematurity affects about 12% of all live births in the U.S., and about 50% of these preterm births were preceded by preterm labor (6). In 2011, the annual rate of premature births in the United States reached 11.7%, nearly two times the rate in European nations (6). Preterm births also account for approximately 70% of newborn deaths and 36% of infant deaths (5).
Several factors have been found to increase the risk of preterm delivery. Epidemiological studies have consistently reported low socioeconomic status, nonwhite race, maternal age of ≤ 18 years or ≥ 40 years, and low pre-pregnancy weight as risk factors. A history of one previous preterm birth is associated with a recurrent risk of 17-37%; the risk increases with the number of prior preterm births and decreases with the number of term deliveries. Other maternal factors associated with a risk of preterm birth may include low weight gain during pregnancy, maternal obesity, hypertension, diabetes, or

sexually transmitted diseases (7). (See risk 311 *History of Preterm or Early Term Delivery* for more details.)

Despite advances in neonatal care, preterm birth remains a leading cause of infant death in the United States (8). Preterm infants may have health problems because their organs did not have enough time to develop in the womb. Babies that are born too early may have a number of health conditions, including:

- Low or very low birth weight (9)
- Increased caloric needs (9)
- Feeding difficulties due to a lack of reflexes for sucking and swallowing (9)
- Immature digestion and impaired absorption of carbohydrates and lipids (10, 11)
- Breathing problems like chronic lung disease/ bronchopulmonary dysplasia and apnea (9, 12, 13)
- Cerebral palsy, an impairment of the brain that controls movement and muscle tone (10, 14)
- Developmental delay and poorer cognitive function(12, 15, 16, 17)
- Vision problems like retinopathy of prematurity (ROP), which may cause blindness (12, 15)
- Hearing problems (12)
- Behavioral problems and psychiatric disorders (16, 17)
- Increased risk for necrotizing enterocolitis (NEC) due to their immature gastrointestinal systems (10, 12)
- Increased risk for Sudden Infant Death Syndrome (SIDS) (10)
- Temperature control problems (9, 10)
- Heart problems like patent ductus arteriosus and low blood pressure (hypotension) (10, 12)
- Blood problems like anemia and jaundice (10, 13)
- Hypoglycemia (9, 10)
- Immature immune systems, which may result in infections (9)

Preterm infants often need special medical care in a neonatal intensive care unit (NICU) and may need to stay there for days or even months. Breastfeeding is recommended as the normative standard for infant feeding and nutrition for all infants, especially preterm babies. Breastfeeding preterm infants has been associated with positive health outcomes for these infants, including:

- Improved motor maturity and cognitive ability (18, 19, 20)
- Reduced risk of NEC (21, 22)
- Reduced risk of ROP and retinal detachment (23)

Additionally, mothers of preterm infants produce milk that is designed to meet the baby's particular nutritional needs during the first few weeks of life. It is

higher in protein and minerals, such as salt, and contains different types of fat that are easier to digest and absorb compared to fats in the milk of mothers of full term babies. The fat in human milk also helps to enhance the development of the baby's brain and neurologic tissues, which is especially important for premature infants. Human milk is also easier for babies to digest than infant formula and avoids exposing the baby's immature intestinal lining to the cow's milk proteins found in premature infant formula. Preterm infants who are breastfed are less likely to develop intestinal infections than babies who are formula fed, and the colostrum produced in the first few days contains high concentrations of antibodies that will help the baby fight infection (22).

Breastfeeding preterm infants, especially if they are in the NICU, may present unique challenges for breastfeeding dyads. These mothers will benefit from extra breastfeeding support due to the delay of direct breastfeeding, reliance on breast pumps, and the stress of having a sick newborn. Even if the baby cannot breastfeed directly from the breast at first, the mother can be encouraged to express her milk to ensure that her supply is maintained. Supportive care for infants in the NICU may include the use of a feeding tube. Expressed human milk can be passed through the tube, therefore, it is important for the mother to discuss her feeding decisions with her baby's doctor. Preterm infants sometimes need additional calories and nutrients to facilitate adequate growth, and in such cases a human milk fortifier may be prescribed by a health care provider (22).

Preterm infants who are not breastfed may require the use of a formula higher in calories and nutrients to support their growth. According to the American Academy of Pediatrics (AAP), soy formulas are typically not recommended for low birth weight preterm infants, as their use may result in less weight gain and lower serum albumin and phosphorus levels than cow's milk-based formulas (24).

In addition to breastfeeding, skin-to-skin care or kangaroo care (holding your baby naked or in just a diaper on your bare chest), can help preterm infants breathe better, gain weight, keep their body at the right temperature, and prepare them for breastfeeding (25). All caregivers can provide skin-to-skin care, not just the mother.

Infants born at 34 0/7 through 36 6/7 weeks gestation, called late preterm infants, are sometimes mistaken for term infants since their size and weight may be similar (10). However, caregivers, healthcare providers, nutritionists, and lactation consultants must be aware that these babies are physiologically and metabolically immature (9). In addition to the health conditions previously mentioned for preterm infants, it is important to be aware that late preterm babies have an increased risk of morbidity and mortality which is often related to feeding problems. Due to their immaturity, late preterm infants may have more challenges with breastfeeding because they tire easily and have less stamina, which results in greater difficulty with latching, sucking, and swallowing. Mothers of late preterm infants will benefit greatly from timely lactation assessment and support since feeding difficulties, slow weight gain, failure to thrive, hypoglycemia, and jaundice are very common in these babies (26).

Preterm infants have different patterns of growth compared to term infants. Plotting the growth of preterm infants using their adjusted gestational age is an essential component of care until they reach 24 to 36 months of age (27). (See the *Clarification* section for more information on how to determine adjusted gestational age.) Most preterm infants, however, show catch-up growth in weight, length, and head circumference after their initial postnatal growth failure. If catch-up growth occurs, it usually starts early in the first months of life and is often achieved within the first years of life (28).

The effects of preterm birth can continue beyond infancy. Children who were born prematurely are at an increased risk for the following:

- Neurodevelopmental problems (29)
- Intellectual/cognitive impairments, which can lead to learning disabilities and the need for special education services (29, 30, 31)
- Motor problems (31)

Feeding difficulties such as problems with chewing and swallowing, late development of feeding skills, food refusal, eating behavior problems, and poor appetite (32)

- Emotional problems such as anxiety and depression (31)
- Behavioral concerns such as attention problems and hyperactivity (31)

Implications for WIC Nutrition Services

WIC services can directly support preterm and early term infants and their caregivers, as these babies may have unique feeding difficulties. Preterm delivery is often unexpected and a mother may not have made decisions about how to feed her baby yet. These infants may require additional calories, extra breastfeeding support, and/or the use of a human milk fortifier or special infant formula.

WIC can support preterm and early term infants and their caregivers through:

- Promoting and supporting breastfeeding as the normative standard for infant nutrition and providing early and frequent breastfeeding support.
- Recommending the use of a hospital grade electric breast pump for expressing milk if the baby is in the NICU or the baby is unable to breastfeed directly from the breast.
- Providing anticipatory guidance about potential feeding challenges.
- Encouraging caregivers to provide skin-to-skin contact.
- Providing education on safe preparation, handling, and storage of breast milk and/or formula.
- Educating pregnant women about the importance of carrying a baby to term, unless medically contraindicated.
- Monitoring the child's growth to ensure healthy weight gain.
- Providing nutrition education for mothers/caregivers and appropriate referrals as necessary for growth, feeding, health, and/or infant developmental issues.

Clarification

All preterm infants and children (up to 2 years of age) who have reached the equivalent age of 40 weeks gestation, shall be assessed for growth using the Centers for Disease Control and Prevention (CDC) Birth to 24 Months gender specific growth charts adjusting for gestational age as follows:

1. Document the infant/child's gestational age (at delivery) in weeks. (Mother/caregiver can self-report, or referral information from the medical provider may be used.)
2. Subtract the child's gestational age in weeks from 40 weeks (gestational age of term infant) to determine the adjustment for prematurity in weeks.
3. Subtract the adjustment for prematurity in weeks from the child's chronological postnatal age in weeks to determine the child's gestation-adjusted age.

Example:
Randy was born prematurely on March 19, 2011. His gestational age at birth was determined to be 30 weeks based on ultrasonographic examination. At the time of the June 11, 2011, clinic visit, his chronological postnatal age is 12 weeks. What is his gestation-adjusted age?

- 30 = gestational age in weeks
- 40 - 30 = 10 weeks adjustment for prematurity
- 12 - 10 = 2 weeks gestation-adjusted age

His measurements would be plotted on a growth chart as a 2-week-old infant.

Note: Preterm infants (< 36 6/7 weeks gestation) who have not reached the equivalent age of 40 weeks gestation may be assessed for growth using a growth chart for low birth weight (LBW) or very low birth weight (VLBW) infants (e.g., Infant Health and Development Program [IHDP]) consistent with the protocols of the local medical community in which the WIC clinic operates. The CDC does not recommend the use of the CDC Growth Charts for preterm infants who have not reached the equivalent age of 40 weeks gestation.

Early Term Delivery

Definition/ cut-off value

Delivery of an infant born ≥37 and ≤38 weeks gestation.

Participant category and priority level

Category	Priority
Infants	I
Children < 24 months old	III

Justification

Preterm birth is a significant cause of newborn morbidity and mortality. Preterm and early term deliveries strain society's healthcare resources due to the longer hospital stays for the infant and the long-term effects on the health of the newborn (3, 4).

Typically, a pregnancy lasts about 40 weeks. Premature or preterm birth, however, is defined as a birth that occurs between 20 and 37 weeks of pregnancy, according to the American College of Obstetricians and Gynecologists (ACOG) (5). In the past, the period from 3 weeks before until 2 weeks after the estimated date of delivery was considered a "term" pregnancy, with the expectation that a baby would have similar health outcomes if they were born any time during this interval. In 2013, ACOG released a committee opinion that the label "term" should be replaced with the designations *early term* (≥37 0/7 weeks and ≤38 6/7 weeks gestation) and *full term* (≥39 0/7 weeks and ≤40 6/7 weeks gestation) to more accurately describe these groups of infants (1).

Up to 10% of babies in the United States are scheduled for early term deliveries via labor-inducing medication or cesarean section before 39 weeks of gestation despite neither the mother nor the baby being at risk if the pregnancy continues (4). Elective deliveries like this are sometimes requested for reasons such as wanting to schedule the date of the infant's birth, physician preference, or for relief of symptoms at the end of the pregnancy (4).

Research shows that a fetus will experience a significant amount of development and growth of the lungs, brain, and liver between 37 and 39 weeks of gestation. The brain develops at its fastest rate at the end of the pregnancy, at a rate of up to one third between weeks 35 and 39. Additionally, layers of fat are added under the infant's skin during the last few weeks of pregnancy which helps them keep warm after birth. According to ACOG, non-medically warranted deliveries prior to 39 weeks should be avoided (33). Early term delivery puts an additional strain on society as the early term infant will likely require a longer hospital stay and may have long term healthcare needs (4).

Implications for WIC Nutrition Services

WIC services can directly support preterm and early term infants and their caregivers, as these babies may have unique feeding difficulties. Preterm delivery is often unexpected and a mother may not have made decisions about how to feed her baby yet. These infants may require additional calories, extra breastfeeding support, and/or the use of a human milk fortifier or special infant formula.

WIC can support preterm and early term infants and their caregivers through:

- Promoting and supporting breastfeeding as the normative standard for infant nutrition and providing early and frequent breastfeeding support.
- Recommending the use of a hospital grade electric breast pump for expressing milk if the baby is in the NICU or the baby is unable to breastfeed directly from the breast.
- Providing anticipatory guidance about potential feeding challenges.
- Encouraging caregivers to provide skin-to-skin contact.
- Providing education on safe preparation, handling, and storage of breast milk and/or formula.
- Educating pregnant women about the importance of carrying a baby to term, unless medically contraindicated.
- Monitoring the child's growth to ensure healthy weight gain.
- Providing nutrition education for mothers/caregivers and appropriate referrals as necessary for growth, feeding, health, and/or infant developmental issues.

Small for Gestational Age

Definition/ cut-off value

For infants and children less than 24 **months old**:

Presence of small for gestational age diagnosed by a physician as self reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Note: See "Guidelines for Growth Charts and Gestational Age Adjustment for Low Birth Weight and Very Low Birth Weight Infants" (FNS Policy Memorandum 98-9, Revision 7, April 2004) for more discussion on the anthropometric assessment and nutritional care of SGA infants.

Participant category and priority level

Category	Priority
Infants	I
Children < 24 months old	III

Justification

Impairment of fetal growth can have adverse effects on the nutrition and health of children during infancy and childhood, including higher mortality and morbidity, slower physical growth, and possibly slower mental development. Infants who are small for gestational age (SGA) are also more likely to have congenital abnormalities. Severely growth-retarded infants are at markedly increased risk for fetal and neonatal death, hypoglycemia, hypocalcemia, polycythemia, and neurocognitive complications of pre- and intrapartum hypoxia. Over the long term, growth-retarded infants may have permanent mild deficits in growth and neurocognitive development. (1)

WIC staff should routinely complete anthropometric assessments and follow-up (to include coordination with and referral to, other health care providers and services) for infants/children with a diagnosis/history of SGA who have not yet demonstrated normal growth patterns.

Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…" Should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

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Large for Gestational Age

Definition/ cut-off value	Birth weight greater than or equal to 9 pounds (greater than or equal to 4000 g); or Presence of large for gestational age diagnosed by a physician as self reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Participant category and priority level	**Category**	**Priority**
	Infants	I

Justification	Infant mortality rates are higher among full-term infants who weigh greater than 4,000 g (greater than 9 lbs) than for infants weighing between 3,000 and 4,000 g (6.6 and 8.8 lbs). Oversized infants are usually born at term; however, preterm infants with weights high for gestational age also have significantly higher mortality rates than infants with comparable weights born at term. When large for gestational occurs with pre-term birth, the mortality risk is higher than when either condition exists alone (1). Very large infants regardless of their gestational age, have a higher incidence of birth injuries and congenital anomalies (especially congenital heart disease) and developmental and intellectual retardation (2). Large for Gestational Age may be a result of maternal diabetes (which may or may not have been diagnosed before or during pregnancy) and may result in obesity in childhood that may extend into adult life (1).
Clarification	Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Low Hematocrit/Low Hemoglobin

Definition/ cut-off value

Hemoglobin or hematocrit concentration below the 95 percent confidence interval (i.e., below the .025 percentile) for healthy, well-nourished individuals of the same age, sex, and stage of pregnancy.

Cut-off values are based on the levels established by the Center for Disease Control and Prevention (CDC) and are programmed into the ITCA STARS System.

Participants with hemoglobin levels below 9.0 should be referred to the Registered Dietitian and the participant's primary care provider. Participants may be retested in 2 months, if the Hgb at that time has not increased or is lower than the previous level, the participant should be referred to the R.D. or the primary care provider.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	VI
Infants	I
Children	III

Justification

Hemoglobin (Hb) and hematocrit (Hct) are the most commonly used tests to screen for iron deficiency anemia. Measurements of Hb and Hct reflect the amount of functional iron in the body. Changes in Hb concentration and Hct occur at the late stages of iron deficiency. While neither an Hb or Hct test are direct measures of iron status and do not distinguish among different types of anemia, these tests are useful indicators of iron deficiency anemia.

Iron deficiency is by far the most common cause of anemia in children and women of childbearing age. It may be caused by a diet low in iron, insufficient assimilation of iron from the diet, increased requirements due to growth or pregnancy, or blood loss. Anemia can impair energy metabolism, temperature regulation, immune function, and work performance. Anemia during pregnancy may increase the risk of prematurity, poor maternal weight gain, low birth weight, and infant mortality. In infants and children, even milk anemia may delay mental and motor development. The risk increases with the duration and severity of anemia, and early damages are unlikely to be reversed through later therapy.

	201 (continued)
Clarification	Basis for blood work assessment: For pregnant women being assessed for iron deficiency anemia, blood work must be evaluated using trimester values established by CDC. Thus, the blood test result for a pregnant woman would be assessed based on the trimester in which her blood work was taken. Definition of Trimester: CDC defines a trimester as a term of three months in the prenatal gestation period with the specific trimesters defined as follows in weeks: • First Trimester: 0-13 weeks • Second Trimester: 14-26 weeks • Third Trimester: 27-40 weeks Further, CDC begins the calculation of weeks starting with the first day of the last menstrual period. If that date is not available, CDC estimates that date from the estimated date of confinement (EDC). This definition is used in interpreting CDC's Prenatal Nutrition Surveillance System data, comprised primarily of data on pregnant women participating in the WIC Program. Adjustments for smoking: A State agency may elect to use only one cutoff for all smokers rather than making specific adjustments based on the individual applicant's smoking frequency. If the State chooses to use only one category for this issue, the "up to

Elevated Blood Lead Levels

Definition/ cut-off value

Blood lead level of ≥ 5µg/deciliter within the past 12 months.

Cut off value is the current published guidance from the Center for Disease Control and Prevention (CDC).

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	VI
Infants	I
Children	III

Justification

Lead poisoning is a persistent, but entirely preventable, public health problem in the United States. Elevated blood lead levels (BLLs) – levels at or above the reference value identified by the Centers for Disease Control and Prevention (CDC) – are a potent, pervasive neurotoxicant associated with harmful effects on health, nutritional status, learning and behavior. The CDC recognizes that there is no safe blood lead level for a mother or fetus yet there are no published guidelines for these groups. Therefore, CDC recommends that the same guidelines identified for children be used for prenatal and breastfeeding women as well as infants until specific guidelines are available. (1, 2)

Blood lead levels have been declining in the U.S. population as a whole. It is most common in children, but can occur in other groups as well. Children remain at heightened risk because they absorb lead more readily than adults and their developing nervous system is particularly vulnerable to the effects of lead. Elevated blood lead levels in children have been associated with decreased IQ, academic failure, and behavioral problems (1).

Avoidance of lead exposure remains the primary preventive strategy for reducing adverse health effects. (1). As a result of the wide variability in lead exposure in different communities, CDC recommends that state and/or local communities implement lead screening requirements based on their local data. If a state or local plan does not exist, it is recommended that the universal BLL testing according to 1991 CDC guidance be followed. (1)

Testing

Venous blood samples are the preferred method of blood lead testing. Elevated BLLs obtained using capillary (finger stick) samples should be confirmed using a venous blood test. (1)

Lead in Pregnant Women
Lead poisoning in a pregnant woman results in lead crossing the placenta and can have a detrimental impact on a developing fetus. One cause of lead poisoning in pregnant women is from practicing pica. Pica is defined as the eating of one or more nonnutritive substances on a persistent basis for a period of at least one month. Items commonly ingested include soil, clay, ice, starch, baking powder, chalk and paint. Cases of lead poisoning have been found when lead containing items, such as lead-contaminated soil and pottery, have been ingested. Pica is commonly practiced in areas of Africa, Asia, and Central America. In the United States it occurs more frequently in the South and in immigrant populations where it is culturally acceptable. In areas of the U.S. where pica is viewed negatively, women may not admit to engaging in these practices thus, it places the pregnant woman and her fetus at risk. (2, 3)

Lead in Breastfeeding Women
Lead can be passed to the infant through breast milk. Some mothers exposed to lead may be encouraged to continue breastfeeding if their BLLs are within an acceptable range. The benefits of breastfeeding outweigh the potential health consequences the infant would otherwise endure.

Key Recommendations for Initiation of Breastfeeding (2):

- Mothers with BLLs <40 µg/dL should breastfeed.
- Mothers with confirmed BLLs ≥40 µg/dL should begin breastfeeding when their blood lead levels drop below 40 µg/dL. Until then, they should pump and discard their breast milk.

Key Recommendations for Continuation of Breastfeeding (2):

- Breastfeeding should continue for all infants with BLLs below 5 µg/dL.
- Infants born to mothers with BLL >5 µg/dL and <40 µg/dL can continue to breastfeed unless there are indications that the breast milk is contributing to elevating BLLs.

Lead in Infants and Children
Similarly, children with pica may also have an elevated BLL. (For more information about pica please see the Lead in Pregnant Women, above and Risk #425 Inappropriate Nutrition Practices for Children.) Lead poisoning is most common in children, especially those living in low income, migrant, or new refugee households. CDC recommends blood lead screening for all children at high risk for elevated BLLs with follow-up screening within 12 months.

Nutrition and Lead Absorption
Adequate consumption of calcium, iron, selenium, and zinc along with vitamins C, D and E decreases the absorption of lead in adults and lowers the susceptibility to the toxic effects in children (2). Nutritional status affects the absorption, deposition, and excretion of lead and thus may affect lead toxicity. Infants and children with a BLL ≥5 µg/dL should be assessed for the adequacy of their diet with a focus on increasing iron, calcium, and vitamin C, as follows:

- Iron deficiency anemia (IDA) can be an indicator of lead poisoning as they often coexist. Iron status should be evaluated and nutritional supplementation may be recommended by the participant's health care provider to correct and prevent IDA. Testing for IDA should occur (4):
  - Once between ages 9-12 months,
  - Again 6 months later, and
  - Annually from ages 2 to 5 years. 05/2015 3 of 4 Biochemical: Elevated Blood Lead Levels 211
- Inadequate dietary calcium intake generally affects lead absorption. Results from some studies indicate that dietary calcium (when consumed at Adequate Intake levels) competitively inhibits lead absorption.
- The antioxidant, vitamin C, has been shown to have natural chelating properties, enhancing the urinary elimination of lead from the body. (2,4)

Referrals

WIC agencies must assess the history of lead testing for every infant and child. The WIC staff should make a referral to a children's health care provider if the:

- Child has never received a lead test
- Child had an elevated BLL 12 months prior and has had no interim follow-up screening
- Child is suspected by a parent or a health care provider to be at risk for lead exposure
- Child has a sibling or frequent playmate with an elevated BLL
- Participant is a recent immigrant, refugee, or foreign adoptee
- Breastfeeding or lactating woman, parent, or child's principal caregiver works professionally or recreationally with lead
- Family has a household member who uses traditional, folk, or ethnic remedies; cosmetics; or who routinely eats unregulated/uninspected food imported from abroad
- Family has been identified at increased risk for lead exposure by the health department because the family has local risk factors for lead exposure

Implications for WIC Nutrition Services

WIC nutrition services may benefit participants with lead exposure or elevated BLL in the following ways by:

- Reinforcing primary prevention strategies to avoid lead exposure and reduce adverse health effects such as offering to explain risk factors and common sources of lead, and providing a referral to lead treatment programs in health departments. Other CDC prevention tips can be found at: http://www.cdc.gov/nceh/lead/tips.htm.
- Encouraging consumption of foods (with an emphasis on the foods in the WIC food package) with nutrients that help minimize absorption of ingested lead and assist in preventing adverse consequences.
  - Calcium: Low-fat dairy, bone-in canned fish, and fortified fruit and vegetable juices http://ods.od.nih.gov/factsheets/Calcium-HealthProfessional/

- Iron: Lentils and beans, fortified cereals, red meats, fish, and poultry o http://ods.od.nih.gov/factsheets/Iron-HealthProfessional/
- Vitamin C: Citrus fruits, tomatoes, and other fruits and vegetables http://ods.od.nih.gov/factsheets/VitaminC-HealthProfessional/

- Helping to determine source(s) of lead exposure and counsel participants on avoiding further exposure, including identification and assessment of pica behavior. (For more information, see Risk #427 Inappropriate Nutrition Practices for Women and Risk #425 Inappropriate Nutrition Practices for Children.)
- Working with local lead treatment programs to determine source(s) of lead exposure and to support their recommendations for reducing further exposure.
- Providing breastfeeding support to mothers with elevated BLLs who need to temporarily pump and discard their breast milk.
- Working with healthcare providers to support breastfeeding according to the CDC guidelines if lead exposure occurs in a breastfeeding dyad.

Hyperemesis Gravidarum

Definition/ cut-off value

Hyperemesis Gravidarum (HG) is defined as severe and persistent nausea and vomiting during pregnancy which may cause more than 5% weight loss and fluid and electrolyte imbalances (1). This nutrition risk is based on a chronic condition, not single episodes. HG is a clinical diagnosis, made after other causes of nausea and vomiting have been excluded.
Presence of condition diagnosed, documented, or reported by a physician or someone working under a physician's orders, or as self-reported by applicant/participant/caregiver. See Clarification for more information about self-reporting a diagnosis.

Participant category and priority level

Category	Priority
Pregnant Women	I

Justification

Nausea and vomiting are common early in gestation; 50-80% or more of pregnant women experience some vomiting. However, pregnant women diagnosed with HG are at risk of weight loss, dehydration, ketonuria, and electrolyte imbalances such as hypokalemia. HG affects approximately 0.3-3.0% of pregnancies and may lead to adverse fetal consequences and hospitalization in some cases. HG is the second most common reason for hospitalization for pregnant women, with preterm labor being the most common (2).

Risk Factors for HG
Biological, physiological, psychological and sociocultural factors are thought to be influential in HG (3). The various risk factors for HG include maternal underweight, multiple pregnancy, nulliparity, previous history of HG and trophoblastic disorders (see clarification). A history of eating disorders, such as anorexia nervosa or bulimia, is also a risk factor associated with HG (4, 5). Helicobacter pylori infection may be a contributing factor for HG (6). Studies indicate that offspring or siblings of women with HG, and/or women pregnant with a female fetus, have increased chances of having HG. A history of motion sickness and/or migraine headaches are also risk factors for HG (7).

Various hormones such as estrogen, progesterone, adrenocorticotropic hormone, cortisol, growth hormone, prolactin and human chorionic gonadotropin (HcG) play an influential role in HG. Increased levels of HcG, which may occur in molar (see clarification) or multi fetal pregnancies may be associated with HG.

Studies indicate that HG increases when HcG level reaches its peak at 9 weeks of gestation (8). It should be noted that thyroid function is affected in

pregnancy. For pregnant women with hyperthyroidism, decreased levels of thyroid stimulating hormone may be implicated for HG (9, 10).

HG and Adverse Maternal Outcomes

HG can adversely affect maternal outcomes and, if inadequately managed, can lead to malnutrition, dehydration, electrolyte imbalances, thrombosis, and Wernicke's encephalopathy (a very rare but potentially life-threatening complication of HG, caused by thiamine deficiency) (11). Vitamin K deficiency has also been reported with HG and may be implicated in neonatal hemorrhage (12). Other serious complications include esophageal rupture (caused by severe vomiting), peripheral neuropathy, coagulopathy and Mallory-Weiss syndrome (acute increase in esophageal pressure due to vomiting) (8).

Studies indicate that pregnant women with HG in the second trimester are also at an increased risk for placental disorders, such as placental abruption (13). Pregnant women with HG are at an increased risk for any autoimmune disorder, and in extreme cases this may lead to organ damage manifesting as oliguria and abnormal liver function tests (14). In addition, pregnant women with HG are at increased risk for psychological distress therefore leading to an increased risk for depression and anxiety (15). Other concerns associated with HG include severe distress, social dysfunction and loss of time from work (16, 17).

Malnourishment may develop over a period of time in women suffering with HG, which may lead to refeeding syndrome (RFS). RFS includes severe metabolic abnormalities and electrolyte disturbances due to the change from catabolic to anabolic metabolism that occurs when refeeding (orally, parentally, or enterally) occurs too quickly after severe malnourishment. RFS requires multidisciplinary nutrition team management as it is a life-threatening condition (18).

HG and Adverse Birth Outcomes

Systematic review and meta-analysis indicate that HG is frequently associated with adverse birth outcomes (19). Women with HG have an increased risk of giving birth to low birth weight, small for gestational age, and premature infants (20). Infants born to mothers suffering from HG have increased risk of colic, irritability, and growth restrictions (21). There is a scarcity of data examining the long-term effect on fetuses exposed to HG in utero. However, some studies indicate that there is an increased risk of psychological disorders and reduced insulin sensitivity for infants born to women with HG (22, 23)

Implications for WIC Nutrition Services

WIC nutrition staff can provide the following nutrition services to women with HG:

- Refer to a health care provider for appropriate monitoring and treatments as necessary.
- Provide education on how to recognize symptoms of dehydration such as: Increased thirst, dry mouth, low urine output or urine that is darker in color than normal.

- Offer suggestions to help with nausea such as:
    - Avoid foods and smells that seem to trigger nausea (e.g., fried or greasy foods, spicy foods, foods of a certain texture).
    - Eat crackers or dry cereal before getting out of bed to curb nausea in the morning.
    - Avoid large fluid intakes in the morning. Drink liquids between meals instead of with meals.
    - Choose foods carefully. Select foods that are high in carbohydrates or protein, low in fat, and easy to digest. Salty foods are sometimes helpful, as are foods that contain ginger — such as ginger lollipops. Avoid greasy, spicy and fatty foods. Consume foods that settle the stomach and calm the nausea. (24)
    - Eat several small meals throughout the day instead of three large meals. Meals should contain more carbohydrate than fat and acid. Protein-rich meals also decrease symptoms. Lighter snacks, including nuts, dairy products, and beans, are recommended. (25)
    - Take prenatal supplement at night or before bedtime.
- Review weight gain goal and weight gain pattern. If weight loss is a problem, discuss nutrient and calorie-dense food choices and refer to the health care provider.
- Encourage women to take prenatal vitamins if considering becoming pregnant again. Studies indicate that taking prenatal vitamins a month before conception may help alleviate the symptoms of HG during pregnancy (26).

Clarification

Self-reporting of a diagnosis by a health care provider should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Gestational Trophoblastic Disease (GTD) may be defined as a condition in which a tumor develops in the uterus that would normally develop as a placenta. Molar pregnancy or a hydatidiform mole may be classified as a form of noninvasive tumor under GTD. A molar pregnancy results from an abnormal fertilization of the egg lacking in maternal tissues. It should be noted that although the tumor is considered benign they have potential to become malignant. The symptoms include vaginal bleeding, hyperemesis, preeclampsia, and hyperthyroidism. (27)

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Gestational Diabetes

Definition/ cut-off value

Gestational diabetes mellitus (GDM) is defined as any degree of glucose/carbohydrate intolerance with onset or first recognition during pregnan (1, 2).

Presence of gestational diabetes diagnosed by a physician as self-reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Participant category and priority level

Category	Priority
Pregnant Women	I

Justification

The definition of GDM applies regardless of whether insulin or only diet modification is used for treatment, or whether the condition persists after pregnancy. Included in this classification are women who may have had undiagnosed diabetes prior to pregnancy but who are first diagnosed during pregnancy (1, 2). Pregnant women requiring the use of exogenous steroids, tocolytics, or other medications, or who have medical conditions that alter glucose tolerance, may develop GDM (2). GDM represents nearly 90% of all pregnancies complicated by diabetes (1). The criteria for the diagnosis of GDM (3) are shown in Table 1 (see Clarification).

Pregnancy is an insulin-resistant and diabetogenic state (2). Deterioration of glucose tolerance occurs normally during pregnancy, particularly in the 3rd trimester (1, 2). Untreated or poorly treated GDM results in a higher risk of morbidity and mortality for both the mother and the fetus (2).

Established risk factors for GDM are advanced maternal age, obesity, and family history of diabetes (4). Risk assessment for GDM should be undertaken at the first prenatal visit. Women with clinical characteristics consistent with a high risk for GDM (e.g., those with marked obesity, personal history of GDM or delivery of a previous large-for-gestation-age infant, glycosuria, polycystic ovary syndrome, or a strong family history of diabetes) should undergo glucose testing as soon as possible (5). Unquestionably, there are also ethnic differences in the prevalence of GDM. In the U.S., Native Americans, Asians, Hispanics, and African American women are at a higher risk for GDM than non-Hispanic White women. Besides obesity, there is a suggestion that physical inactivity, diets high in saturated fat and smoking are associated with increasing risk for GDM or recurrent GDM (4).

Infants of women with GDM are at an increased risk of developing obesity, iimpaired glucose tolerance or diabetes as children or young adults (4). GDM is

associated with a higher incidence of maternal and fetal complications. Maternal complications include polycythemia, respiratory distress syndrome, and increased rate of stillbirth (6). Although rarely seen in GDM, congenital anomalies, neural tube defects, cardiac abnormalities and/or caudal regression may occur if a woman has GDM in the early first trimester (6, 7).

Since GDM is a risk factor for subsequent type 2 diabetes after delivery, lifestyle modifications aimed at reducing weight and increasing physical activity are recommended (8). The National Diabetes Education Program (NDEP) is currently promoting a GDM Prevention Initiative, targeting both providers and women with a GDM history (9). Key messages are illustrated in Table 2 (see Clarification).

Medical Nutrition Therapy (MNT) is the primary treatment for the management of GDM (7). MNT for GDM primarily involves a carbohydrate-controlled meal plan that promotes optimal nutrition for maternal and fetal health with adequate energy for appropriate gestational weight gain, achievement and maintenance of normoglycemia, and absence of ketosis (7, 8). Breastfeeding should be strongly encouraged as it is associated with maternal weight loss and reduced insulin resistance for both mother and offspring (10). WIC nutrition services can reinforce and support the medical and diet therapies (such as MNT) that participants with GDM receive from their health care providers.

Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Women at high risk for GDM who have tested negative at the initial screening, and women at average risk for GDM should be tested by a licensed medical provider, between 24 and 28 weeks of gestation. Women of average risk should be tested at 24-28 weeks of gestation. Testing should follow one of two approaches:

- **One-step approach:** perform a diagnostic 100-g OGTT (Oral Glucose Tolerance Test)

- **Two-step approach:**
  1. A screening test (glucose challenge test) that measures plasma or serum glucose is done 1 hour after a 50-g oral glucose load without regard for time of day or time of last meal. If a plasma or serum glucose level meets or exceeds the threshold (>130 mg/dl [7.2 mmol/L] or >140 mg/dl [7.8 mmol/L], respectively), an OGTT is performed (3).

  2. A diagnosis of GDM is made with a 100-g oral glucose load after an overnight fast. Using a 3-hour test, if two or more plasma or serum glucose levels meet or exceed the threshold, a diagnosis of GDM is made. Alternatively, the diagnosis can be made using a 75-

g oral glucose load. The glucose threshold values for both tests are listed in Table 1 (10). The 75-g glucose load test is not as well validated as the 100-g OGTT.

With either the 75-g OGTT or the 100-g OGTT, it is recommended that the test be performed after an overnight fast of at least 8 hours but no longer than 14 hours. For 3 days prior to the test the woman should consume an unrestricted diet (>150 g carbohydrate per day) and maintain unrestricted physical activity. Women need to remain seated and not smoke during the test. (1, 2).

Table 1. Diagnosis of Gestational Diabetes Mellitus with a 100-g or 75-g Oral Glucose Load

Time (h)	***100-g Oral Glucose Load***	***75-g Oral Glucose Load***
Fasting	95 mg/dL (5.3 mmol/L)	95 mg/dL (5.3 mmol/L)
1	180 mg/dL (10.0 mmol/L)	180 mg/dL (10.0 mmol/L)
2	155 mg/dL (8.6 mmol/L)	155 mg/dL (8.6 mmol/L)
3	140 mg/dL (7.8 mmol/L)	

Two or more of the venous plasma concentrations must be met or exceeded for a positive diagnosis. *Source:* American Diabetes Association (3).

Table 2. Gestational Diabetes Mellitus (GDM) Prevention Initiative from the National Diabetes Education Program

- GDM imparts lifelong risk for diabetes, mostly type 2
- Modest weight loss and physical activity can delay or prevent type 2 diabetes.
- Offspring can lower risk of diabetes by eating healthy foods, being active and not becoming overweight.

Conservative recommendations to patients include:

- Let health care practitioners know of any history of GDM.
- Get glucose testing at 6 to 12 weeks postpartum, then every 1-2 years.
- Reach pre-pregnancy weight 6-12 months postpartum.
- If still overweight, lose at least 5 to 7% of weight slowly, over time, and keep it off.-

Adapted from the National Diabetes Education Program (9).

History of Gestational Diabetes

Definition/ cut-off value

History of diagnosed gestational diabetes mellitus (GDM).

Presence of condition diagnosed by a physician as self-reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under a physician's orders.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	VI

Justification

Women who have had a pregnancy complicated by GDM are 40-60% more likely to develop diabetes within 15-20 years (1), usually type 2 (2). This risk of subsequent diabetes is greatest in women with GDM who are diagnosed early in the pregnancy, exhibit the highest rates of hyperglycemia during the pregnancy, and are obese.

Approximately 30-50% of the women with a history of GDM will develop GDM in a subsequent pregnancy. Studies have found that the risk factors for subsequent GDM include insulin use in the index pregnancy, obesity, diet composition*, physical inactivity, failure to maintain a healthy BMI and weight gain between pregnancies (2, 3). In addition, if a woman's lipid levels are elevated, a history of GDM is also a risk factor for cardiovascular disorders (3).

There is evidence to suggest that some women with a history of GDM show relative beta-cell dysfunction during and after pregnancy (3). Most women with a history of GDM are insulin resistant. Changes in lifestyle (dietary and physical activity) may improve postpartum insulin sensitivity and could possibly preserve B-cell function to slow the progression to type 2 diabetes (2, 3).

During WIC nutrition education and counseling, obese women with a history of GDM should be encouraged to lose weight before a subsequent pregnancy. Breastfeeding has been shown to lower the blood glucose level and to decrease the incidence of type 2 diabetes in women with a history of GDM (2, 3). Exercise also has a beneficial effect on insulin action by enhancing peripheral tissue glucose uptake (3). Medical Nutrition Therapy (MNT) is an essential component in the care of women with a history of GDM.

pregnancy, and to request early glucose screening in the next pregnancy (4). The National Diabetes Education Program (NDEP) is currently promoting a GDM Diabetes Prevention Initiative, targeting both providers and women with a history of GDM (5). Key messages are illustrated in Table 2. (See Clarification).

WIC nutrition services can support and reinforce the MNT and physical activity recommendations that participants receive from the health care providers. In addition, WIC nutritionists can play an important role in providing women with counseling to help manage their weight after delivery. Also, children of women with a history of GDM should be encouraged to establish and maintain healthy dietary and lifestyle behaviors to avoid excess weight gain and reduce their risk for type 2 diabetes (1).

*** Diet Composition** Carbohydrate is the main nutrient that affects postprandial glucose elevations. During pregnancy complicated with GDM, carbohydrate intake can be manipulated by controlling the total amount of carbohydrate, the distribution of carbohydrate over several meals and snacks, and the type of carbohydrate. These modifications need not affect the total caloric intake level/prescription (6).

Because there is wide inter-individual variability in the glycemic index each women needs to determine, with the guidance of the dietitian, which foods to avoid or use in smaller portions at all meals or during specific times of the day, for the duration of her pregnancy. Practice guidelines have avoided labeling foods as “good” or “bad” (6).

Meal plans should be culturally appropriate and individualized to take into account the patient’s body habitus, weight gain and physical activity; and should be modified as needed throughout pregnancy to achieve treatment goals (6).

Clarification

Self-reporting of “History of…” conditions should be treated in the same manner as self-reporting of current conditions requiring a physician’s diagnosis, i.e., the applicant may report to the CPA that s/he was diagnosed by a physician with a given condition at some point in the past. As with current conditions, self-diagnosis of a past condition should never be confused with self-reporting.

Table 1. Reasons for Delayed Postpartum Glucose Testing of Women with Prior Gestational Diabetes Mellitus (GDM)

1 . The substantial prevalence of glucose abnormalities detected by 3 months postpartum.

2 . Abnormal test results identify women at high risk of developing diabetes over the next 5 to 10 years.

3 . Ample clinical trial evidence in women with glucose intolerance that type 2 diabetes can be delayed or prevented by lifestyle interventions or modest and perhaps intermittent drug therapy.

4 . Women with prior GDM and impaired glucose tolerance (IGT) have cardiovascular disease (CVD) risk factors. Interventions may reduce subsequent CVD, which is the leading cause of death in both types of diabetes.

5 . Identification, treatment, and planning of pregnancy in women developing diabetes after GDM should reduce subsequent early fetal loss and major congenital malformations.

Kitzmiller JL, Dang-Kilduff L, Taslimi MM

Table 2. Gestational Diabetes Mellitus (GDM) Preventive Initiative from the National Diabetes Education Program

- GDM imparts lifelong risk for diabetes, mostly type 2
- Modest weight loss and physical activity can delay or prevent type 2 diabetes.
- Offspring can lower risk of diabetes by eating healthy foods, being active and not becoming overweight.

Conservative recommendations to patients include:

- Let health care practitioners know of any history of GDM.
- Get glucose testing at 6 to 12 weeks postpartum, then every 1-2 years.
- Reach pre-pregnancy weight 6-12 months postpartum.
- If still overweight, lose at least 5 to 7% of weight slowly, over time, and keep it off.-

Adapted from the National Diabetes Education Program.

History of Preeclampsia

Definition/ cut-off value

History of diagnosed preeclampsia. Presence of condition diagnosed by a physician as self-reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under a physician's orders.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	VI

Justification

Preeclampsia is defined as pregnancy-induced hypertension (>140mm Hg systolic or 90mm Hg diastolic) with proteinuria developing usually after the twentieth week of gestation (1, 2). Clinical symptoms of preeclampsia may include: edema, renal failure, and the HELLP (Hemolysis, Elevated Liver enzymes and Low Platelets) syndrome.

Preeclampsia is a leading cause of maternal death and a major contributor to maternal and perinatal morbidity (3). Women who have had preeclampsia in a prior pregnancy have an increased risk of recurrence (about 20% overall) (4). The risk is greater in women who have had preeclampsia occurring early in pregnancy or who have had preeclampsia in more than one pregnancy. Additionally, maternal pre-pregnancy obesity with BMI > 30 is the most prevalent risk factor for preeclampsia (4).

Risk factors for preeclampsia include (2,4,5):

- Pre-pregnancy obesity BMI > 30
- Preeclampsia in a prior pregnancy
- Nulliparity (no prior delivery)
- Maternal age >35 years
- Endocrine disorders (e.g., diabetes); autoimmune disorders (e.g.,lupus); renal disorders
- Multi-fetal gestation
- Genetics
- Black race

There are few established nutrient recommendations for the prevention of preeclampsia. However, vitamin D may be important because it influences vascular structure and function, and regulates blood pressure (4). Also, calcium may prevent preeclampsia among women with very low baseline calcium intake (4).

There is no treatment for preeclampsia. The condition resolves itself only when the pregnancy terminates or a placenta is delivered (4). Early prenatal care, therefore, is vital to the prevention of the onset of the disease.

WIC is well poised to provide crucial strategies during the critical inter-conceptual period to help reduce the risk of recurrence of preeclampsia in a subsequent pregnancy.

WIC nutrition education encourages practices shown by research to have a protective effect against developing preeclampsia (2,4,5). These include:

- Gaining recommended weight based on pre-pregnancy BMI, in order to help return to a healthy post partum weight
- Scheduling early prenatal care visits
- Consuming a diet adequate in calcium and vitamin D
- Taking prenatal vitamins
- Engaging in regular physical activity
- Discontinuing smoking and alcohol consumption

Post-Partum Women: Women who have had preeclampsia should be advised that they are at risk for recurrence of the disease and development of cardiovascular disease (CVD) later in life (4,7). WIC nutrition education can emphasize measures that support the prevention of preeclampsia in a future pregnancy such as reaching or maintaining a healthy BMI and lifestyle between pregnancies, consuming a nutritionally adequate diet consistent with the Dietary Guidelines for Americans, and engaging in regular physical activity.

Pregnant Women: The WIC Program provides supplemental foods rich in nutrients, especially calcium and Vitamin D, which research has shown to have a protective effect on preeclampsia (4). During nutrition education, WIC can encourage actions or behaviors that also have been shown to have a protective effect against preeclampsia: early prenatal care, taking a prenatal vitamin, and engaging in physical activity (6). WIC can also discourage smoking and alcohol consumption (2) and counsel pregnant women to gain recommended weight based on pre-pregnancy BMI (8) and to return to pre-pregnancy weight or a healthy BMI of <25 for the benefit of future pregnancies.

Clarification

Self-reporting for "History of…" conditions should be treated in the same manner as self-reporting for current conditions requiring a physician's diagnosis, i.e., the applicant may report to the CPA that s/he was diagnosed by a physician with a given condition at some point in the past. As with current conditions, self-diagnosis of a past condition should never be confused with self-reporting.

History of Preterm Delivery

Definition/ cut-off value

Delivery of an infant born ≤ 36 weeks

Pregnant Women: any history of preterm delivery
Breastfeeding/Postpartum: most recent pregnancy

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	VI

Justification

Women with a history of preterm delivery have an increased risk of spontaneous preterm delivery in a subsequent pregnancy compared to women with no history of prior spontaneous preterm delivery (3). Prior spontaneous preterm delivery is highly associated with recurrence in subsequent pregnancies. A history of one previous preterm birth is associated with a recurrent risk of 17-37%; the risk increases with the number of prior preterm births and decreases with the number of term deliveries (4).

Typically a pregnancy lasts about 40 weeks. Premature or preterm birth, however, is defined as a birth that occurs between 20 and 37 weeks of pregnancy, according to the American College of Obstetricians and Gynecologists (ACOG) (5). In the past, the period from 3 weeks before until 2 weeks after the estimated date of delivery was considered a "term" pregnancy, with the expectation that a baby would have similar health outcomes if they were born any time during this interval. In 2013, ACOG released a committee opinion that the label "term" should be replaced with the designations *early term* (≥37 0/7 weeks and ≤38 6/7 weeks gestation) and *full term* (≥39 0/7 weeks and ≤40 6/7 weeks gestation) to more accurately describe these groups of infants (1).

Prematurity affects about 12% of all live births in the U.S., and about 50% of these preterm births were preceded by preterm labor (6). In 2011, the annual rate of premature births in the United States reached 11.7%, nearly two times the rate in European nations (6). Preterm births also account for approximately 70% of newborn deaths and 36% of infant deaths (5).

Despite advances in neonatal care, preterm birth remains a leading cause of infant death in the United States (7). More infants die from pre-term related problems than any other single cause (6). Preterm birth strains society's

healthcare resources due to its long-term effects on the health of the newborn (6). Premature infants may have physical problems that have nutritional implications, including immature sucking, swallowing and immature digestion and absorption of carbohydrates and lipids (7). Preterm infants are at risk for a number of illnesses/health conditions that range from minor to severe complications depending on the circumstances. (See risk 142 *Preterm or Early Term Delivery* for more details.)

Several factors have been found to increase the risk of preterm delivery. Epidemiologic studies have consistently reported low socioeconomic status, nonwhite race, maternal age of ≤ 18 years or ≥ 40 years, and low pre-pregnancy underweight as risk factors (4). Studies suggest even modest restrictions in maternal nutrition around the time of conception can lead to premature births and long-term adverse health effects for offspring (8). Other factors associated with a risk of preterm birth may be identified before pregnancy, at conception, or during pregnancy include (8, 9):

- Low maternal weight gain during pregnancy
- Maternal infections
- Maternal hypertension
- Gestational diabetes
- Smoking
- Indoor pollution
- Maternal stress
- Poor housing quality
- Teen pregnancy
- Sexually transmitted diseases
- Low psychosocial health status
- Previous or present pregnancy complications
- Multiple fetuses
- Lack of perceived social support

A recent study indicated that maternal obesity is also an independent risk factor for preterm delivery (10). Complications associated with obesity (BMI > 30) prior to conception that increase the risk for preterm delivery include (11):

- Gestational Diabetes Mellitus
- Hypertension
- Preeclampsia
- Cesarean Delivery
- Postpartum weight retention

Additional concerns related to obesity include potential intrapartum, operative, and postoperative complications and difficulties related to anesthesia

management. Obese women are also less likely to initiate and sustain breastfeeding (11).

Breastfeeding is recommended as the normative standard for infant feeding and nutrition for all infants, especially preterm babies. Breastfeeding preterm infants has been associated with positive health outcomes for these infants, including:

- Improved motor maturity and cognitive ability (12, 13, 14)
- Reduced risk of necrotizing enterocolitis (15, 16)
- Reduced risk of retinopathy of prematurity and retinal detachment (17)

Additionally, mothers of preterm infants produce milk that is designed to meet the baby's particular needs during the first few weeks of breastfeeding. It is higher in protein and minerals, such as salt, and contains different types of fat that the baby will be able to digest and absorb more easily compared to the milk of mothers of full term babies. The fat in human milk also helps to enhance the development of the baby's brain and neurologic tissues, which is especially important for premature infants. Human milk is also easier for babies to digest than formula and avoids exposing the baby's immature intestinal lining to the cow's milk proteins found in premature infant formula. Preterm infants who are breastfed are less likely to develop intestinal infections than babies who are formula fed, and the colostrum produced in the first few days contains high concentrations of antibodies that will also help the baby fight infection. (16)

Breastfeeding preterm infants, especially if they are in the NICU, may present unique challenges for breastfeeding dyads. These mothers will benefit from extra breastfeeding support due to the delay of direct breastfeeding, reliance on breast pumps, and the stress of having a sick newborn. Even if the baby cannot breastfeed directly from the breast at first, the mother can be encouraged to express her milk to ensure that her supply is maintained. Supportive care for infants in the NICU may include the use of a feeding tube. Expressed human milk can be passed through the tube, so it is important for the mother to discuss her feeding decisions with her baby's doctor.

Pregnant women who come from low or inadequate income households are at a greater risk for poor physical and mental health due to poor eating habits. WIC services may assist women at risk of preterm and early term births by providing them with proper nutrition.

Early prevention is the primary way to stop preterm labors. WIC can assist in reducing preterm deliveries by increasing prevention strategies. WIC can improve outcomes through:

- Recommending healthy maternal weight gain and providing nutrition education that addresses the WIC food package and other healthy foods that contribute to a balanced diet.
- Promoting early and regular prenatal care.

- Encouraging use of prenatal vitamins, as prescribed by the health care provider.
- Recommending adherence to Dietary Guidelines for Americans.

WIC staff may find the below listed resources helpful in providing nutrition counseling**:**

- *Additional Considerations for Some Adults-Physical Activity for Women During Pregnancy and the Postpartum Period*: http://health.gov/paguidelines/guidelines/chapter7.aspx.
- *Women, Infants, and Children-About WIC, How WIC Helps*: http://www.fns.usda.gov/wic/about-wic-how-wic-helps.
- *WIC Works Resource Systems*: https://wicworks.fns.usda.gov/.

History of Early Term Delivery

Definition/ cut-off value

Delivery of an infant born ≥ 37 and ≤ 38 weeks

Pregnant Women: any history of preterm delivery
Breastfeeding/Postpartum: most recent pregnancy

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	VI

Justification

Women with a history of preterm delivery have an increased risk of spontaneous preterm delivery in a subsequent pregnancy compared to women with no history of prior spontaneous preterm delivery (3). Prior spontaneous preterm delivery is highly associated with recurrence in subsequent pregnancies. A history of one previous preterm birth is associated with a recurrent risk of 17-37%; the risk increases with the number of prior preterm births and decreases with the number of term deliveries (4).

Typically a pregnancy lasts about 40 weeks. Premature or preterm birth, however, is defined as a birth that occurs between 20 and 37 weeks of pregnancy, according to the American College of Obstetricians and Gynecologists (ACOG) (5). In the past, the period from 3 weeks before until 2 weeks after the estimated date of delivery was considered a "term" pregnancy, with the expectation that a baby would have similar health outcomes if they were born any time during this interval. In 2013, ACOG released a committee opinion that the label "term" should be replaced with the designations *early term* (≥37 0/7 weeks and ≤38 6/7 weeks gestation) and *full term* (≥39 0/7 weeks and ≤40 6/7 weeks gestation) to more accurately describe these groups of infants (1).

Up to 10% of babies in the United States are scheduled for early term deliveries via labor-inducing medication or cesarean section before 39 weeks of gestation despite neither the mother nor the baby being at risk if the pregnancy continues (18). Elective deliveries like this are sometimes requested for reasons such as wanting to schedule the date of the infant's birth, physician preference, or for relief of symptoms at the end of the pregnancy (18).

Research shows that a fetus will experience a significant amount of development and growth of the lungs, brain, and liver between 37 and 39

weeks of gestation. The brain develops at its fastest rate at the end of the pregnancy, at a rate of up to one third between weeks 35 and 39. Additionally, layers of fat are added under the infant's skin during the last few weeks of pregnancy which helps them keep warm after birth. According to ACOG, non-medically warranted deliveries prior to 39 weeks should be avoided (19). Early term delivery puts an additional strain on society as the early term infant will likely require a longer hospital stay and may have long term healthcare needs (18). Factors that can increase the risk of a woman delivering an early term infant are the same and are stated above for preterm birth.

When a woman delivers an early term infant or chooses an early elective delivery, she is at increased risk for postpartum depression, cesarean delivery, and other complications requiring longer hospital stays (18). Steps pregnant women can take in order to decrease the prevalence of pre-term births include (18):

- Seek regular prenatal care throughout pregnancy.
- Maintain a healthy diet, including daily prenatal vitamins.
- Cease consumption of alcohol, drugs, or other dangerous toxins during pregnancy.
- Avoid stress.
- Contact their health care provider with all questions or concerns.

Implications for WIC Nutrition Services

Pregnant women who come from low or inadequate income households are at a greater risk for poor physical and mental health due to poor eating habits. WIC services may assist women at risk of preterm and early term births by providing them with proper nutrition.

Early prevention is the primary way to stop preterm labors. WIC can assist in reducing preterm deliveries by increasing prevention strategies. WIC can improve outcomes through:

- Recommending healthy maternal weight gain and providing nutrition education that addresses the WIC food package and other healthy foods that contribute to a balanced diet.
- Promoting early and regular prenatal care.
- Encouraging use of prenatal vitamins, as prescribed by the health care provider.
- Recommending adherence to Dietary Guidelines for Americans.

WIC staff may find the below listed resources helpful in providing nutrition counseling**:**

- *Additional Considerations for Some Adults-Physical Activity for Women During Pregnancy and the Postpartum Period*: http://health.gov/paguidelines/guidelines/chapter7.aspx.
- *Women, Infants, and Children-About WIC, How WIC Helps*: http://www.fns.usda.gov/wic/about-wic-how-wic-helps.
- *WIC Works Resource Systems*: https://wicworks.fns.usda.gov/.

History of Low Birth Weight

Definition/ cut-off value

Birth of an infant weighing □≤ 5 lb. 8 oz (≤□ 2500 grams)

Pregnant Women: any history of low birth weight
Breastfeeding/Postpartum: most recent pregnancy

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	VI

Justification

A woman's history of a delivery of a low birth weight (LBW) baby is the most reliable predictor for LBW in her subsequent pregnancy (1). The risk for LBW is 2-5 times higher than average among women who have had previous LBW deliveries and increases with the number of previous LBW deliveries (1). This is true for histories in which the LBW was due to premature birth, fetal growth restriction (FGR) or a combination of these factors. The extent to which nutritional interventions (dietary supplementation and counsel) can decrease risk for repeat LBW, depends upon the relative degree to which poor nutrition was implicated in each woman's previous poor pregnancy outcome. Nutritional deficiencies and excesses have been shown to result in LBW and pregnancy loss. The pregnant woman's weight gain is one of the most important correlates of birth weight and of FGR (2, 3).

History of Spontaneous Abortion, Fetal or Neonatal Loss

Definition/ cut-off value

A spontaneous abortion (SAB) is the spontaneous termination of a gestation at < 20 weeks gestation or < 500 grams.
Fetal death is the spontaneous termination of a gestation at □ ≥ 20 weeks
Neonatal death is the death of an infant within 0-28 days of life.

Pregnant women: any history of fetal or neonatal death or 2 or more spontaneous abortions.
Breastfeeding women: most recent pregnancy in which there was a multifetal gestation with one or more fetal or neonatal deaths but with one or more infants still living
Non-Breastfeeding: most recent pregnancy

Presence of condition diagnosed by a physician as self reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	VI

Justification

Previous fetal and neonatal deaths are strongly associated with preterm low birth weight (LBW) and the risk increases as the number of previous poor fetal outcomes goes up (1,2).

Spinnillo et al found that the risk for future small for gestational age outcomes increased two fold if a woman had 2 or more SAB. Adverse outcomes related to history of SAB include recurrent SAB, low birth weight (including preterm and small for gestational age infants), premature rupture of membranes, neural tube defects and major congenital malformations. Nutrients implicated in human and animal studies include energy, protein, folate, zinc, and vitamin A.

Postpartum women:

A SAB has been implicated as an indicator of a possible neural tube defect in a subsequent pregnancy. Women who have just had a SAB or a fetal or neonatal death should be counseled to increase their folic acid intake and delay a subsequent pregnancy until nutrient stores can be replenished.

The extent to which nutritional interventions (dietary supplementation and counseling) can decrease the risk for repeat poor pregnancy outcomes, depends upon the relative degree to which poor nutrition was implicated in each woman's previous poor pregnancy outcome. WIC Program clients receive foods and services that are relevant and related to ameliorating adverse pregnancy outcomes. Specifically, WIC food packages include good sources of implicated nutrients. Research confirms that dietary intake of nutrients provided by WIC foods improve indicators of nutrient status and/or fetal survival in humans and/or animals.

Pregnancy at a Young Age

Definition/ cut-off value

Conception ≤ 17 years of age.

Pregnant Women: current pregnancy
Breastfeeding/Postpartum: most recent pregnancy

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	VI

Justification

Pregnancy before growth is complete is a nutritional risk because of the potential for competition for nutrients for the pregnancy needs and the woman's growth.

The pregnant teenager is confronted with many special stresses that are superimposed on the nutritional needs associated with continued growth and maturation.

Younger pregnant women of low socioeconomic status tend to consume less than recommended amounts of protein, iron, and calcium, and are more likely to come into pregnancy already underweight. Pregnant teens who participate in WIC have been shown to have an associated increase in mean birth weight and a decrease in LBW outcomes.

Adolescent mothers frequently come into pregnancy underweight, have extra growth related nutritional needs, and because they often have concerns about weight and body image, are in need of realistic, health promoting nutrition advice and support during lactation. Diets of adolescents with low family incomes typically contain less iron, and less vitamin A than are recommended during lactation.

The adolescent mother is also confronted with many special stresses superimposed on the normal nutritional needs associated with continued growth. Nutrition status and risk during the postpartum period follow from the nutritional stresses of the past pregnancy, and in turn have an impact on nutrition related risks in subsequent pregnancies. Poor weight gain and low intakes of a variety of nutrients are more common in pregnant adolescents. Therefore, participation in the WIC Program should be of substantial benefit.

Short Interpregnancy Interval

Definition/ cut-off value

Short Interpregnancy Interval (IPI), formerly known as Closely Spaced Pregnancies, is defined as an interpregnancy interval of less than 18 months from the date of a live birth to the conception of the subsequent pregnancy for the following:

Pregnant Women: current pregnancy
Breastfeeding/Non-Breastfeeding: most recent pregnancy

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	VI

Justification

Adverse maternal and infant health outcomes have been associated with short Interpregnancy Intervals (IPIs). While there is no standard definition for short IPI, an IPI less than 18 months has been associated with increased risk for adverse outcomes (1, 2). An interval of 18 to 24 months has been associated with the lowest relative risk (2). Evidence associated with the lowest relative risk for an IPI following a miscarriage or abortion is still unclear (see Clarification Section for more information) therefore only health effects associated with a short IPI following a live birth were reviewed for this criterion.

Historically, the World Health Organization (WHO) and other international authorities had recommended at least 2-3 years between pregnancies and the United States Agency for International Development (USAID) had suggested an interval of 3-5 years. Given the inconsistency, various countries and regional programs requested the WHO to further review the research and provide recommendations. As a result, the report from the 2005 WHO Technical Consultation and Scientific Review of Birth Spacing recommended an interval of at least 24 months after a live birth to reduce the risk of adverse maternal, perinatal, and infant outcomes. (3). A more recent review of data suggests that there are increased risks for adverse perinatal and maternal outcomes with an IPI less than 18 months (1, 2 ,4) and increased risks for perinatal (1, 4) and maternal (4, 5, 6) outcomes longer than 59 months while 18 to 24 months was associated with the lowest relative risk (2). Parallel to recent findings, Healthy People 2020 has proposed a 10% improvement in reducing the proportion of pregnancies conceived within 18 months of a previous birth (7).

Outcomes associated with short IPI have included maternal complications such as uterine rupture in women attempting a vaginal birth after a previous cesarean delivery (also referred to as VBAC) (8, 9); and perinatal and neonatal complications such as preterm birth (1, 2, 10), low birth weight (1, 2), small for gestational age (1, 2), birth defects (11), and autism (12, 13).

Short interpregnancy interval has been identified as a risk for increasing uterine rupture in women attempting a VBAC delivery (8, 9, 14). Yet when comparing short interpregnancy interval to labor type – induced labor and spontaneous, there was a decrease rate in VBAC success in women who were induced, and no difference with spontaneous labor (15). Given the lack of a specific IPI recommendation for women with a previous cesarean delivery and the inconsistencies in study designs there appears to be no specific guidelines for interval length after a cesarean delivery (16). The short interpregnancy interval definition cutoff of 18 months, however, appears to be inclusive of women who delivered by cesarean with their previous pregnancy.

Factors contributing to adverse outcomes and short IPI remain controversial. It was thought that socioeconomic factors contributed to adverse outcomes. However, when controlled for possible cofounders, short IPI remained an independent risk factor (1, 2). Nutrition-related hypothetical causal mechanisms have been proposed to explain the effects short IPIs have on health, yet research remains inconclusive (4). The Maternal Depletion Syndrome hypothesized that mothers who have a short IPI often do not have adequate time to replenish macro- and micro-nutrients which may lead to the mother and fetus competing for nutrients (17). However, a recent systematic review of the literature found no evidence to support this hypothesis (4). Studies to support the folate depletion theory have had differing results (11, 18). When folate intake is inadequate, concentrations begin to decrease in the fifth month of pregnancy and for several weeks after birth (19). Women who did not take folic acid supplementation during pregnancy, compared to women who did, were at greater risk of fetal growth restriction with a short (less than six months) IPI and, this risk was found to decrease as IPI increased (18). Of interest, a retrospective Canadian study of 46,243 women found an association between IPI (less than six months) and folate-independent anomalies, however not for folate-dependent anomalies such as neural tube defects, cleft lip and palate, and cardiovascular defects (11). In addition, the association between short IPI and anemia was found inconclusive (2).

Findings from a small pilot study found coordination of primary health care and social support services reduced adverse pregnancy outcomes and the average number of pregnancies conceived within 18 months among low-income African-American who previously delivered a very low birth weight baby (20). Results from a 2007 U.S. survey found that among women of childbearing age, those aged 18-24 years were the least aware of the need for folic acid prior to pregnancy and least likely to report daily use of supplements containing folic acid. Of equal concern, only 17% of women aged 18-24 years were likely to hear about folic acid from their healthcare provider. (21)

Initiations of healthcare referrals for family planning, early prenatal care, and folic acid supplementation have the potential to improve health outcomes for

women, infants, and children. Given that half of all pregnancies nationwide are unintended (22), WIC can help to reduce the risk of adverse pregnancy outcomes by:

- Encouraging postpartum women and their partner to meet with their healthcare provider to discuss developing a reproductive plan and birth spacing, as appropriate. http://www.cdc.gov/preconception/documents/rlphealthproviders.pdf
- Encouraging folic acid supplementation. http://www.cdc.gov/features/folicacidbenefits/
- Encouraging healthful eating patterns consistent with the Dietary Guidelines for Americans. http://www.cnpp.usda.gov/DietaryGuidelines

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Study results for an optimal Interpregnancy Interval (IPI) following a termination or miscarriage have been inconsistent (3, 10, 23, 24). The WHO Technical Consultation on Birth Spacing Report recommended a minimum interval of at least six months between a miscarriage or induced abortion and the next pregnancy. This recommendation was based on a large retrospective cross-sectional study, a review of 258,108 hospital records from several Latin American countries between 1985-2002, that found women whose previous pregnancy resulted in a spontaneous or induced abortion and had an IPI shorter than 6 months had an increased risk for adverse maternal and perinatal outcomes (21). Given several limitations in the study the WHO cautioned against generalizing the results to other regions or even within the Latin American region since service operations and conditions may differ from the study sample (3). However, more recently a review of approximately a million California births found a decreased risk for preterm birth for women with an IPI of less than six months after a terminated pregnancy (10). An overview of the research found that there may be little benefit from delaying pregnancy after an uncomplicated miscarriage, and to that end pregnancy spacing recommendations following a miscarriage should be individually tailored to the person. (25)

High Parity and Young Age

Definition/ cut-off value

Women under age 20 at date of conception who have had 3 or more previous pregnancies of at least 20 weeks duration, regardless of birth outcome.

Pregnant Women: current pregnancy
Breastfeeding/Postpartum: most recent pregnancy

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	VI

Justification

The IOM Report (p. 204) states, "empirical evidence on the interactions of high parity with both age and short interpregnancy interval does suggest significant [nutritional] risks associated with high parity at young ages and high parity with short interpregnancy intervals (1)."

Since factors such as adolescent pregnancy (<18 years of age) and short interpregnancy interval are used independently as risk criteria, women with such risks would be eligible for participation in WIC. Studies by Kramer (1987) and MacLeod & Kiely (1988) (pg. 202) show that "multiparity increases the risk of low birth weight (LBW) for women under age 20." Kramer further reports "multiparity has little effect for women age 20-34 years and decreases for women over age 35." These studies demonstrate the risk of delivering LBW babies for women under the age of 20 years. Thus, low birth weight increases the likelihood of physical and mental developmental deficiencies among surviving infants, and even a higher incidence of infant death.

Lack of or Inadequate Prenatal Care

Definition/ cut-off value

Prenatal care beginning after the 1st trimester (after 13th week), or based on an Inadequate Prenatal Care Index published in a peer reviewed article such as the one by Kessner et al. (3):

First prenatal visit in the third trimester (7-9 months) or:

Weeks of gestation	Number of prenatal visits
14-21	0 or unknown
22-29	1 or less
30-31	2 or less
32-33	3 or less
34 or more	4 or less

Participant category and priority level

Category	Priority
Pregnant Women	I

Justification

Women who do not receive early and adequate prenatal care are more likely to deliver premature, growth retarded, or low birth weight infants (2). The Kessner Index can be used to assess the adequacy of prenatal care for a woman with an uncomplicated pregnancy. Women with medical or obstetric problems, as well as younger adolescents, may need closer management; the frequency of prenatal visits should be determined by the severity of identified problems (1). Several studies have reported significant health and nutrition benefits for pregnant women enrolled in the WIC Program (2).

Multifetal Gestation

Definition/ cut-off value

More than one (>1) fetus in a current pregnancy (Pregnant Women) or the most recent pregnancy (Breastfeeding and Non-Breastfeeding Women).

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	VI

Justification

Multi-fetal gestations are associated with low birth weight, fetal growth restriction, placental and cord abnormalities, preeclampsia, anemia, shorter gestation and an increased risk of infant mortality. Twin births account for 16% of all low birth weight infants. The risk of pregnancy complications is greater in women carrying twins and increases markedly as the number of fetuses increases. (1, 2)

For twin gestations, the 2009 IOM recommendations provide provisional guidelines: normal weight women should gain 37-54 pounds; overweight women, 31-50 pounds; and obese women, 25-42 pounds (3). There was insufficient information for the IOM committee to develop even provisional guidelines for underweight women with multiple fetuses. A consistent rate of weight gain is advisable. A gain of 1.5 pounds per week during the second and third trimesters has been associated with a reduced risk of preterm and low-birth weight delivery in twin pregnancy (2). In triplet pregnancies the overall gain should be around 50 pounds with a steady rate of gain of approximately 1.5 pounds per week throughout the pregnancy (2). Education by the WIC nutritionist should address a steady rate of weight gain that is higher than for singleton pregnancies.

Pregnant or breastfeeding women with twins have greater requirements for all nutrients than women with only one infant. Postpartum, non-breastfeeding women delivering twins are at greater nutritional risk than similar women delivering only one infant. All three groups of women would benefit greatly from the nutritional supplementation provided by the WIC Program.

Fetal Growth Restriction

Definition/ cut-off value	Fetal Growth Restriction (FGR) (replaces the term Intrauterine Growth Retardation (IUGR)), may be diagnosed by a physician with serial measurements of fundal height, abdominal girth and can be confirmed with ultrasonography. FGR is usually defined as a fetal weight < 10th percentile for gestational age. Presence of condition diagnosed by a physician as self reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Participant category and priority level

Category	Priority
Pregnant Women	I

Justification

Fetal Growth Restriction (FGR) usually leads to low birth weight (LBW) which is the strongest possible indicator of perinatal mortality risk. Severely growth restricted infants are at increased risk of fetal and neonatal death, hypoglycemia, polycythemia, cerebral palsy, anemia, bone disease, birth asphyxia, and long term neurocognitive complications. FGR may also lead to increased risk of ischemic heart disease, hypertension, obstructive lung disease, diabetes mellitus, and death from cardiovascular disease in adulthood. FGR may be caused by conditions affecting the fetus such as infections and chromosomal and congenital anomalies. Restricted growth is also associated with maternal height, prepregnancy weight, birth interval, and maternal smoking. WIC's emphasis on preventive strategies to combat smoking, improve nutrition, and increase birth interval, may provide the guidance needed to improve fetal growth.

History of Birth of a Large for Gestational Age Infant

Definition/ cut-off value

Pregant Women: Any history of giving birth to an infant weighing greater than or equal to 9 lbs. (4000 grams).
Breastfeeding/Non-Breastfeeding Women: Most recent pregnancy, or history of giving birth to an infant weighing greater than or equal to 9 lbs. (4000 grams).

Presence of condition diagnosed by a physician as self reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	III, IV, V, or VI

Justification

Women with a previous delivery of an infant weighing greater than 9 lbs. (4000 grams) are at an increased risk of giving birth to a large for gestational age infant (1). Macrosomia may be an indicator of maternal diabetes (current or gestational) or a predictor of future diabetes (2).

The incidence of maternal, fetal, and neonatal complications is high with neonates weighing greater than 9 lbs. (4000 grams). Risks for the infant include dystocia, meconium aspiration, clavicular fracture, brachia plexus injury, and asphyxia (3).

Clarification

Self-reporting for “History of…”conditions should be treated in the same manner as self-reporting for current conditions requiring a physicians diagnosis, i.e., the applicant may report to the CPA that s/he was diagnosed by a physician with a given condition at some point in the past. As with current conditions, self-diagnosis of a past condition should never be confused with self-reporting.

Pregnant Woman Currently Breastfeeding

Definition/ cut-off value	Breastfeeding woman now pregnant.	
Participant category and priority level	**Category**	**Priority**
	Pregnant Women	I
Justification	Breastfeeding during pregnancy can influence the mother's ability to meet the nutrient needs of her growing fetus and nursing baby. Generally, pregnancy hormones cause the expectant mother's milk supply to drastically decline (until after delivery). If the mother conceived while her nursing baby was still solely or predominantly breastfeeding, the baby could fail to receive adequate nutrition. In addition to changes in milk volume and composition, mothers who breastfeed throughout a pregnancy usually report that their nipples, previously accustomed to nursing, become extremely sensitive (presumably due to pregnancy hormones). When women nurse through a pregnancy it is possible that oxytocin released during breastfeeding could trigger uterine contractions and premature labor. When a mother chooses to nurse through a pregnancy, she needs breastfeeding counseling.	

History of Birth with Nutrition Related Congenital or Birth Defect

Definition/ cut-off value

A woman who has given birth to an infant who has a congenital or birth defect linked to inappropriate nutritional intake, e.g., inadequate zinc, folic acid, excess vitamin A.

Pregnant Women: any history of birth with nutrition-related congenital or birth defect
Breastfeeding/Postpartum: most recent pregnancy

Presence of condition diagnosed by a physician as self reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	VI

Justification

The single greatest risk factor for a pregnancy with a neural tube defect is a personal or family history of such a defect. More than 50% of recurrences can be prevented by taking folic acid before conception. Recent studies suggest that intake of folic acid may also be inversely related to the occurrence of cleft lip and palate. The WIC Program provides nutrition education and folic acid-rich foods to women to help prevent future birth defects.

Recurrent birth defects can also be linked to other inappropriate nutritional intake prior to conception or during pregnancy, such as inadequate zinc (LBW) or excess vitamin A (cleft palate or lip). The food package and nutrition education provided to WIC participants help women at risk make food choices that provide appropriate nutrient levels.

Nutrient Deficiency or Disease

Definition/ cut-off value

Any currently treated or untreated nutrient deficiency or disease. These include, but are not limited to, Protein Energy Malnutrition, Scurvy, Rickets, Beriberi, Hypocalcemia, Osteomalacia, Vitamin K Deficiency, Pellagra, Xerophthalmia, and Iron Deficiency.

Presence of condition diagnosed, documented, or reported by a physician or someone working under a physician's orders, or as self-reported by applicant/participant/caregiver. See Clarification for more information about self-reporting a diagnosis.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	III
Infants	I
Children	III

Justification

Nutrient deficiencies or diseases can be the result of poor nutritional intake, chronic health conditions, acute health conditions, medications, altered nutrient metabolism, or a combination of these factors, and can impact the levels of both macronutrients and micronutrients in the body. They can lead to alterations in energy metabolism, immune function, cognitive function, bone formation, and/or muscle function, as well as growth and development if the deficiency is present during fetal development and early childhood.

The Centers for Disease Control and Prevention (CDC) estimates that less than 10% of the United States population has nutrient deficiencies; however, nutrient deficiencies vary by age, gender, and/or race and ethnicity (1). For certain segments of the population, nutrient deficiencies may be as high as one third of the population (1).

Intake patterns of individuals can lead to nutrient inadequacy or nutrient deficiencies among the general population. Intakes of nutrients that are routinely below the Dietary Reference Intakes (DRI) can lead to a decrease in how much of the nutrient is stored in the body and how much is available for biological functions. DRIs are based on age and sex and include Recommended Dietary Allowance (RDA), Adequate Intake (AI), Estimated Average Requirement (EAR) and Tolerable Upper Intake Level (UL). DRIs are established by the National Academies of Science, Engineering and Medicine and include the following definitions:

- RDA - Indicates the average daily intake of particular nutrients to meet the requirements of 97-98% of healthy people.
- AI - Established to assume adequate intake when there is insufficient evidence to develop an RDA.
- EAR - The average daily intake of a nutrient that is thought to meet the needs of 50% of healthy individuals. EARs are used to assess the adequacy of nutrient intakes among populations rather than the individual.
- UL - The highest nutrient intake that is considered to be safe and does not lead to adverse health effects in the general population (2).

Macronutrient deficiencies include deficiencies in protein, fat, and/or calories, and can lead to stunting, pronounced wasting (marasmus) or a disproportionately large abdomen (a sign of kwashiorkor). Marasmus is a disease of severe wasting due to a prolonged inadequate intake of protein, carbohydrate, and fat. Kwashiorkor is a disease that results from a prolonged inadequate intake of protein. Essential fatty acid deficiencies, which would include omega-3 fatty acid deficiency, are thought to be rare among the general population (3, 4). Signs of an essential fatty acid deficiency may include a dry scaly rash, decreased growth in infants and children, lowered immune response, and impaired wound healing (3).

Micronutrient deficiencies would include deficiencies in vitamins and minerals in the body. According to National Health and Nutrition Examination Survey (NHANES) data, the most common nutrient deficiencies from 2003-2006 in the general United States population were vitamin B6, iron, vitamin D, vitamin C, and vitamin B12 (1). Because NHANES does not assess the status of all vitamins and minerals, there may be other micronutrient deficiencies that are present in the population without an estimated prevalence.

According to NHANES data from 2005-2012, a significant proportion of women who participate in WIC have inadequate nutrient intakes of vitamin E (96-100%). Additionally, greater than 50% of pregnant women participants reported inadequate intakes of iron and between 10-50% reported inadequate intakes of magnesium, folate, zinc, vitamin A, vitamin C, and vitamin B6 (5). Micronutrient deficiencies during pregnancy are not only a concern for the mother, but are of great concern to the developing fetus that is at risk of certain birth defects related to inadequate levels of certain nutrients including B vitamins, vitamin K, magnesium, copper, and zinc (6). Iodine deficiency during pregnancy can lead to irreversible adverse effects on fetal growth and development. Iodine deficiency is the leading cause of intellectual disability worldwide. According to NHANES data from 2005-2008, 56.9% of the pregnant women surveyed had urinary iodine concentrations below the established threshold of 150mcg/L. This finding suggests that greater than half of pregnant women have insufficient intakes of iodine (7). Because intake patterns of pregnant women can exclude or limit specific food groups, it is not uncommon to have multiple nutrient deficiencies during pregnancy (8). For example, iron deficiency usually does not occur alone, but it often occurs in conjunction with other vitamin and mineral deficiencies (9).

Intakes of nutrients were also found to be low among postpartum and breastfeeding women participating in WIC. Among women who were

breastfeeding and participating in WIC, more than 50% had inadequate intakes of vitamin A, and 10-50% had inadequate intakes of magnesium, zinc, vitamin C, vitamin B6, folate, copper, and calcium (5). Greater than 50% of postpartum women who were not breastfeeding were found to have inadequate intakes of magnesium, vitamin A, and calcium, while 10-50% had inadequate intakes of vitamin C, folate, copper, zinc, thiamin, vitamin B6, vitamin B12, iron, and riboflavin (5).

According to NHANES data from 2011-2012, formula fed infants had an average usual intake of choline that was below the AI for that nutrient; however, intakes of other vitamins and minerals were estimated to be adequate (5). Intakes of vitamin D, iron, and zinc among breastfed infants can be of concern if appropriate and timely complementary foods and/or vitamin and mineral supplements are not provided to the infant. According to NHANES data from 2009-2012, at least 10% of infants receiving human milk between 6 and 12 months of age had inadequate intakes of iron and zinc (5). Concentrations of vitamin D in human milk have been found to be low. Therefore, it has been recommended by the American Academy of Pediatrics (AAP) to provide all infants who are taking less than 32 ounces of formula a day a vitamin D supplement of 400 IU daily (10, 11). Additionally, infants who are born to mothers who are vitamin D deficient are more likely to be deficient themselves. (For more information see risk 411 Inappropriate Nutrition Practices for Infants.)

For children participating in the WIC program, the prevalence of inadequate intakes of nutrients was found to be less than 5% for each nutrient, except vitamin E, which was found to be inadequate in the diets of 34.9% of children between 2 and 5 years of age (5). Additionally, it has been estimated that one in four children does not meet the RDA for iron, and one in ten does not meet the RDA for calcium (12).

In addition to health risks associated with low nutrient status, some micronutrients pose a health risk at levels higher than the established UL. For this reason, individuals with nutrient deficiency diseases, or who are concerned that they may have a nutrient deficiency disease, should be followed by their medical provider (especially if supplements are required for treatment).

Populations who may be at greater risk of nutrient deficiencies or diseases include:

- Individuals who have intakes below the established RDA, AI, or EAR for the nutrient.
- Individuals who experience food insecurity.
- Individuals who are experiencing homelessness.
- Women who have a short interpregnancy interval.
- Individuals who have recently left their previous country of residence.
- People with a gastrointestinal disease that can limit absorption of nutrients (i.e. celiac disease or Crohn's disease) or individuals with a history of gastrointestinal surgery (including gastric bypass). For example, individuals who have had a portion of their stomach removed or their distal ileum removed during a weight-loss or other surgery are at a greater risk of developing a vitamin B12 deficiency (13).

- Individuals with other medical conditions that influence nutrient status (i.e. cystic fibrosis, renal disease, genetic disorders).
- Individuals on medications that are known to interact with the absorption or excretion of certain vitamins and minerals.
- People with substance use disorders (including alcohol) may be more likely to have deficiencies due to poor intake and/or the effects of the substance. People who have high intakes of alcohol are at greater risk of developing a magnesium deficiency (14, 15).
- People who smoke are more likely to have a vitamin C deficiency due to the increase in oxidative stress.

Nutrient deficiencies or diseases can be subclinical or clinical. Subclinical deficiencies involve changes to the concentrations of the micronutrient in the blood or tissues. Clinical deficiencies involve noticeable changes to the appearance of skin, nails, hair, oral cavity, and bone formation as well as major disturbances in the function of cells and tissues in the body. At either stage of a nutrient deficiency, blood work is often taken to confirm a deficiency. Blood work to detect nutrient deficiencies can be misleading, as some nutrients, such as magnesium, may have an overall deficiency in the body but be at a normal level in the blood (15). Other methods can be used to assess for nutrient deficiency disease, such as a physical nutrition assessment. Because it can be difficult to be tested for, and diagnosed with, a nutrient deficiency or a nutrient deficiency disease can go undetected and untreated.

The table below provides information regarding specific nutrients that are more commonly of concern among the WIC population; however, additional nutrient deficiency diseases may occur in the population. Detailed fact sheets about each nutrient can be found at the National Institutes of Health Office of Dietary Supplements website: https://ods.od.nih.gov/factsheets/list-all/.

Nutrient	Function	Signs and Symptoms of Deficiency
Vitamin A	Involved in immune function, vision, cell growth and cell communication.	Night blindness and xerophthalmia (16).
Vitamin B6	Involved in greater than 100 enzyme reactions in the body and involved in protein metabolism.	Microcytic anemia, scaling of the lips and cracks in the corners of the mouth, swollen tongue, depression, and confusion (17).
Vitamin B12	Involved in red blood cell formation, neurological function, and DNA synthesis.	Megaloblastic anemia, fatigue, weakness, constipation, loss of appetite, and weight loss (13).
Vitamin C	Involved in the formation of collagen, certain neurotransmitters, and protein synthesis.	Development of scurvy which would include: fatigue, inflammation of the gums, and weakened connective tissue (14).

Vitamin D	Promotes calcium absorption and proper bone formation, involved in cell growth, immune function, and reduces inflammation.	Development of rickets in children or osteomalacia in adults, and fatigue (18).
Calcium	Involved in muscle function, nerve transmission, and proper bone formation.	Development of osteoporosis (19).
Folate	Involved in the synthesis of RNA and DNA and is required for cell division and the prevention of Neural Tube Defects.	Megaloblastic anemia (20).
Iodine	A component of thyroid hormones that regulate protein synthesis, metabolism, and enzyme activity.	Stunted growth and neurodevelopmental deficits (7).
Iron	A component of hemoglobin and therefore important in the transfer of oxygen from the lungs to organs, and involved in the synthesis of hormones as well as normal growth and development.	Microcytic, hypochromic anemia; impaired cognitive function, poor body temperature regulation, depressed immune function, and spoon like shape of nails (9).
Magnesium	Involved in more than 300 enzyme reactions, protein synthesis, muscle function, nerve function, blood sugar control, and blood pressure control.	Loss of appetite, fatigue, weakness, nausea, vomiting, numbness, tingling, muscle cramps, seizures, personality changes, and abnormal heart rhythms (15).
Zine	Involved in cell metabolism, enzyme activity, immune function, protein synthesis, wound healing, DNA synthesis, and cell division.	Stunted growth, depressed immune function, hair loss, eye and skin lesions, delayed wound healing, and taste alterations (21).

Implications for WIC Nutrition Services

The WIC food package is designed to include foods that contain specific nutrients to improve the health status of program participants, address inadequate intakes, and, ultimately, prevent nutrient deficiencies. Nutrition education combined with the WIC food package can help decrease the likelihood that an individual would develop a nutrient deficiency or disease. For individuals who currently have a nutrient deficiency or disease, WIC staff can:

- Encourage improved intake of whole grains, legumes, dairy, lean protein, fruits, and vegetables.

- Emphasize appropriate portion size and variety to avoid nutrient to nutrient interaction. (For example, excessive calcium intake inhibits the absorption of iron.)
- Provide education on foods that contain the specific nutrient(s) of concern.
- Provide education on preparing foods that are part of the WIC food package.
- Refer individuals who report food insecurity to appropriate resources in the community like the Supplemental Nutrition Assistance Program (SNAP) and/or food pantries.
- Reinforce the medical and dietary treatment plans provided by the medical provider, and refer participants to medical providers for medical follow-up care.
- Refer individuals who smoke to tobacco cessation programs.

Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Gastro-Intestinal Disorders

Definition/ cut-off value

Diseases and/or conditions that interfere with the intake, digestion, and/or absorption of nutrients. The diseases and/or conditions include, but are not limited to:

- gastroesophageal reflux disease (GERD)
- peptic ulcer
- post-bariatric surgery
- short bowel syndrome
- inflammatory bowel disease, including ulcerative colitis or Crohn's disease
- liver disease
- pancreatitis
- biliary tract diseases

Presence of gastrointestinal disorders diagnosed by a physician, as self-reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	III
Infants	I
Children	III

Justification

Gastrointestinal disorders increase nutritional risk in a number of ways, including restricted food intake, abnormal deglutition, impaired digestion of food in the intestinal lumen, generalized or specific nutrient malabsorption, or excessive gastrointestinal losses of endogenous fluids and nutrients. Frequent loss of nutrients through vomiting, diarrhea, malabsorption, or infections can result in malnourishment and lowered disease resistance (1, 2). Nutrition management plays a prominent role in the treatment of gastrointestinal disorders.

Gastroesophageal Reflux Disease (GERD) GERD is irritation and inflammation of the esophagus due to reflux of gastric acid into the esophagus (3). Nutritional care of GERD includes avoiding eating within 3 hours before going to bed; avoiding fatty foods, chocolate, peppermint, and spearmint, which may relax the lower esophageal sphincter; and coffee and alcoholic beverages, which may increase gastric secretion (4). Consumption of these items may need to be limited depending on individual tolerance.

Peptic Ulcer Peptic ulcer normally involves the gastric and duodenal regions of the gastrointestinal tract (4). Because the primary cause of peptic ulcers is Helicobacter pylori infection, the focus of treatment is the elimination of the bacteria with antibiotic and proton pump inhibitor therapy. Dietary advice for persons with peptic ulcers is to avoid alcohol, coffee (with and without caffeine), chocolate, and specific spices, such as black pepper (4, 5).

Post-bariatric Surgery Many types of surgical procedures are used for the intervention of morbid obesity. These procedures promote weight loss by restricting dietary intakes, e.g., adjustable gastric banding (AGB), and/or bypassing some portion of intestine to cause incomplete digestion and/or malabsorption of nutrients, e.g., Roux-y gastric bypass (RYGB). Therefore, the risks for developing nutritional deficiencies after bariatric surgery are greatly increased. Since gastric bypass individuals have both a decreased availability of gastric acid and intrinsic factor, vitamin B12 deficiency can develop without supplementation. Taking daily nutritional supplements and eating foods high in vitamins and minerals are important aspects of the nutritional management for the individuals who have had bariatric surgery (6).

Short Bowel Syndrome (SBS) SBS is the result of extensive small bowel resection. SBS in infants is mostly the result of small bowel resection for the treatment of congenital anomalies, necrotizing enterocolitis, and congenital vascular. In adults, Crohn's disease, radiation enteritis, mesenteric vascular accidents, trauma, and recurrent intestinal obstruction are the most common conditions treated by small bowel resection and resulting in SBS (4). The loss of a large segment of the small bowel causes malabsorption syndrome. Total parenteral nutrition usually is started within the first few days after intestinal resection. Gradual supplementation with enteral feeding promotes intestinal adaptation in order to wean from parenteral nutrition therapy. Supplementation with fat soluble vitamins and vitamin B12 may be needed (7). The pediatric client’s nutritional status must be assessed and growth closely monitored (8).

Inflammatory Bowel Disease (IBD) Inflammatory bowel disease includes Crohn’s disease and ulcerative colitis. Weight loss, growth impairment, and malnutrition are the most prevalent nutritional problems observed in IBD. Nutritional support is essential. Exclusive elemental nutrition has been used in attaining the remission of Crohn’s disease. However, symptoms tend to recur promptly after resuming the conventional diet (9).

Liver Disease Since the liver plays an essential role in the metabolic processes of nutrients, liver disorders have far-reaching effects on nutritional status. Acute liver injury is often associated with anorexia, nausea and vomiting. Therefore, inadequate nutritional intakes are common. Decreased bile salt secretion is associated with the maldigestion and impaired absorption of fat and fat-soluble vitamins. Defects in protein metabolism

associated with chronic liver failure include decreased hepatic synthesis of albumin, coagulation factors, urea synthesis and metabolism of aromatic amino acids. For nutritional therapy, an important consideration should be the balance between preventing muscle wasting and promoting liver regeneration without causing hepatic encephalopathy. It is recommended that persons with chronic liver disease consume the same amount of dietary protein as that required by normal individuals (0.74g/kg) (10).

Pancreatic Disease In chronic pancreatitis, there is a reduced secretion of pancreatic enzymes leading to malabsorption. In severe cases, tissue necrosis can occur. It is suggested that for patients with pancreatitis, a high carbohydrate, low-fat, low protein diet may be helpful (11).

Biliary Tract Diseases
Common diseases of the biliary tract are:

- cholelithiasis (gallstones, without infection)
- choledocholithiasis (gallstone in the bile duct causing obstruction, pain and cramps)
- cholecystitis (inflammation of gallbladder caused by bile duct obstruction).

Obesity or severe fasting may increase risk for these disorders. Since lipids stimulate gallbladder contractions, a low fat diet with 25% to 30% of total calories as fat is recommended. Greater fat limitation is undesirable as some fat is required for stimulation and drainage of the biliary tract. Supplementation with fat-soluble vitamins may be needed for persons with fat malabsorption or a chronic gall bladder condition (12).

WIC nutritionists can provide counseling to support the medical nutrition therapy given by clinical dietitians, and monitor compliance with therapeutic dietary regimens. They can also review and provide WIC-approved medical foods or formulas prescribed by the health care providers. In certain circumstances, WIC staff may recommend an appropriate medical food or formula to the health care provider. They should also make referrals to an appropriate health care provider for medical nutrition therapy by a clinical dietitian when indicated.

Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Diabetes Mellitus

Definition/ cut-off value

Diabetes mellitus consists of a group of metabolic diseases characterized by inappropriate hyperglycemia resulting from defects in insulin secretion, insulin action or both (1).

Presence of diabetes mellitus diagnosed by a physician, as self-reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under a physician's orders.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	III
Infants	I
Children	III

Justification

Diabetes mellitus may be broadly described as a chronic, systemic disease characterized by:

- Abnormalities in the metabolism of carbohydrates, proteins, fats, and insulin; and
- Abnormalities in the structure and function of blood vessels and nerves (2

The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of various organs, especially the eyes, kidneys, nerves, heart, and blood vessels (1, 2) and includes type 1 diabetes mellitus, type 2 diabetes mellitus, and Maturity Onset Diabetes of the Young (MODY). MODY is a series of familial disorders characterized by early onset and mild hyperglycemia. Specific genetic defects have been identified on chromosomes 7, 12, and 20 (2). MODY is often diagnosed before the age of 25 years. It is caused by dominantly inherited defect of insulin secretion. Persons with MODY are often non-obese and without metabolic syndrome (3).

The two major classifications of diabetes are type 1 diabetes (beta-cell destruction, usually leading to absolute insulin deficiency); and type 2 diabetes (ranging from predominantly insulin resistance with relative insulin deficiency to a predominantly insulin secretory defect with insulin resistance) (1). The Expert Committee on Diagnosis and Classification of Diabetes Mellitus, working under the sponsorship of the American Diabetes Association, has identified the criteria for the diagnosis of diabetes mellitus (1, 2) (see clarification).

Long-term complications of diabetes include retinopathy with potential loss of vision, nephropathy leading to renal failure; peripheral neuropathy with risk of foot ulcers,amputations, and Charcot joints; and, autonomic neuropathy causing gastrointestinal, genitourinary, cardiovascular symptoms and sexual dysfunction. Patients with diabetes have an increased incidence of atherosclerotic cardiovascular, peripheral arterial and cerebrovascular diseases. Hypertension and abnormalities of lipoprotein metabolism are often found in people with diabetes (1).

WIC nutrition services can reinforce and support the medical and dietary therapies (such as Medical Nutrition Therapy) that participants with diabetes receive from their health care providers (4).

Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Diabetes mellitus is sometimes described by both patients and health professionals as "a little bit of sugar" or "high sugar." In reality, "sugar" is only one component of the pathology and clinical manifestations of the multifaceted syndrome of diabetes mellitus (2).

Diabetes mellitus is diagnosed by a licensed medical provider using any one of the following three methods:

1. Fasting plasma glucose > 126 mg/dL (7.0 mmo1/l). Fasting is defined as no caloric intake for at least 8 hours.

2. Symptoms of hyperglycemia plus casual plasma glucose concentration > 200 mg/dl (11.1 mmo1/L).
   - Casual implies any time of day without regard to time since last meal.
   - The classic symptoms of hyperglycemia include polyuria, polydipsia, and unexplained weight loss.

3. Two-hour plasma glucose > 200mg/dL (11.1 mmo1/L) during a 75-g oral glucose tolerance test (OGTT) (1).

In the absence of unequivocal hyperglycemia, these criteria should be confirmed by repeat testing on a different day. The third measure (OGTT) is not recommended for routine clinical use.

Thyroid Disorders

Definition/ cut-off value

Hyperthyroidism – Excessive thyroid hormone production (most commonly known as Graves' disease and toxic multinodular goiter)

Hypothyroidism – Low secretion levels of thyroid hormone (can be overt or mild/subclinical). Most commonly seen as chronic autoimmune thyroiditis (Hashimoto's thyroiditis or autoimmune thyroid disease). It can also be caused by severe iodine deficiency.

Congenital Hyperthyroidism – Excessive thyroid hormone levels at birth, either transient (due to maternal Graves' disease) or persistent (due to genetic mutation)

Congenital Hypothyroidism – Infant born with an under active thyroid gland and presumed to have had hypothyroidism in-utero.

Postpartum Thyroiditis – Transient or permanent thyroid dysfunction occurring in the first year after delivery based on a autoimmune inflammation of the thyroid. Frequently, the resolution is spontaneous.

Presence of condition diagnosed, documented or reported by a physician or someone working under physician's orders, or as self-reported by applicant /participant/caregiver.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	III
Infants	I
Children	III

Justification

The thyroid gland manufactures three thyroid hormones: thyroxine (T4), triiodothyronine (T3), and calcitonin. The thyroid hormones regulate how the body gets energy from food (metabolism). Iodine is an essential component of the T4 and T3 hormones (1) and must come from the diet. (Note: In nature, iodine does not exist as a free element; rather, it forms compounds such as sodium iodide (2, 3). For more information see Clarification section.) Iodine is available from various foods, and is present naturally in soil and sea water. A dysfunctional thyroid gland can become enlarged (goiter) as a result of an overproduction of thyroid hormones (hyperthyroidism) or conversely, from

insufficient thyroid hormone production (hypothyroidism). Thyroid hormones influence virtually every organ system in the body.

Maternal needs for dietary iodine and thyroid hormone medication (if prescribed) increase during pregnancy as maternal thyroid hormones and iodine are transferred to the fetus along with an increased loss of iodine through the maternal kidneys (3). Concurrently, the fetus is unable to produce thyroid hormones during the first trimester and is entirely dependent on the maternal supply of thyroid hormones. As a result, maternal production of T4 must increase by at least 50% during pregnancy (4). If the pregnant woman is receiving thyroid hormone therapy, often a 30% - 50% increase in thyroid hormone medication is also needed.

Hyperthyroidism

Hyperthyroidism is a condition in which the thyroid gland is overactive, manufacturing too much thyroid hormone (T4 and T3). An excessive consumption of iodine (> 1000 µg/d) may cause fetal and maternal hyperthyroidism (5). In other circumstances, the thyroid might develop nodules which secrete excessive amounts of thyroid hormone regardless of iodine status (5). Enlargement of the thyroid gland (goiter) is a common symptom, as well as weight loss, fatigue, muscle weakness and an irregular heartbeat.

Hyperthyroidism is relatively uncommon in pregnancy (4). However, when it occurs, uncontrolled hyperthyroidism (especially in the second half of pregnancy) may result in infection, miscarriage, preterm delivery, preeclampsia, or congestive heart failure. Fetal complications may include prematurity, small for gestational age, fetal or neonatal thyrotoxicosis, or death (6). Postpartum maternal hyperthyroidism is likely in women with prenatal hyperthyroidism (7).

The primary medical therapy for hyperthyroidism is radioactive iodine therapy which is contraindicated during pregnancy and lactation (7). If hyperthyroidism occurs during this period, low doses of thiomide (antithyroid drug) are given instead.

Hypothyroidism

Hypothyroidism is a condition in which the thyroid gland does not make enough thyroid hormone. Maternal and fetal hypothyroidism may occur when preconception maternal iodine stores are insufficient and there is inadequate maternal iodine intake in early pregnancy. In this instance, the maternal iodine balance may become negative and may never be restored, even with eventual iodine supplementation (4).

Mothers with iodine deficiency during the first half of pregnancy may produce offspring with severe, irreversible brain damage (8). Maternal thyroid deficiency has been associated with neonatal developmental problems which may cause lasting changes in the brain structure and cognitive function.

Uncontrolled hypothyroidism in the second half of pregnancy can cause maternal complications such as anemia, preeclampsia, miscarriage, premature delivery, and postpartum thyroid disease. Fetal or neonatal complications include prematurity, low birth weight, congenital anomalies, poor neuropsychological development, and stillbirth (6).

When iodine nutrition status is adequate, autoimmune thyroid disease (AITD) – also called Hashimoto's thyroiditis - is the most common type of hypothyroidism during pregnancy (4). Pregnant women with AITD are at increased risk of miscarriage and postpartum thyroid disease (including thyroiditis, hyperthyroidism and hypothyroidism). There is an increased risk of permanent and significant impairment in cognitive function for their infants (9).

Congenital Hyperthyroidism and Hypothyroidism

Congenital hyperthyroidism is rare in neonates. Transient congenital hyperthyroidism is caused by maternal Graves' disease. Thyroid stimulating immunoglobulin passes from the mother to the fetus via the placenta and causes thyrotoxicosis in the fetus and subsequently, the neonate. After the baby is born, improvement is rapid if the condition is treated using antithyroid drugs and the hyperthyroidism will subside within several weeks (10). Persistent congenital hyperthyroidism is a familial non-autoimmune disease. It is caused by a genetic mutation resulting in an increase in the constitutive activity of the TSH receptor (11).

Congenital hypothyroidism due to maternal iodine deficiency is a leading cause of preventable mental retardation (10). Over-treatment of thyroid hormone, during pregnancy, as well as prolonged maternal iodine therapy (more than two weeks of therapy or more than 1000 µg/iodine) can also cause congenital hypothyroidism (6). The condition is exacerbated by coexisting selenium and vitamin A deficiencies or iron deficiency (5). Treatment for neonatal hypothyroidism should be started as soon as possible, as every day of delay may result in loss of IQ. Unless treated shortly after birth (within the first 18 days of life), the resulting mental retardation will be irreversible (10).

Postpartum Thyroiditis

Postpartum thyroiditis, an autoimmune inflammation of the thyroid, occurs within the first year after delivery or sometimes after termination of pregnancy. It can be a transient thyroid dysfunction with a brief thyrotoxic phase followed by hypothyroidism, usually with a spontaneous resolution (10). Smoking is a significant precipitating factor in the onset of postpartum thyroiditis (9). Women with a past history of postpartum thyroiditis have a risk of long-term permanent hypothyroidism and recurrence of postpartum thyroiditis in subsequent pregnancies (12). Tests for this condition consist of radioactive products necessitating a temporary cessation of breastfeeding (usually up to 3 days).

Implications for WIC Nutrition Services

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Individuals with thyroid disorders can benefit from WIC foods and WIC nutrition services can reinforce and support the medical and dietary therapy prescribed by the participants' health care provider. The following nutrition education messages may be appropriate depending on the type of thyroid disorder:

- Encourage iodine sufficiency, unless contraindicated, with an adequate intake of foods high in iodine such as iodized table salt, bread, saltwater fish, kelp, egg yolks (because of iodine supplementation in chicken feed), milk and milk products (because of the treatment of cows with supplemental dietary iodine) (5). It is important to note that the salt used in manufactured foods is not iodized.

- Advise women to review the iodine content of their prenatal supplement. It is recommended that all prenatal vitamin-mineral supplements for use during pregnancy and lactation contain at least 150 micrograms of iodine a day (13). Currently, less than 50 percent of prenatal vitamins on the market contain iodine (5, 7).

- Promote breastfeeding, as there are no contraindications to breastfeeding and thyroid hormone replacement therapy as long as normal thyroxine levels in the maternal plasma are maintained. Breast milk provides iodine to the infant and is influenced by the dietary intake of the pregnant and lactating mother (14). Hyperthyroidism can develop for the first time during the postpartum period, but the mother's ability to lactate is not affected. However, if a woman with untreated hypothyroidism breastfeeds, her milk supply may be insufficient. In such instances, replacement thyroid hormone therapy is necessary to help increase milk production.

- Weight management - hyperthyroidism: The elevated plasma levels of thyroid hormones may cause increased energy expenditure and weight loss along with increased appetite. Following medical treatment, individuals with hyperthyroidism usually regain their typical body weight with a concurrent decrease in appetite (4). Therefore, the monitoring of weight status and dietary adequacy are recommended.

- Weight management – hypothyroidism: Many individuals with hypothyroidism experience an increase in weight due to both a decrease in basal metabolic rate and an excessive accumulation of water and salt. Most of the weight gained is due to the excess water and salt retention. After medical treatment, a small amount of weight may be lost, usually less than 10% of body weight (15). Once hypothyroidism has been treated and thyroid hormones are within normal levels, it is less likely that the weight gain is solely due to the thyroid. If an overweight condition persists, weight control therapy may be necessary.

- Recommend the cautionary use of soy formula and the avoidance of foods or supplements rich in soy, fiber, or iron when therapeutic thyroid medications are prescribed, since soy, iron, calcium, fiber and phytates may interfere with the absorption of oral thyroid hormone therapy (16, 17).

- Discourage smoking as the compound thiocynate found in tobacco smoke inhibits iodine transport (9).

Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have /my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Iodine (I2) is an element. In the ambient temperature, it is volatile and forms blue-violet gas. In nature, it does not exist as free element. Instead, it forms compounds, such as sodium iodide (NaI), and potassium iodide (KI). To prevent iodine deficiency, potassium iodide is added to the salt (most commonly to table salt) to form iodized salt (2, 3).

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Hypertension and Prehypertension

Definition/ cut-off value

Presence of hypertension or prehypertension diagnosed by a physician as self reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	III
Infants	I
Children	III

Justification

Hypertension, commonly referred to as high blood pressure, is defined as persistently high arterial blood pressure with systolic blood pressure above 140 mm Hg or diastolic blood pressure above 90 mm Hg (1). People with high blood pressure can be asymptomatic for years (2). Untreated hypertension leads to many degenerative diseases, including congestive heart failure, end-stage renal disease, and peripheral vascular disease.

There is a large segment of the population that falls under the classification of prehypertension, with blood pressure readings between 130/80 to 139/89 mm Hg (3). People with prehypertension are twice as likely to develop hypertension (3).

There is no cure for hypertension (2); however lifestyle modifications can prevent high blood pressure and are critical in the management of hypertension and prehypertension (3).

Risk factors for hypertension include (4):

- Age (increases with age)
- Race/ethnicity (occurs more often and earlier in African Americans)
- Overweight or obesity
- Male gender
- Unhealthy nutrient consumption and lifestyle habits (e.g. high sodium intake, excessive alcohol consumption, low potassium intake, physical inactivity, and smoking)
- Family history
- Chronic stress

Management of hypertension includes lifestyle modifications and medication. In prehypertensive individuals, implementing lifestyle changes can prevent or delay the onset of hypertension (3, 5). In hypertensive individuals, dietary intervention is not only effective in reducing blood pressure but also in delaying drug treatment (6).

Lifestyle changes to manage hypertension and prehypertension include:

- Consuming a diet consistent with the Dietary Guidelines for Americans or following the DASH (Dietary Approaches to Stop Hypertension) eating plan, if recommended by a physician
- Limiting dietary sodium
- Engaging in regular physical activity
- Achieving and maintaining a healthy weight
- Smoking cessation

The WIC Program provides fruits, vegetables, low fat milk and cheese, which are important components of the DASH eating plan. WIC nutritionists provide nutrition education and counseling to reduce sodium intakes, achieve/maintain proper weight status, promote physical activity, and make referrals to smoking cessation programs, which are the lifestyle interventions critical to the management of hypertension/prehypertension.

Pregnant Women: Hypertension is the most common medical complication of pregnancy, occurring in 7% of all pregnancies. Hypertension during pregnancy may lead to low birth weight, fetal growth restriction, and premature delivery, as well as maternal, fetal, and neonatal morbidity (7). Hypertensive disorders of pregnancy are categorized as (8, 9):

- Chronic Hypertension: Hypertension that was present before pregnancy. It increases perinatal mortality and morbidity through an increased risk of SGA (small for gestational age) infants. Women with chronic hypertension are at risk for complications of pregnancy such as preeclampsia. There is a 25% risk of superimposed preeclampsia and an increased risk for preterm delivery, fetal growth restriction, congestive heart failure and renal failure.
- Preeclampsia: A pregnancy-specific syndrome observed after the 20th week of pregnancy with elevated blood pressure accompanied by significant proteinuria.
- Eclampsia: The occurrence of seizures, in a woman with preeclampsia,that cannot be attributed to other causes.
- Preeclampsia superimposed upon chronic hypertension: Preeclampsia occurring in a woman with chronic hypertension. It is the major leading factor of maternal and infant mortality and morbidity.
- Gestational Hypertension: Blood pressure elevation detected for the first time after midpregnancy without proteinuria. It presents minimal risks to mother and baby, when it does not progress to preeclampsia.

The term "pregnancy-induced hypertension" includes gestational hypertension, preeclampsia and eclampsia. For more information about preeclampsia, please see risk #304, History of Preeclampsia.

The following conditions are associated with an increased incidence of pregnancy-induced hypertension (4):

- Inadequate diet
- Nutritional deficiencies, including low protein, essential fatty acid, or magnesium intake
- Inadequate calcium intake in early pregnancy (7)
- Obesity
- Primigravidity
- Age (pregnancy before age 20 or after age 40)
- Multi-fetal gestation
- Genetic disease factors
- Familial predisposition

The impact of hypertension continues after delivery. Special consideration must be given to lactating women with high blood pressure, especially if their care plan includes medication. It is important that the hypertensive lactating woman inform her physician of her breastfeeding status if she is also taking medication to determine whether they pose any risks to the infant. However, hypertension is not a contraindication for lactation. Lactation, as suggested in research, is thought to present some therapeutic advantages in the management of the disease in women (10, 11, 12).

Children: Hypertension during childhood is age-specific, and is defined as blood pressure readings greater than the 95th percentile for age, gender, and height on at least three separate occasions. Blood pressure reading between the 90th and 95th percentile is considered prehypertension (13). Children with high blood pressure are more likely to become hypertensive adults (15). Therefore, they should have their blood pressure checked regularly beginning at the age of three (14, 15).

Epidemiologic data suggests an association between childhood obesity and high blood pressure (16). Blood pressure and overweight status have been suggested as criteria to identify hypertensive children. Weight control decreases blood pressure, sensitivity to salt and other cardiovascular risk factors (13).

Nutrition-related prevention efforts in overweight hypertensive children should aim at achieving a moderate weight loss or preventing further weight gain. Additionally, a decrease in time spent in sedentary activities with subsequent increase in physical activity should be emphasized.

Dietary changes conducive to weight management in children include:

- Portion control
- Decreased consumption of sugar-containing beverages and energy-dense snacks

- Increased consumption of fresh fruits and vegetables
- Regular meals, especially breakfast

The WIC Program provides nutritious supplemental foods and nutrition education compatible with changes needed to promote a healthy weight and decrease the impact of hypertension in children.

Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the

Renal Disease

Definition/ cut-off value

Any renal disease including pyelonephritis and persistent proteinuria, but excluding urinary tract infections (UTI) involving the bladder. Presence of renal disease diagnosed by a physician as self reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	III
Infants	I
Children	III

Justification

Renal disease can result in growth failure in children and infants. In pregnant women, fetal growth is often limited and there is a high risk of developing a preeclampsia-like syndrome. Women with chronic renal disease often have proteinuria, with risk of azotemia if protein intake becomes too high.

Cancer

Definition/ cut-off value

A chronic disease whereby populations of cells have acquired the ability to multiply and spread without the usual biologic restraints. The current condition, or the treatment for the condition, must be severe enough to affect nutritional status.

Presence of cancer diagnosed by a physician as self reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women*	I
Postpartum Women	III
Infants	I
Children	III

* Some cancer treatments may contraindicate breastfeeding.

Justification

An individual's nutritional status at the time of diagnosis of cancer is associated with the outcome of treatment. The type of cancer and stage of disease progression determines the type of medical treatment, and if indicated, nutrition management. Individuals with a diagnosis of cancer are at significant health risk and under specific circumstances may be at increased nutrition risk, depending upon the stage of disease progression or type of ongoing cancer treatment.

Central Nervous System Disorders

Definition/ cut-off value

Conditions which affect energy requirements, ability to feed self, or alter nutritional status metabolically, mechanically, or both. These include, but are not limited to:

- epilepsy
- cerebral palsy (CP)
- neural tube defects (NTDs), such as spina bifida
- Parkinson's disease
- multiple sclerosis (MS)

Presence of central nervous system disorders diagnosed by a physician as self reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	III, IV, V, or VI
Infants	I
Children	III

Justification

Epileptics are at nutrition risk due to alterations in nutritional status from prolonged anti-convulsion therapy, inadequate growth, and physical injuries from seizures (1). The ketogenic diet has been used for the treatment of refractory epilepsy in children (2). However, children on a ketogenic diet for six months or more have been observed to have slower gain in weight and height (3,4). Growth monitoring and nutrition counseling to increase energy and protein intakes while maintaining the ketogenic status are recommended (4). In some cases, formula specifically prepared for children on a ketogenic diet is necessary. Women on antiepileptic drugs (AEDs) present a special challenge. Most AEDs have been associated with the risk of neural tube defects on the developing fetus. Although it is unclear whether folic acid supplementation protects against the embryotoxic and teratogenic effects of AEDs, folic acid is recommended for women with epilepsy as it is for other women of childbearing age (5-7).

Oral motor dysfunction is associated with infants and children with cerebral palsy (CP). These infants and children often have poor growth due to eating impairment, such as difficulty in spoon feeding, biting, chewing, sucking, drinking from a cup and swallowing. Rejection of solid foods, choking, coughing, and spillage during eating are common among these children (8,9). Growth monitoring and nutrition counseling to modify food consistency and increase energy and nutrient intakes are recommended. Some children may require tube feeding and referral to feeding clinics, where available.

Limited mobility or paralysis, hydrocephalus, limited feeding skills, and genitourinary problems, put children with neural tube defects (NTDs) at increased risk of abnormal growth and development. Ambulatory disability, atrophy of the lower extremities, and short stature place NTDs affected children at high risk for increased body mass index (10). Growth monitoring and nutrition counseling for appropriate feeding practices are suggested.

In some cases, participants with Parkinson's disease require protein redistribution diets to increase the efficacy of the medication used to treat the disease (11). Participants treated with levodopa-carbidopa may also need to increase the intake of B vitamins (12). Participants with Parkinson's disease will benefit from nutrition education/counseling on dietary protein modification, which emphasizes adequate nutrition and meeting minimum protein requirements. Additionally, since people with Parkinson's often experience unintended weight loss (13), it is important to monitor for adequate maternal weight gain.

Individuals with multiple sclerosis (MS) may experience difficulties with chewing and swallowing that require changes in food texture in order to achieve a nutritionally adequate diet (14). Obesity and malnutrition are frequent nutrition problems observed in individuals with MS. Immobility and the use of steroids and anti-depressants are contributing factors for obesity. Dysphagia, adynamia, and drug therapy potentially contribute to malnutrition. Both obesity and malnutrition have detrimental effects on the course of the disease. Adequate intakes of polyunsaturated fatty acids, vitamin D, vitamin B_{12} and a diet low in animal fat have been suggested to have beneficial effects in relapsing-remitting MS (15-17). Breastfeeding advice to mothers with MS has been controversial. However, there is no evidence to indicate that breastfeeding has any deleterious effect on women with MS. In fact, breastfeeding should be encouraged for the health benefits to the infant (18). In addition, mothers who choose to breastfeed should receive the necessary support to enhance breastfeeding duration.

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As a public health nutrition program, WIC plays a key role in health promotion and disease prevention. As such, the nutrition intervention for participants with medical conditions should focus on supporting, to the extent possible, the medical treatment and/or medical/nutrition therapy a participant may be receiving. Such support may include: investigating potential drug-nutrient interactions; inquiring about the participant's understanding of a prescribed special diet; encouraging the participant to keep medical appointments; tailoring the food package to accommodate the medical condition; and referring the participant to other health and social services.

Genetic and Congenital Disorders

Definition/ cut-off value

Hereditary or congenital condition at birth that causes physical or metabolic abnormality. The current condition must alter nutrition status metabolically, mechanically, or both. May include, but is not limited to, cleft lip or palate, Down's syndrome, thalassemia major and sickle cell anemia (not sickle cell trait) and muscular dystrophy.

Presence of genetic and congenital disorders diagnosed by a physician as self reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	III
Infants	I
Children	III

Justification

For women, infants, and children with these disorders, special attention to nutrition may be required to achieve adequate growth and development and/or to maintain health.

Severe cleft lip and palate anomalies commonly cause difficulty with chewing, sucking and swallowing, even after extensive repair efforts (2). Surgery is required for many gastrointestinal congenital anomalies. (Examples are trachea-esophageal fistula, esophageal atresia, gastroschisis, omphalocele, diaphragmatic hernia, intestinal atresia, and Hirschsprung's Disease.)

Impaired esophageal atresia and trachea-esophageal fistula can lead to feeding problems during infancy. The metabolic consequences of impaired absorption in short bowel-syndrome, depend on the extent and site of the resection or the loss of competence. Clinical manifestations of short bowel syndrome, include diarrhea, dehydration, edema, general malnutrition, anemia, dermatitis, bleeding tendencies, impaired taste, anorexia, and renal calculi. Total parenteral feedings are frequently necessary initially, followed by gradual and individualized transition to oral feedings. After intestinal resection a period of adaptation by the residual intestine begins and may last as long as 12-18 months (3). Even after oral feedings are stabilized, close follow-up and frequent assessment of the nutritional status of infants with repaired congenital gastro-intestinal anomalies is recommended (2).

Sickle-cell anemia is an inherited disorder in which the person inherits a sickle gene from each parent. Persons with sickle-cell trait carry the sickle gene, but under normal circumstances are completely asymptomatic. Good nutritional status is important to individuals with sickle-cell anemia to help assume adequate growth (which can be compromised) and to help minimize complications of the disease since virtually every organ of the body can be affected by sickle-cell anemia (i.e., liver, kidneys, gall ladder, and immune system). Special attention should be given to assuring adequate caloric, iron, folate, vitamin E and vitamin C intakes as well as adequate hydration.

Muscular dystrophy is a familial disease characterized by progressive atrophy and wasting of muscles. Changes in functionality and mobility can occur rapidly and as a result children may gain weight quickly (up to 20 pounds in a 6 month period). Early nutrition education that focuses on foods to include in a balanced diet, limiting foods high in simple sugars and fat and increasing fiber intake can be effective in minimizing the deleterious effects of the disease.

Inborn Errors of Metabolism

Definition/ cut-off value

Inherited metabolic disorders caused by a defect in the enzymes or their co-factors that metabolize protein, carbohydrate, or fat.

Inborn errors of metabolism (IEM) generally refer to gene mutations or gene deletions that alter metabolism in the body, including but not limited to:

- Amino Acid Disorders
- Carbohydrate Disorders
- Fatty Acid Oxidation Disorders
- Organic Acid Metabolism Disorders
- Lysosomal Storage Disorders
- Mitochondrial Disorders
- Peroxisomal Disorders
- Urea Cycle Disorders

Presence of condition diagnosed, documented, or reported by a physician or someone working under physician's orders, or as self-reported by applicant /participant/caregiver. See Clarification for more information about self-reporting a diagnosis.

Participant category and priority level

Category	Priority
Infants	I
Children	III
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	III

Justification

The inheritance of most metabolic disorders is rare. IEM disorders may manifest at any stage of life, from infancy to adulthood. Early identification of IEM correlates with significant reduction in morbidity, mortality, and associated disabilities for those affected (1).

All States screen newborns for IEM, although the type and number of IEM screened for may vary from State to State. Typically, infants are screened for amino acid disorders, urea cycle disorders, organic acid disorders, and fatty acid oxidation defects. A few States are working toward including lysosomal storage diseases and peroxisomal disorders among their newborn screening panels (2).

Justification

In most states, treatment of an IEM is referred to a specialized metabolic treatment facility. Please see Clarification for contact information for treatment facilities. IEM treatment is based on symptomatic therapy which may include the following strategies: substrate restriction; stimulation or stabilization of residual enzyme activity; replacement of deficient products; removal of toxic metabolites or blocking their production; and enzyme replacement therapy (3). Avoidance of catabolism is essential at all treatment stages.

Nutrition therapy is integral to the treatment of IEM. Nutrition therapy should both correct the metabolic imbalance and ensure adequate energy, protein, and nutrients for normal growth and development among affected individuals. Continual monitoring of nutrient intake, laboratory values, and the individual's growth are needed for evaluation of the adequacy of the prescribed diet (4). It is important that caregivers of infants and children with IEM ensure that the patient follows the prescribed dietary regimen. The below embedded links provide the most up-to-date information about the disease state as well as treatment.

Amino Acid Metabolism Disorders

- Phenylketonuria (includes clinically significant hyperphenylalaninemia variants)
- Maple syrup urine disease
- Homocystinuria
- Tyrosinemia

Amino Acid Metabolism Disorders are characterized by the inability to metabolize a certain essential amino acid. The build-up of the amino acid that is not metabolized can be toxic. Treatment of amino acid disorders involves restricting one or more essential amino acids to the minimum required for growth and development and supplying the missing product due to the blocked reaction.

Carbohydrate Disorders

- Galactosemia
- Glycogen storage disease type I
- Glycogen storage disease type II (See also Pompe disease)
- Glycogen storage disease type III
- Glycogen storage disease type IV (Andersen Disease)
- Glycogen storage disease type V
- Glycogen storage disease type VI
- Hereditary Fructose Intolerance (Fructose 1-phosphate aldolase deficiency, Fructose 1, 6, biphosphatase deficiency, fructose kinase deficiency)

This group of disorders includes an enzyme deficiency or its cofactor that affects the catabolism or anabolism of carbohydrate. Carbohydrate disorders are complex and affect neurological, physical, and nutritional status.

Fatty Acid Oxidation Defects
- Medium-chain acyl-CoA dehydrogenase deficiency
- Long-chain 3-hydroxyacyl-CoA dehydrogenase deficiency
- Trifunctional protein deficiency type 1 (LCHAD deficiency)
- Trifunctional protein deficiency type 2 (mitochondrial trifunctional protein deficiency)
- Carnitine uptake defect (primary carnitine deficiency)
- Very long-chain acyl-CoA dehydrogenase deficiency

Fatty acid oxidation defects include any enzyme defect in the process of mitochondrial fatty acid oxidation (FAO) system. The biochemical characteristic of all FAO defects is abnormal low ketone production as a result of the increased energy demands. This results in fasting hypoglycemia with severe acidosis secondary to the abnormal accumulation of intermediate metabolites of FAO, which can result in death.

Organic Acid Disorders (AKA organic aciduria or organic acidemia)
- Isovaleric acidemia
- 3-Methylcrotonyl-CoA carboxylase deficiency
- Glutaric acidemia type I
- Glutaric acidemia type II
- 3-hydroxy-3-methylglutaryl-coenzyme A lyase deficiency
- Multiple carboxylase deficiency (Biotinidase deficiency, Holocarboxylase synthetase deficiency)
- Methylmalonic acidemia
- Propionic acidemia
- Beta-ketothiolase deficiency

Organic Acid Disorders are characterized by the excretion of non-amino organic acids in the urine. Most of the disorders are caused by a deficient enzyme involving the catabolism of specific amino acid(s). As a result, the non-metabolized substance accumulates due to the blockage of the specific metabolic pathway, which is toxic to certain organs and may also cause damage to the brain (7).

Lysosomal Storage Diseases
- Fabry disease (α-galactosidase A deficiency)
- Gauchers disease (glucocerebrosidase deficiency)
- Pompe disease (glycogen storage disease Type II, or acid α-glucosidase deficiency)

Lysosomal storage diseases are a group of related conditions characterized by increased storage of undigested large molecule in lysosomes. Lysosome is a cellular organelle responsible for intracellular degradation and recycling of macromolecules. Due to a defect in a specific lysosomal enzyme, the macromolecule that normally would be metabolized is not broken down; instead, it accumulates in the lysosomes. This leads to tissue damage, organ failures and premature death. Common clinical features include bone abnormalities, organomegaly, developmental impairment and central, peripheral nervous system disorders.

Mitochondrial Disorders
- Leber hereditary optic neuropathy
- Mitochondrial encephalomyopathy, lactic acidosis, and stroke-like episodes (MELAS)
- Mitochondrial neurogastrointestinal encephalopathy disease (MNGIE)
- Myoclonic epilepsy with ragged-red fibers (MERRF)
- Neuropathy, ataxia, and retinitis pigmentosa (NARP)
- Pyruvate carboxylase deficiency

Mitochondrial Disorders are caused by the dysfunction of the mitochondrial respiratory chain, or electron transport chain (ETC). Mitochondria play an essential role in energy production. The ETC dysfunction increases free radical production, which causes mitochondrial cellular damage, cell death and tissue necrosis and further worsens ETC dysfunction and thus forms a vicious cycle. The disorders can affect almost all organ systems. However, the organs and cells that have the highest energy demand, such as the brain and muscles (skeletal and cardiac) are most affected. The clinical features vary greatly among this group of disorders, but most have multiple organ dysfunctions with severe neuropathy and myopathy.

Peroxisomal Disorders
- Zellweger Syndrome Spectrum
- Adrenoleukodystrophy (x-ALD)

There are two types of peroxisomal disorders: single peroxisomal enzyme deficiencies and peroxisomal biogenesis disorders. These disorders cause severe seizures and psychomotor retardation (9). Peroxisomes are small organelles found in cytoplasm of all cells. They carry out oxidative reactions which generate hydrogen peroxides. They also contain catalase (peroxidase), which is important in detoxifying ethanol, formic acid and other toxins. Single peroxisomal enzyme deficiencies are diseases with dysfunction of a specific enzyme, such as acyl coenzyme A oxidase deficiency. Peroxisomal biogenesis disorders are caused by multiple peroxisome enzymes such as Zellweger syndrome and neonatal adrenoleukodystrophy.

Urea Cycle Disorders
- Citrullinemia
- Argininosuccinic aciduria
- Carbamoyl phosphate synthetase I deficiency

Urea Cycle Disorders occur when any defect or total absence of any of the enzymes or the cofactors used in the urea cycle results in the accumulation of ammonia in the blood. The urea cycle converts waste nitrogen into urea and excretes it from the kidneys. Since there are no alternate pathways to clear the ammonia, dysfunction of the urea cycle results in neurologic damages.

Clarification

IEM not listed within this write-up may be found under: http://rarediseases.info.nih.gov/GARD. Please keep in mind these additional resources are not meant for medical advice nor to suggest treatment.

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Infectious Diseases - Acute

Definition/ cut-off value

A disease which is characterized by a single or repeated episode of relatively rapid onset and short duration. Infectious diseases come from bacteria, viruses, parasites, or fungi and spread directly or indirectly from person to person (1). Infectious diseases may also be zoonotic, which are transmitted from animals to humans, or vector-borne, which are transmitted from mosquitoes, ticks, and fleas to humans (1, 2). These diseases and/or conditions include, but are not limited to (an extensive listing of infectious diseases can be found at: http://www.nlm.nih.gov/medlineplus/infections.html):

- Hepatitis A
- Hepatitis E
- Meningitis (Bacterial/Viral)
- Parasitic Infections
- Listeriosis
- Pneumonia
- Bronchitis (3 episodes in last 6 months)

The infectious disease must be present within the past six months, and diagnosed, documented, or reported by a physician or someone working under a physician's orders, or as self-reported by applicant/participant/caregiver. See Clarification for more information about self-reporting a diagnosis.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	III
Infants	I
Children	III

Justification

Both chronic and acute infectious diseases can lead to: 1) poor appetite, 2) low nutrient absorption, 3) accelerated nutrient utilization, and/or 4) rapid nutrient loss, depending on the individual's nutritional state before becoming infected and the individual's diet during the improvement period (3). The following information pertains to some of the more prevalent and/or serious acute infectious diseases.

VIRAL HEPATITIS

Hepatitis is inflammation of the liver. It is most often caused by viruses, but can also be caused by excessive alcohol consumption, toxins, and medicines such as acetaminophen, as well as other medical conditions linked to liver inflammation (4). Viral hepatitis is caused by a series of viruses labeled A, B,

C, D, and E – with A, B, and C being the most common forms in the United States. Viral hepatitis A and E are the only forms that are acute and do not become chronic, whereas B, C, and D can both be acute and chronic in nature (5). (For more information on chronic infectious diseases see Risk #352b Infectious Diseases – Chronic.) Regardless of the type of hepatitis, infected individuals with signs of the infection will typically experience anorexia, nausea, vomiting, diarrhea, jaundice, epigastria pain, tiredness, and weakness, all of which affect one's diet and health (5). In addition, darker urine and pale stools may be present in infected individuals. It is important to note that viral hepatitis is the leading cause of liver cancer and the most frequent need for liver transplants in the United States (6).

Hepatitis A: Hepatitis A is an acute infection caused by exposure to the Hepatitis A virus. It is transmitted through the fecal-oral route, with transmission most commonly spread through close contact with an infected household member or sexual partner. Outbreaks can also be caused by fecal-contaminated food or water. Because the symptoms of all types of acute hepatitis infections are the same, suspected diagnosis must be confirmed through either positive laboratory testing, or epidemiologic link to a confirmed case. (7)

A large majority of those infected with Hepatitis A are asymptomatic, with 70% showing no clinical signs of infection. Hepatitis A does not progress to a chronic disease, and symptoms typically resolve without treatment in two months, however in 10-15% of cases periodic relapses can occur for up to six months. (8)

The Hepatitis A virus can survive for months outside of the body, therefore proper hygiene and food safety are important preventative measures. However, the most effective method of preventing infection is through vaccination, which has reduced the incidence of Hepatitis A by 95% since its introduction. Emphasis should be placed on preventing an unvaccinated child from close personal contact with someone who is at high risk, or suspected of Hepatitis A infection. (7)

Hepatitis E: Hepatitis E is an acute infection caused by exposure to the Hepatitis E virus. It is transmitted through the fecal-oral route, most commonly through ingestion of contaminated drinking water. However recent cases have been linked to uncooked/undercooked meat and shellfish, indicating the potential for foodborne exposure. While Hepatitis E is believed to be uncommon in the United States, those who frequently travel to developing countries with poor water and environmental sanitation are at risk of becoming infected. Diagnosis for Hepatitis E can be confirmed only by testing for the presence of antibodies to the virus or viral RNA. There are currently no serological tests approved for use in the United States. (9)

Hepatitis E symptoms typically resolve on their own, and there is currently no therapeutic treatment or approved vaccine for the disease. Supportive therapy should be offered and hospitalization recommended for severe cases. The predominant forms of prevention are good sanitation and only relying on clean drinking water when in areas at high risk for infection. (10)

Pregnant women are especially at risk when infected with Hepatitis E. While in general most people will recover completely and the death rate among confirmed cases is about 1%, the mortality rate can reach 10-30% for women in their third trimester. (9)

MENINGITIS

Characterized by an inflammation of the protective membranes known as the meninges, meningitis is typically caused by an infection of the fluid surrounding the brain and the spinal cord. Most commonly meningitis is caused by a bacterial or viral infection, but it can also result as a response to physical injury, cancer, or certain drugs. Due to the severity of meningitis and resulting treatment differing depending on the cause, it is important to correctly diagnose the agent responsible for the disease. (11)

Bacterial Meningitis: While most people with meningitis typically recover, bacterial meningitis is typically severe and can result in serious complications, including brain damage, hearing loss, or learning disabilities. The leading causes of bacterial meningitis in the United States include Haemophilus influenzae, Streptococcus pnemoniae, Listeria monocytogenes, and Neisseria meningitidis. The causes of meningitis vary by age group. In adults, including pregnant women, it is most commonly caused by Streptococcus pneumoniae, Neisseria meningitidis, and Listeria monocytogenes. The cause in newborns is most typically Group B Sterptococcus, E. coli, and Listeria. Infants and children most commonly develop meningitis in response to Streptococcus pneumoniae, Neisseria meningitidis, and Haemophilus influenzae type b. (12)

In addition, *Cronobactor* may cause severe meningitis in infants. Although *Cronobactor* infection is rare (the Centers for Disease Control and Prevention reports 4-6 infections in infants per year), meningitis due to *Cronobactor* occurs almost exclusively among infants in the first 2 months of life. *Cronobactor* infections have been associated with consumption of reconstituted powdered infant formula. In several outbreak investigations, *Cronobactor* has been found in powdered infant formula that had been contaminated in the factory. In other cases, the powdered infant formula might have been contaminated with *Cronobactor* after it was opened at home or elsewhere. It is recommended that manufacturer's preparation instructions be adhered to in order to prevent *Cronobactor* infection in infants consuming reconstituted powdered infant formula. (13)

Risk factors for bacterial meningitis include, but are not limited to, age, with infants at higher risk than other age groups; congregate living settings, with groups such as military personnel and college students at increased risk; medical conditions that weaken the immune system; and travel to the meningitis belt in sub-Saharan Africa. Transmission from an infected person usually requires prolonged, close, contact. Additionally, healthy people may carry the bacteria in their nose and throat without developing an illness and most healthy people who carry the disease never become sick. Pregnant women infected with any of the bacteria responsible for causing meningitis are capable of passing the bacteria to their baby, putting them at increased risk of developing meningitis. (12)

Meningitis symptoms are characterized by a sudden onset of fever, headache, and stiff neck. Other symptoms are also often present, including nausea, vomiting, sensitivity to light, and confusion. Diagnosis must be confirmed through laboratory testing of the blood or cerebrospinal fluid. Bacterial meningitis is effectively treated with antibiotics, though it is important to begin treatment as early as possible. (12)

The most effective method of preventing meningitis is vaccination. There are currently vaccines available for three types of meningitis causing bacteria - *Neisseria meningitidis* (meningococcus), *Streptococcus pneumoniae* (pneumococcus), and *Haemophilus influenzae* type b (Hib). Additionally for individuals in close contact with those with the disease, antibiotics may be recommended as a preventative measure. The risk of meningitis resulting from Listeria can be prevented by properly preparing and refrigerating food as well as avoiding certain foods. Women diagnosed with group B strep are also given antibiotics during labor to prevent transmission to their newborn. (12)

Viral Meningitis: Viral meningitis is the most common type of meningitis and is often less severe than bacterial caused cases. In the United States it is most commonly caused by non-polio enteroviruses, as well as others including the mumps, herpes, measles, influenza, and arboviruses. While few people infected with these viruses develop meningitis, the risk is especially high from summer to fall. Children younger than five and people with weakened immune systems are at higher risk of developing the disease, with infants younger that one month old and people with weakened immune systems more likely to develop severe illness. (14)

Transmission of a virus that can lead to meningitis may occur due to close contact with a person who has viral meningitis, however it is unlikely meningitis will develop. Symptoms in infants include fever, irritability, poor eating, sleepiness or trouble waking, and lethargy. Adults most commonly experience fever, headache, stiff neck, light sensitivity, sleepiness or trouble waking, nausea, vomiting, lack of appetite, and lethargy. As with bacterial meningitis, diagnosis requires lab tests to confirm the illness. (14)

Typically viral meningitis resolves without treatment in 7-10 days. However those with meningitis caused by the herpes virus or influenza may benefit from antiviral medication. While there are no vaccines available for the non-polio enteroviruses that can cause meningitis, the following steps can be taken to reduce the risk of infection:

- Washing hands often with soap and water, especially after changing diapers, using the toilet, or coughing or blowing your nose.
- Avoiding face touching with unwashed hands.
- Avoiding close contact with infected persons.
- Cleaning and disinfecting frequently touched household surfaces.
- Staying home when sick.

Additionally children should be vaccinated against the other viruses that can cause meningitis, including measles, mumps, chickenpox, and influenza. (14)

LISTERIOSIS

Listeriosis is a serious infection caused by the bacteria *Listeria monocytogenes*. It is most commonly transmitted through contaminated food; however it is also naturally present in the soil, water, and animals, including poultry and cattle (15). Listeria is especially dangerous due to its ability to grow in cold temperatures, unlike many other pathogens (16). Common food sources include ready-to-eat deli meats and hot dogs, unpasteurized milk and dairy products, raw sprouts and others. Symptoms include fever, stiff neck, confusion, weakness, vomiting, and diarrhea (17).

Pregnant women and newborns are at exceptionally high risk for listeriosis, with pregnant women 10-20 times as likely as the general population to become infected (18). It can lead to miscarriage, stillbirth, or lifelong health issues for the child (19). Additionally, those with weakened immune systems are also at heightened risk. Listeriosis is treated with antibiotics and for severe cases referral to a medical facility may be necessary. The best methods of prevention are associated with proper food safety, handling, and storage. Additionally, raw milk and raw dairy products should be avoided. There is currently no vaccine available. (17)

PNEUMONIA

Pneumonia is an infection of the lungs that can cause mild to severe illness. It can be caused by viruses, bacteria, and fungi. In the United States the most common causes of viral and bacterial pneumonia are respiratory synctal virus (RSV) and Streptococcus pneumonia (pneumococcus), respectively, however Human Parainfluenza Viruses are the leading cause of pneumonia in infants and children. Symptoms include fever, muscle aches, fatigue, enlarged lymph nodes in the neck, chest pain, sore throat, coughing, shortness of breath, and rapid breathing. (20)

Children younger than five years of age are considered at especially high risk of pneumonia. Additionally, pneumonia contracted during pregnancy has been associated with increased morbidity and mortality when compared with non-pregnant women. It can lead to negative outcomes including low birth weight, increased risk of pre-term birth, and serious complications for the mother including respiratory failure. Treatment includes administering antimicrobial and antiviral drugs depending on the pathogen responsible for the infection. (21)

Vaccination is an effective way to prevent pneumonia, with several vaccinations available for both bacteria and viruses including pneumococcal, Haemophilus influenzae type b (Hib), pertussis (whooping cough), varicella (chickenpox), measles, and influenza vaccines. Good hygiene is also another effective method of prevention, including regular hand-washing and disinfecting frequently touched surfaces. (20)

BRONCHITIS

Acute bronchitis is diagnosed by a healthcare provider based on the signs and symptoms present in the patient. It is a condition that occurs when the airways in the lungs swell and produce mucus, resulting in a cough. Bronchitis typically occurs after a chest cold and is usually caused by a virus, with the

most common being: Respiratory syncytial virus (RSV), Adenovirus, Influenza viruses, and parainfluenza. Symptoms include, but are not limited to coughing that produces mucus; soreness in the chest; fatigue; headache; body aches; fever; and sore throat. Most symptoms of acute bronchitis resolve on their own after two weeks, but the cough may last up to eight weeks in some cases. In severe cases, such as a fever above 100.4 degrees Fahrenheit, patients should seek assistance from a health care provider. (22)

Since bronchitis is almost never caused by bacteria, antibiotics are not needed or recommended. Furthermore, antibiotic treatment may cause harm in both children and adults (20). The best course of action is to provide symptom relief through rest, over-the-counter medicines, and other self-care methods. It is important to use pain relievers appropriate for the age of the child, and only acetaminophen for babies six months of age and younger (23). Bronchitis may be prevented by avoiding smoking, practicing good hygiene, and remaining current on all immunizations (22).

PARASITIC INFECTIONS

Parasites are organisms that live on or in a host organism and survive by getting their food at the detriment of the host. Pregnant women and children are most at risk from certain types of parasites including *Toxoplasma gondii* – found in uncooked meat; *Giardia intestinalis*; *Cryptosporidium;* lice; and pinworms (24). Toxoplasmosis, caused by *Toxoplasma gondii*, is considered to be the leading cause of death attributed to foodborne illness in the United States (25). To reduce the risk of parasitic infection, prevention includes good food safety and general good hygiene. Additionally environmental risk can be reduced by wearing gloves when coming into contact with soil, covering sandboxes, and teaching children the importance of hand washing (26).

Most healthy people will recover from parasites without treatment. However for pregnant women, newborns, and infants with toxoplasmosis, treatment can be administered as a combination of drugs such as pyrimethamine and sulfadiazine, plus folinic acid (27). This treatment will reduce the parasitic burden, but will not eliminate it completely as parasites can remain in tissues, which makes it hard for the medication to reach them. Lice and other dermal parasites can be treated with topical drugs, such as medicated shampoo (24).

Implications for WIC Nutrition Services

WIC can improve the management of acute infectious diseases through WIC foods, nutrition education, counseling, and referrals to community resources. The table below provides additional WIC nutrition services recommendations specific to the disease state that can help improve the health outcomes of participants with acute infectious diseases:

	WIC Nutrition Services Recommendations for Acute Infectious Disease
All Types of Infections	• Encourage sufficient calorie intake to ameliorate accelerated nutrient utilization. • Recommend the *Dietary Guidelines* to ensure healthy eating patterns. • Provide suggestions to address poor appetite. • Provide education on safe food handling and storage practices.
All Types of Hepatitis	• Recommend testing to pregnant women and high risk individuals • Encourage abstinence from alcohol. • Provide information on high calorie, high protein and moderate fat diets. • Recommend high calorie consumption at breakfast as nausea is less common in the morning. • Recommend, in consultation with health care provider, consumption of high calorie and protein liquid formula between meals to boost calorie intake. • Encourage a bland diet with extra fluids depending on the severity of nausea and vomiting.
Hepatitis A	• Encourage the Hepatitis A vaccine for all children, previously unvaccinated adolescents through the age of 18, and high-risk adults. • Promote breastfeeding as being safe, but to avoid breastfeeding when nipples are cracked and bleeding – at which time, mothers should pump and discard milk to maintain supply. • Discourage the practice of pre-chewing food for infants, as blood may be present.
Hepatitis E	• Avoid contaminated water.
Meningitis	• Encourage vaccinations for both bacteria and viruses known to cause meningitis. • Provide education on proper food handling and storage practices. • Recommend use of manufacturer's instruction for the preparation of infant formula. • Provide education on good hygiene practices.
Listeriosis	• Recommend alternatives to raw milk and dairy products. • Emphasize importance of safe food handling, preparation and storage practices.
Pneumonia	• Recommend referral to a healthcare provider to administer appropriate antimicrobial or antiviral treatment.
Bronchitis	• Provide education on symptom relief and proper pain-medication practices for children. • Recommend smoking cessation. • Provide education on good hygiene practices. • Encourage appropriate vaccinations.
Parasitic Infections	• Recommend appropriate measures be taken when coming into contact with potential environmental contaminants, e.g., use of gloves when working with soil and covering sandboxes when not in use. • Provide education on proper food handling and storage practices. • Provide education on good hygiene practices.

Clarification Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Infectious Diseases - Chronic

Definition/ cut-off value

Conditions likely lasting a lifetime and require long-term management of symptoms. Infectious diseases come from bacteria, viruses, parasites, or fungi and spread directly or indirectly, from person to person (1). Infectious diseases may also be zoonotic, which are transmitted from animals to humans, or vector-borne, which are transmitted from mosquitoes, ticks, and fleas to humans (1, 2). These diseases and/or conditions include, but are not limited to (an extensive listing of infectious diseases can be found at: http://www.nlm.nih.gov/medlineplus/infections.html):

- HIV (Human Immunodeficiency Virus)
- AIDS (Acquired Immunodeficiency Syndrome)
- Hepatitis B
- Hepatitis C
- Hepatitis D

Presence of condition diagnosed, documented, or reported by a physician or someone working under a physician's orders, or as self reported by applicant/participant/caregiver. See Clarification for more information about self-reporting a diagnosis.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women*	I
Non-Breastfeeding Women	III
Infants	I
Children	III

Justification

Both chronic and acute infectious diseases can lead to: 1) poor appetite, 2) low nutrient absorption, 3) accelerated nutrient utilization, and/or 4) rapid nutrient loss, depending on the individual's nutritional state before becoming infected and the individual's diet during the improvement period (3). The following information pertains to some of the more prevalent and/or serious chronic infectious diseases.

Human Immunodeficiency Virus (HIV)/ Acquired Immunodeficiency Syndrome (AIDS)

The Human Immunodeficiency Virus (HIV) is a chronic virus that reduces an individual's ability to fight off infections and diseases (4). HIV destroys white blood cells found in the immune system, also known as CD4 (cluster of

differentiation) or T cells (T lymphocytes) (5). HIV is transmitted only through blood, semen, pre-seminal fluid, rectal fluids, vaginal fluids, and breast milk from an HIV-infected person (6). HIV can lead to Acquired Immunodeficiency Syndrome (AIDS) if left untreated (4). Individuals who are aware of their HIV status and are undergoing antiretroviral therapy (ART) to stop the replication of the virus, can typically live decades – while those unaware of their status or are not on ART, can usually remain in this stage about ten years before progressing to the AIDS stage. Some individuals may progress to the AIDS stage sooner than 10 years. During the time period a person progresses from HIV to AIDS, the immune system becomes extremely weakened and can no longer protect against other infections or opportunistic illnesses** - which are infections generally not detrimental to healthy individuals, but can be life-threatening in people infected with HIV. A person with AIDS and an opportunistic illness that goes untreated has a life expectancy of approximately one year (4).

Getting tested is the only way individuals know they are infected with HIV. Many people infected with the virus display no symptoms for as long as ten years or more. The Centers for Disease Control and Prevention (CDC) currently estimates that 1 in 6 people in the United States infected with HIV do not know they have the virus and therefore recommends that everyone between the ages of 13-64 get tested at least once as part of a regular health screening. The CDC further recommends that all pregnant women be tested early in their pregnancy, via an "opt-out" testing measure – which is when pregnant women are told that an HIV test will be included in the standard group of prenatal tests and that they may decline the test. Unless the HIV test is specifically declined, they will be tested for the virus. (7)
An early diagnosis in pregnant women can reduce the transmission of HIV in babies to 2%, if the expectant mother (8):

- Receives Active Antiretroviral Therapy (ART) during pregnancy, labor, and delivery.
- Delivers the baby by cesarean, or C-section.
- Avoids breastfeeding.

There is a 20% chance of transmission if the HIV positive, expectant mother does none of the prevention measures listed above (8). In addition, women living in certain geographic areas or women considered high risk, such as those with sexually transmitted infections, multiple partners, or have substance abuse issues, are encouraged to be retested in the third trimester, preferably when less than 36 weeks pregnant (9).

PrEP (Pre-Exposure Prophylaxis) is a daily pill containing two medicines (tenofovir and emtricitabine), recommended for HIV negative people who are at substantial risk of becoming infected with HIV. PrEP, when taken consistently, reduces HIV transmission by up to 92%, and is recommended for (10):

- Individuals in an HIV discordant relationship in which one partner is HIV positive and the other partner is HIV negative.

- Heterosexual women who do not regularly use condoms with sex partners of unknown HIV status.
- Women who share injectable drug paraphernalia or were in treatment for injectable drug use in the past six months.

** Extensive listing of opportunistic illness can be found at: http://womenshealth.gov/hiv-aids/opportunistic-infections-and-other-conditions/.

HIV/AIDS and Nutrition: Dietary needs for an HIV positive individual are determined by the presence of symptoms (11, 12). **Symptomatic** individuals experiencing unintended weight loss, or wasting, and are dealing with: 1) poor food intake due to medication side effects, sore mouth, or mental health issues; 2) altered metabolism due to disease progression; or 3) nutrient malabsorption caused by gastrointestinal problems resulting from medications or just the presence of the virus. In symptomatic participants, the main goals are to: 1) increase or maintain a normal body weight; 2) retain or increase lean body mass; and 3) ensure adequate intake of macro- and micronutrients. In most cases, these individuals usually require diets higher in protein and potentially a multivitamin, as vitamins A, B6, C, and E are lower in symptomatic people. In instances when wasting cannot be alleviated through regular dietary means, enteral and parenteral nutrition therapy may be necessary. For **asymptomatic** individuals or those with a stable weight, the goals should focus on adequate intake of nutrients to prevent wasting – and if food intake is low, these individuals could potentially include a multivitamin or mineral supplement to avoid deficiencies (11, 12).

It is important to note that taking large amounts of iron supplements, leading to iron-overload, encourages disease progression from HIV to AIDS, and should be avoided. In addition, Vitamin A and Zinc, in the form of supplements, can have a negative impact on adults living with HIV/AIDS (12). Participants should always consult with their health care providers before taking dietary supplements over the Recommended Dietary Allowance to prevent adverse reactions and interactions with medications used to treat HIV/AIDS. (13)

HIV/AIDS Medication Nutritional Problems: Even though people with HIV are able to manage the disease and live longer with Highly Active Antiretroviral Therapy (HAART), the side effects can have a negative impact on a person's nutritional status. Common side effects include: gastrointestinal problems, lipid disorders, and insulin resistance/glucose intolerance. Participants experiencing these problems should: reduce total fat intake and cholesterol; increase dietary fiber; increase physical activity; reduce alcohol consumption; and reduce the consumption of simple sugars. (11, 12)

HIV/AIDS and Food Safety: Participants living with HIV are more susceptible to contracting a food-borne illness due to weakened immune systems and therefore should be encouraged to: store and prepare foods safely; check expiration dates; and avoid raw or semi raw foods, such as meat, non-pasteurized dairy, and soft cheeses (11, 12). Infants born to HIV positive mothers, regardless of their HIV status, should drink ready-to-feed or liquid

concentrate infant formula as powdered infant formula is not sterile and may not be microbiological safe (14).

HIV/AIDS Care and Support: HIV-affected families often experience a lack of financial and psychosocial support needed to deal with an HIV/AIDS diagnosis, including the effects of social stigma which negatively impacts their ability to comply with the medical treatment needed to control the disease (15). Further, to fully benefit from current treatment protocols required to manage HIV and reduce the progression to AIDS, infected individuals who know their status, must get care, stay in care, and adhere to an effective antiretroviral treatment plan known as an HIV/AIDS Care Continuum (16). WIC agencies should proactively refer participants to health care services and various community resources, including other FNS nutrition assistance programs, to improve health outcomes among HIV-infected WIC participants.

Implications for WIC Nutrition Services

WIC can improve the management of chronic infectious diseases through WIC foods, nutrition education, counseling, and referrals to community resources that provide support in the long-term management of chronic infectious diseases.

HIV/AIDS

The table below summarizes the WIC Nutrition Services that can help improve the health and birth outcomes of participants with HIV/AIDS.

Participant Category	WIC Nutrition Services Recommendations for HIV/AIDS
ALL CATEGORIES	**NUTRITION AND HEALTH TIPS TO MANAGE HIV/AIDS SYMPTOMS** • Use MyPlate as the guide for dietary needs. • Consult health care providers when using supplements and herbs to avoid adverse reactions or medication interactions that could reduce effectiveness. • Eat small, frequent meals when gastrointestinal problems are present or persistent. • Eat soft foods with manageable textures at tolerable temperatures when oral lesions and dental problems are present (i.e. mashed potatoes, scrambled/boiled eggs, bananas, non-citrus juices, puddings, custards, milk, cooked vegetables, rice, oatmeal, non-fizzy drinks, cottage cheese, non-spicy foods). • Add canned tuna, beans, cheese, peanut butter, dried milk for inexpensive extra protein. • Add moderate amounts of concentrated sources of calories to diet when needed (e.g., butter, cream cheese, gravies, whole milk, ice cream). • Consume nutritious, high caloric foods when appetite is normal or has returned. • Drink adequate water to stay hydrated, replace fluid loss from diarrhea and vomiting, and help medications move through the body.

	• Consume foods high in fiber or fiber supplements to slow digestion if foods are moving too quickly through the body. • Eat yogurt or foods with *Lactobacillus acidophilus* culture to help with bacterial over-growth resulting from prolonged use of antibiotics. • Avoid caffeinated beverages to prevent dehydration. • Avoid or reduce sugar-free foods with sorbitol as diarrhea may be exacerbated. • Consult with health care provider about use of complete oral nutritional supplements to help nutritional status. • Avoid alcohol and illegal drugs for overall good health and to help protect the liver. • Use pancreatic enzymes when medically prescribed to help with digestion. • Prepare and store food safely. • Avoid expired and moldy foods or foods with rotten spots. • Participate in weight-bearing exercises to strengthen and maintain bones. • Refer HIV-affected families to other community resources for food, housing, and medical resources to improve compliance with HIV treatment.
WOMEN	• Encourage all women to be tested to prevent mother-to-child HIV transmission through delivery and breastfeeding (7). Women who are considered high risk, such as those with sexually transmitted infections, multiple partners, or have substance abuse issues, are encouraged to be retested during late gestation, preferably before 36 weeks (9). Note: HIV testing is not a standard medical test administered to pregnant women in many states, in addition, pregnant women can opt-out in those states in which HIV testing is part of the standard test. Therefore, WIC can impact the spread of HIV/AIDS by making referrals to participants for early and late gestation testing, given that some populations served by WIC are most at risk for contracting HIV (7). • Educate mothers with HIV/AIDS to avoid breastfeeding. This is especially important for recent immigrants and refugees from developing nations, as the recommendations are different in developing countries (15). In some developing countries, breastfeeding is encouraged due to the lack of available clean water to prepare infant formula and other sanitation problems). • More information about **women and HIV** can be found at: o http://www.womenshealth.gov/hiv-aids/ o http://www.cdc.gov/hiv/risk/gender/pregnantwomen/facts/
	• Inform mothers/caregivers that formula feeding is the standard for infants born to HIV positive mothers in the United States as breastfeeding is not recommended – especially to the immigrant and refugee population (13).

INFANTS	• Ensure that liquid concentrate, or ready-to-feed infant formula, prescribed with medical documentation, is provided to HIV-exposed infants or babies born to HIV positive mothers, even if the infant has tested negative for HIV. Powdered infant formula is not sterile and therefore may not be microbiologically safe for immune-compromised participants (14). • Discourage giving pre-chewed food, regardless of HIV status, as the individual's HIV status, who is pre-chewing the food is unknown (6). • More information about **infants and HIV** can be found at: o http://www.cdc.gov/hiv/risk/gender/pregnantwomen/facts/
CHILDREN	• Discourage giving pre-chewed food, regardless of HIV status, as the individual's HIV status, who is pre-chewing the food is unknown (6) • More information about **children and HIV** can be found at: o http://www.cdc.gov/hiv/risk/gender/pregnantwomen/facts/ o http://aids.gov/hiv-aids-basics/just-diagnosed-with-hiv-aids/overview/children/

VIRAL HEPATITIS

Hepatitis is inflammation of the liver. It is most often caused by viruses, but can also be caused by excessive alcohol consumption, toxins, and medicines such as acetaminophen, as well as other medical conditions linked to liver inflammation (20). Viral hepatitis is caused by a series of viruses labeled A, B, C, D, and E with A, B, and C being the most common forms in the United States. Viral hepatitis A and E are the only forms that are acute and do not become chronic, whereas B, C, and D can both be acute and chronic in nature (20). Regardless of the type of hepatitis, infected individuals with signs of the infection will typically experience: anorexia, nausea, vomiting, diarrhea, jaundice, epigastria pain, tiredness, and weakness, all of which affect one's diet and health (21). In addition, darker urine and pale stools may be present in infected individuals. It is important to note that viral hepatitis is the leading cause of liver cancer and the most frequent need for liver transplants in the United States (22).

Hepatitis B: Hepatitis B is both acute and chronic, and is transmitted through contact with hepatitis B virus (HBV) infected blood, sexual intercourse with an infected person, and from mother to child by both vaginal or cesarean section births (20). Those at higher risk of becoming infected with hepatitis B are those: living with a hepatitis B infected person**;** coming into contact with blood, needles, or body fluids through work**;** working or living in a prison system**;** from Asian and Pacific Islands nations**;** undergoing kidney dialysis**;** infected with HIV or hepatitis; and who have an immigrant or refugee status (21).

Treatment for Hepatitis B involves the use of interferon and antiviral drugs to interfere with the course of the virus. Early diagnosis and treatment of hepatitis B can help prevent damage to the liver. In addition, the Hepatitis B vaccination can prevent Hepatitis B. (22)

Hepatitis B is not spread through human milk. Given that Hepatitis B is spread through blood, mothers who breastfeed should care for their nipples to avoid cracking and bleeding. If a mother with Hepatitis B has cracked and bleeding nipples, she should temporarily stop breastfeeding until her nipples heal - but continue to pump and discard pumped milk to maintain her milk supply (23). If a mother with HBV has concerns with providing her milk to her infant or concerns with drug treatment for the HBV, she should consult her physician.

Hepatitis C: Hepatitis C is both acute and chronic; however, most cases are chronic and commonly spread through sharing needles during intravenous drug use (20). It can also spread through sexual intercourse; having a blood transfusion or organ transplant before July 1992; or using the razor, toothbrush, or nail clippers of an infected person. Being infected with a sexually transmitted disease or HIV can increase the chances of becoming infected with Hepatitis C. Getting tattoos and body piercings from unlicensed facilities, in casual settings, or with the use of non-sterile instruments can also transmit Hepatitis C (20).

By the time symptoms appear with hepatitis C, the liver has been damaged, which in most cases can be as long as ten years after being infected. There is no vaccine for Hepatitis C. Medicines are used to slow or stop the virus from damaging the liver in chronic hepatitis. Severe damage to the liver leading to failure may require a liver transplant. (20)

Infants born to mothers with hepatitis C can become infected; however, breastfeeding is not contraindicated, as Hepatitis C is not transmitted through human milk, unless the mother's nipples are cracked and bleeding. (See information above in **Hepatitis B** about breastfeeding with cracked and/or bleeding nipples.)

Hepatitis D: Hepatitis D is both acute and chronic. Though not common in the United States, viral hepatitis D can only be contracted when an individual also has hepatitis B (20, 22). The virus is present in blood and other body fluids of infected persons and is most commonly transmitted through: engaging in sexual activity; mother to child during delivery; sharing injection drug paraphernalia, razors, or toothbrushes; or coming in direct contact with the blood of an infected person. Chronic hepatitis D resulting from a super-infection, in which an individual has chronic hepatitis B, can progress to end-stage liver diseases (cirrhosis) or liver cancer. In some patients, interferon may be useful for treating hepatitis D. Although no vaccine exist for Hepatitis D, it can be prevented in persons who do not have Hepatitis B, by getting the Hepatitis B vaccination (20, 22).

Implications for WIC Nutrition Services

WIC can improve the management of chronic infectious diseases through WIC foods, nutrition education, counseling, and referrals to community resources that provide support in the long-term management of chronic infectious diseases.

Types of Hepatitis	WIC Nutrition Services Recommendations for Chronic Hepatitis
All types	• Recommend testing to pregnant women and high risk individuals. • Encourage abstinence from alcohol. • Provide information on high calorie, high protein and moderate fat diets. • Recommend high calorie consumption at breakfast to mitigate nausea. (Typically nausea is less common in the morning.) • Recommend, in consultation with health care provider, consumption of high calorie and protein liquid formula between meals to boost calorie intake. • Encourage a bland diet with extra fluids depending on the severity of nausea and vomiting.
Hepatitis B	• Encourage the Hepatitis B vaccine for all newborns, previously unvaccinated adolescents through the age of 18, and high-risk adults. • Promote breastfeeding as being safe, but to avoid breastfeeding when nipples are cracked and bleeding – at which time, mothers should pump and discard milk to maintain supply. • Discourage the practice of pre-chewing food for infants, as blood may be present.
Hepatitis C	• Promote breastfeeding as being safe, but to avoid breastfeeding when nipples are cracked and bleeding – at which time, mothers should pump and discard milk to maintain supply.
Hepatitis D	• Recommend Hepatitis B vaccine.

Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Food Allergies

Definition/ cut-off value

Food allergies are adverse health effects arising from a specific immune response that occurs reproducibly on exposure to a given food. (1)
Presence of condition diagnosed, documented, or reported by a physician or someone working under a physician's orders, or as self-reported by applicant/ participant/caregiver. See Clarification for more information about self-reporting a diagnosis.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	VI
Infants	I
Children	III

Justification

The actual prevalence of food allergies is difficult to establish due to variability in study designs and definitions of food allergies; however recent studies suggest a true increase in prevalence over the past 10 to 20 years (1). A meta-analysis conducted by the National Institute of Allergy and Infectious Disease (NIAID) found the prevalence of food allergy among all age groups between 1-10% (2). Further research has found that food allergy affects more children than recently reported with the prevalence estimated to be 8 % (2). Food allergies are a significant health concern as they can cause serious illness and life-threatening reactions. Prompt identification and proper treatment of food allergies improves quality of life, nutritional well-being and social interaction.

Food allergy reactions occur when the body's immune system responds to a harmless food as if it were a threat (3). The most common types of food allergies involve immunoglobulin E (IgE)-mediated responses. The immune system forms IgE against offending food(s) and causes abnormal reactions. IgE is a distinct class of antibodies that mediates an immediate allergic reaction. When food allergens enter the body, IgE antibodies bind to them and release chemicals that cause various symptoms. (1)

According to an expert panel sponsored by the National Institute of Allergy and Infectious Disease, individuals with a family history of any allergic disease are susceptible to developing food allergies and are classified as "at risk" or "high risk." Individuals who are "at risk" are those with a biological parent or sibling with existing, or history of, allergic rhinitis, asthma or atopic

dermatitis. Individuals who are "high risk" are those with preexisting severe allergic disease and/or family history of food allergies. (1)

Food Allergies vs. Intolerances

Food intolerances are classified differently from food allergies based on the pathophysiological mechanism of the reactions. Unlike food allergies, food intolerances do not involve the immune system. Food intolerances are adverse reactions to food caused either by the properties of the food itself, such as a toxin, or the characteristics of the individual, such as a metabolic disorder (4). Food intolerances are often misdiagnosed as food allergies because the symptoms are often similar. Causes of food intolerances may include food poisoning, histamine toxicity, food additives such as monosodium glutamate (MSG), or sulfites (5). The most common food intolerance is lactose intolerance (see nutrition risk criterion #355, Lactose Intolerance).

Common Food Allergens

Although reactions can occur from the ingestion of any food, a small number of foods are responsible for the majority of food-induced allergic reactions (6). The foods that most often cause allergic reactions include:

- cow's milk (and foods made from cow's milk)
- eggs
- peanuts
- tree nuts (walnuts, almonds, cashews, hazelnuts, pecans, brazil nuts)
- fish
- crustacean shellfish (e.g., shrimp, crayfish, lobster, and crab)
- wheat
- soy

For many individuals, food allergies appear within the first two years of life. Allergies to cow's milk, eggs, wheat and soy generally resolve in early childhood. In contrast, allergy to peanuts and tree nuts typically persist to adulthood. Adults may have food allergies continuing from childhood or may develop sensitivity to food allergens encountered after childhood, which usually continue through life. (1)

Symptoms

There are several types of immune responses to food including IgE-mediated, non-IgE-mediated or mixed. In an IgE-mediated response, the immune system produces allergen-specific IgE antibodies (sIgE) when a food allergen first enters the body. Upon re-exposure to the food allergen, the sIgE identifies it and quickly initiates the release of chemicals, such as histamine (3). These chemicals cause various symptoms based on the area of the body in which they were released. These reactions occur within minutes or up to 4 hours after ingestion and include symptoms such as urticaria (hives), angioedema, wheezing, cough, nausea, vomiting, hypotension and anaphylaxis (7).

Food-induced anaphylaxis is the most severe form of IgE-mediated food allergies. It often occurs rapidly, within seconds to a few hours after exposure, and is potentially fatal without proper treatment. Food induced anaphylaxis often affects multiple organ systems and produces many symptoms, including respiratory compromise (e.g., dyspnea, wheeze and bronchospasm), swelling and reduced blood pressure (7). Prompt diagnosis and treatment is essential to

prevent life-threatening reactions. Tree nuts, peanuts, milk, egg, fish and crustacean fish are the leading causes of food-induced anaphylaxis (1).

Food allergens may also induce allergic reactions which are non-IgE-mediated. Non-IgE-mediated reactions generally occur more than 4 hours after ingestion, primarily result in gastrointestinal symptoms and are more chronic in nature (7). Examples of non-IgE-mediated reactions to specific foods include celiac disease (see nutrition risk criterion #354, Celiac Disease), food protein-induced enterocolitis syndrome (FPIES), food protein-induced proctocolitis (FPIP), food protein-induced gastroenteropathy, food-induced contact dermatitis and food-induced pulmonary hemosiderosis (Heiner's syndrome) (accessed May 2012) (8).

The diagnosis of food allergies by a health care provider (HCP) is often difficult and can be multifaceted (see Clarification for more information). Food allergies often coexist with severe asthma, atopic dermatitis (AD), eosinophilic esophagitis (EoE) and exercise-induced anaphylaxis. Individuals with a diagnosis of any of these conditions should be considered for food allergy evaluation. (1)

Prevention

Currently, there is insufficient evidence to conclude that restricting highly allergenic foods in the maternal diet during pregnancy or lactation prevents the development of food allergies in the offspring(9). Adequate nutrition intake during pregnancy and lactation is essential to achieve positive health outcomes. Unnecessary food avoidance can result in inadequate nutrition. There is also a lack of evidence that delaying the introduction of solids beyond 6 months of age, including highly allergenic foods, prevents the development of food allergies. If the introduction of developmentally appropriate solid food is delayed beyond 6 months of age, inadequate nutrient intake, growth deficits and feeding problems can occur. (1)

The protective role that breastfeeding has in the prevention of food allergies remains unclear. There is some evidence for infants at high risk of developing food allergies that exclusive breastfeeding for at least 4 months may decrease the likelihood of cow's milk allergy in the first 2 years of life (9). The American Academy of Pediatrics (AAP) continues to recommend that all infants, including those with a family history of food allergies, be exclusively breastfed until 6 months of age, unless contraindicated for medical reasons (1, 10). For infants who are partially breastfed or formula fed, partially hydrolyzed formulas may be considered as a strategy for preventing the development of food allergies in at-risk infants. According to the AAP, there is no convincing evidence for the use of soy formula as a strategy for preventing the development of food allergies in at-risk infants and therefore it is not recommended. (9)

Management

Food allergies have been shown to produce anxiety and alter the quality of life of those with the condition. It is recommended that individuals with food allergies and their caregivers be educated on food allergen avoidance and emergency management that is age and culturally appropriate. Individuals

with a history of severe food allergic reactions, such as anaphylaxis, should work with their HCP to establish an emergency management plan. (1)

Food allergen avoidance is the safest method for managing food allergies. Individuals with food allergies must work closely with their HCP to determine the food(s) to be avoided. This includes the avoidance of any cross-reactive foods, i.e., similar foods within a food group (see Clarification for more information). Nutrition counseling and growth monitoring is recommended for all individuals with food allergies to ensure a nutritionally adequate diet. Individuals with food allergies should also be educated on reading food labels and ingredient lists. (1) Infants who are partially breastfed or formula fed, with certain non-IgE mediated allergies, such as, FPIES and FPIP may require extensively hydrolyzed casein or amino acid-based formula. According to food allergy experts, children with FPIES can be re-challenged every 18-24 months and, infants/children with FPIP can be re-challenged at 9-12 months of age. The re-challenging of foods should be done with HCP oversight. (8)

Implications for WIC Nutrition Services

Through client-centered counseling, WIC staff can assist families with food allergies in making changes that improve quality of life and promote nutritional well-being while avoiding offending foods. Based on the needs and interests of the participant, WIC staff can (as appropriate):

- Facilitate and encourage the participant's ongoing follow-up with the HCP for optimal management of the condition.
- Promote exclusive breastfeeding until six months of age and continue through the first year (10).
- Provide hypoallergenic formula for participants with appropriate medical documentation, as needed.
- Tailor food packages to substitute or remove offending foods.
- Educate participants on maintaining adequate nutritional intake while avoiding offending foods.
- Monitor weight status and growth patterns of participants.
- Educate participants about reading food labels and identifying offending foods and ingredients.

  See resources below:
  - http://www.fda.gov/downloads/ForConsumers/ConsumerUpdates/UCM254727.pdf. Accessed May 2012
  - http://www.webmd.com/allergies/foodtriggers. Accessed May 2012.
  - http://www.foodallergy.org/section/how-to-read-a-label. Accessed May 2012.
- Educate participants on planning meals and snacks for outside the home.
- Refer participants to their HCP for a re-challenge of offending foods, as appropriate.
- Establish/maintain communication with participant's HCP.

Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Food allergies are diagnosed by a HCP by evaluating a thorough medical history and conducting a physical exam to consider possible trigger foods to determine the underlying mechanism of the reaction, which guides testing. Along with a detailed history of the disorder, such as symptoms, timing, common triggers and associations, there are several types of tests that the HCP may use in diagnosing food allergies. These include the following:

- Food Elimination Diet
- Oral Food Challenges
- Skin Prick Test (SPT)
- Allergen-specific serum IgE (sIgE)
- Atopy Patch Test

Diagnosing food allergies is difficult because the detection of sIgE does not necessarily indicate a clinical allergy. Often, more than one type of test is required to confirm a diagnosis. The double-blind, placebocontrolled food challenge is considered the gold standard in testing for food allergies. (11)

Children often outgrow allergies to cow's milk, soy, egg, and wheat quickly; but are less likely to outgrow allergies to peanut, tree nuts, fish, and crustacean shellfish. If the child has had a recent allergic reaction, there is no reason to retest. Otherwise, annual testing may be considered to see if the allergy to cow's milk, soy, egg, or wheat has been outgrown so the diet can be normalized. (1)

Cross-reactive food: When a person has allergies to one food, he/she tends to be allergic to similar foods within a food group. For example, all shellfish are closely related; if a person is allergic to one shellfish, there is a strong chance that person is also allergic to other shellfish. The same holds true for tree-nuts, such as almonds, cashews and walnuts. (1)

Celiac Disease

Definition/ cut-off value

Celiac Disease (CD) is an autoimmune disease precipitated by the ingestion of gluten (a protein in wheat, rye, and barley) that results in damage to the small intestine and malabsorption of the nutrients from food. (1). (For more information about the definition of CD, please see the Clarification section)

CD is also known as:

- Celiac Sprue
- Gluten-sensitive Enteropathy
- Non-tropical Sprue

Presence of condition diagnosed, documented, or reported by a physician or someone working under a physician's orders, or as self-reported by applicant/participant/caregiver. See Clarification for more information about self-reporting a diagnosis.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	III
Infants	I
Children	III

Justification

CD affects approximately 1% of the U.S. population (2, 3). CD can occur at any age and the treatment requires strict adherence to a gluten-free diet for life. CD is both a disease of malabsorption and an abnormal immune reaction to gluten. When individuals with CD eat foods or ingest products containing gluten, their immune system responds by damaging or destroying villi—the tiny, fingerlike protrusions lining the small intestine. Villi normally allow nutrients from food to be absorbed through the walls of the small intestine into the bloodstream (4). The destruction of villi can result in malabsorption of nutrients needed for good health. Key nutrients often affected are iron, calcium and folate as they are absorbed in the first part of the small intestine. If damage occurs further down the small intestinal tract, malabsorption of carbohydrates (especially lactose), fat and fat-soluble vitamins, protein and other nutrients may also occur (2,5).

In addition to the gastrointestinal system, CD affects many other systems in the body, resulting in a wide range and severity of symptoms. Symptoms of CD may include chronic diarrhea, vomiting, constipation,

pale foul-smelling fatty stools and weight loss. Failure to thrive may occur in infants and children. The vitamin and mineral deficiencies that can occur from continued exposure to gluten may result in conditions such as anemia, osteoporosis and neurological disorders such as ataxia, seizures and neuropathy.

Individuals with CD who continue to ingest gluten are also at increased risk for developing other autoimmune disorders (e.g., thyroid disease, type 1 diabetes, Addison's disease) and certain types of cancer, especially gastrointestinal malignancies (2).

Continued exposure to gluten increases the risk of miscarriage or having a low birth weight baby, and may result in infertility in both women and men. A delay in diagnosis for children may cause serious nutritional complications including growth failure, delayed puberty, iron-deficiency anemia, and impaired bone health. Mood swings or depression may also occur (2, 6). See Table 1 for Nutritional Implications and Symptoms.

Table 1. Nutritional Implications and Symptoms of CD
Common in Children
Digestive Symptoms-more common in infants and children, may include. • vomiting • chronic diarrhea • constipation • abdominal bloating and pain • pale, foul-smelling, or fatty stool
Other Symptoms: • delayed puberty • dental enamel abnormalities of the permanent teeth • failure to thrive (delayed growth and short stature) • weight loss • irritability
Common in Adults
Digestive Symptoms- same as above, less common in adults
Other Symptoms- adults may instead have one or more of the following: • unexplained iron-deficiency anemia • other vitamin and mineral deficiencies (A, D, E, K, calcium) • lactose intolerance • fatigue • bone or joint pain • arthritis • depression or anxiety • tingling numbness in the hands and feet

• seizures • missed menstrual periods • infertility (men and women) or recurrent miscarriage • canker sores inside the mouth • itchy skin rash- dermatititis herpetiformis • elevated liver enzymes
Sources: Case, Shelley, Gluten-Free Diet, A Comprehensive Resource Guide, Case Nutrition Consulting Inc., 2008. National Institute of Diabetes and Digestive and Kidney Diseases, Celiac Disease, NIH Publication No. 08-4269 September 2008.) http://digestive.niddk.nih.gov/ddiseases/pubs/celiac/#what. Accessed May 2012.

Implications for WIC Nutrition Services

The risk for development of CD depends on genetic, immunological, and environmental factors. Recent studies suggest that the introduction of small amounts of gluten while the infant is still breast-fed may reduce the risk of CD. Both breastfeeding during the introduction of dietary gluten, and increasing the duration of breastfeeding were associated with reduced risk in the infant for the development of CD. It is not clear from studies whether breastfeeding delays the onset of symptoms or provides a permanent protection against the disease. Therefore, it is prudent to avoid both early (<4 months) and late (≥7 months) introduction of gluten and to introduce gluten gradually while the infant is still breast-fed, as this may reduce the risk of CD. (7)

The only treatment for CD is a gluten-free diet. Individuals with CD should discuss gluten-free food choices with a dietitian or physician that specializes in CD. Individuals with CD should always read food ingredient lists carefully to make sure that the food does not contain gluten. Making informed decisions in the grocery stores and when eating out is essential for the successful treatment of the disease (5, 8).

Through client-centered counseling, WIC staff can assist participants with CD in making gluten-free food choices that improve quality of life and promote nutritional well-being. WIC can provide nutrition education/ counseling on alternatives to gluten-containing food products as well as provide gluten-free grain selections available in the WIC food packages. Based on the needs and interests of the participant, WIC staff may (as appropriate):

- Promote breastfeeding throughout the first year of life, with exclusive breastfeeding until 4-6 months of age.
- In consultation with the guidance of a medical provider, introduce gluten-containing foods between 4 and 6 months to infants at risk of CD, including infants with a parent or sibling with CD.
- Tailor food packages to substitute or remove gluten-containing foods.

- Educate participants on meeting nutritional needs in the absence of gluten-containing foods.
- Encourage high fiber, gluten-free grain selections.
- Monitor participant's growth pattern and weight status.
- Educate participants on planning gluten-free meals and snacks for outside the home.
- Provide educational materials outlining allowed foods and foods to avoid, for example:

  - http://www.celiac.nih.gov/Default.aspx. Accessed May 2012.
  - http://www.naspghan.org/user-assets/Documents/pdf/diseaseInfo/GlutenFreeDietGuide-E.pdf.Accessed May 2012.

- Provide referrals as appropriate.

Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

The 2006 American Gastroenterological Association (AGA) Institute Technical Review on the Diagnosis and Management of Celiac Disease refers to CD as "a unique disorder that is both a food intolerance and autoimmune disorder" (9). According to the 2010 NIAID-Sponsored Expert Panel definition, CD is a non-IgE mediated food allergy (10). (See nutrition risk criterion #353, Food Allergy.) However, the Expert Panel did not include information about CD in its report but rather refers readers to existing clinical guidelines on CD, including the AGA Institute's Technical Review. (5 9,10)

Lactose Intolerance

Definition/ cut-off value

Lactose intolerance is the syndrome of one or more of the following: diarrhea, abdominal pain, flatulence, and/or bloating, that occurs after lactose ingestion.

Presence of condition diagnosed, documented, or reported by a physician or someone working under a physician's orders, or as self-reported by applicant/ participant/caregiver. See Clarification for more information about self-reporting a diagnosis.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	VI
Infants	I
Children	III

Justification

Lactose intolerance occurs because of a deficiency in the levels of the lactase enzyme (1). Many variables determine whether a person with lactase deficiency develops symptoms. They include: the dose of lactose ingested; the residual intestinal lactase activity; the ingestion of food along with lactose; the ability of the colonic flora to ferment lactose; and, the individual sensitivity to the products of lactose fermentation (1). Some forms of lactase deficiencies may be temporary, resulting from premature birth or small bowel injuries, and will correct themselves, leaving individuals with the ability to digest lactose sufficiently (2).

Primary lactase deficiency is attributable to relative or absolute absence of lactase that develops in childhood, and is the most common cause of lactose malabsorption and lactose intolerance (2).

Secondary lactase deficiency is one that results from small bowel injury, such as acute gastroenteritis, persistent diarrhea, or other causes that injure the small intestine mucosa, and can present at any age, but is more common in infancy. Treatment of secondary lactase deficiency and lactose malabsorption attributable to an underlying condition generally do not require elimination of lactose from the diet. Once the primary problem is resolved, lactose-containing products can be consumed normally. (2)

Congenital lactase deficiency is a rare disorder that has been reported in only a few infants. Affected newborn infants present with intractable diarrhea as soon as human milk or lactose-containing formula is introduced. (2) Developmental lactase deficiency is the relative lactase deficiency observed among pre-term infants of less than 34 weeks gestation (2). One study in

preterm infants reported benefit from the use of lactase supplemented feedings or lactose-reduced formulas (3). The use of lactose-containing formulas and human milk does not seem to have any short- or long-term deleterious effects in preterm infants (2).

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Lactose is found primarily in milk, milk-based formula and other dairy products, which provide a variety of nutrients essential to the WIC population (calcium, vitamin D, protein). Lactose intolerance varies according to individuals. Some individuals may tolerate various quantities of lactose without discomfort, or tolerate it when consumed with other foods. Dairy products that are soured, or otherwise treated with bacteria that secrete lactase (e.g., Lactobacillus acidophilus), such as cheese and yogurt, are easier to digest in lactose-intolerant individuals because they contain relatively low levels of lactose. (4)

Many individuals diagnosed with lactose intolerance avoid dairy all together. Also, lactose intolerance has been shown to be associated with low bone mass and increased risk of fracture (5). Inadequate dairy intake increases the risk of metabolic syndrome, hypertension, preeclampsia, obesity and certain forms of cancer, especially colon cancer (6).

Implications for WIC Nutrition Services

It is important to assess participants individually for lactose tolerances and nutrient needs to determine the best plan of action. WIC can provide client-centered counseling to incorporate tolerated amounts of lactose-containing foods and/or other dietary sources of calcium, vitamin D and protein into participants' diets. WIC foods such as cheese, lactose-free milk, soy beverages, tofu, and calcium fortified foods (like juice) can provide these nutrients to participants with lactose intolerance. Based on the needs and interests of the participant, WIC staff can, in addition, also offer the following strategies (as appropriate):

- Except for infants with congenital lactase deficiency, promote exclusive breastfeeding until six months of age and continue breastfeeding through the first year. For infants with congenital lactase deficiency, treatment is removal and substitution of lactose from the diet with a commercial lactose-free formula (2).
- Tailor food packages to substitute or remove lactose-containing foods.
- Educate participants on meeting nutritional needs in the absence of lactose-containing foods.
- Educate participants on planning lactose-free/lactose-reduced meals and snacks for outings, social gatherings, school and/or work.

Any WIC participant suspected to have lactose intolerance should be referred to a health care provider for evaluation and appropriate diagnosis (7), if needed

(see Clarification for additional information on diagnosing Lactose intolerance).

Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Lactose malabsorption can be diagnosed with a hydrogen breath test. The test involves having individuals ingest a standard dose of lactose after fasting. Elevated levels of breath hydrogen, which are produced by bacterial fermentation of undigested lactose in the colon, indicate the presence of lactose malabsorption (1). The hydrogen breath test is not routinely ordered, and instead, patients are frequently asked to assess symptoms while avoiding dairy products for a period of time followed by a lactose product challenge to determine if they are lactose intolerant (7). The demonstration of lactose malabsorption does not necessarily indicate that an individual will be symptomatic.

Hypoglycemia

Definition/ cut-off value

Presence of hypoglycemia diagnosed by a physician as self reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	VI
Infants	I
Children	III

Justification

Hypoglycemia can occur as a complication of diabetes, as a condition in itself, in association with other disorders, or under certain conditions such as early pregnancy, prolonged fasting, or long periods of strenuous exercise (1).

Symptomatic hypoglycema is a risk observed in a substantial proportion of newborns who are small for gestational age (SGA), but it is uncommon and of shorter duration in newborns who are of the appropriate size for gestational age (2).

WIC can provide nutrition management that concentrates on frequent feedings to support adequate growth for infants and children (2). WIC can also provide nutrition education to help manage hypoglycemia in women that includes consuming a balanced diet, low carbohydrate snacks and exercise (1).

Eating Disorders

Definition/ cut-off value

Eating disorders (anorexia nervosa and bulimia), are characterized by a disturbed sense of body image and morbid fear of becoming fat. Symptoms are manifested by abnormal eating patterns including, but not limited to:

- self-induced vomiting
- purgative abuse
- alternating periods of starvation
- use of drugs such as appetite suppressants, thyroid preparations or diuretics
- self-induced marked weight loss

Presence of eating disorder(s) diagnosed by a physician as self reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders or evidence of such disorders documented by the CPA.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	III

Justification

Anorexia nervosa and bulimia are serious eating disorders that affect women in the childbearing years. These disorders result in general malnutrition and may cause life-threatening fluid and electrolyte imbalances. Women with eating disorders may begin pregnancy in a poor nutritional state. They are at risk of developing chemical and nutritional imbalances, deficiencies, or weight gain abnormalities during pregnancy if aberrant eating behaviors are not controlled. These eating disorders can seriously complicate any pregnancy since the nutritional status of the pregnant woman is an important factor in perinatal outcome.

Maternal undernutrition is associated with increased perinatal mortality and an increased risk of congenital malformation. While the majority of pregnant women studied reported a significant reduction in their eating disorder symptoms during pregnancy, a high percentage of these women regressed in the postpartum period. This regression in postpartum women is a serious concern for breastfeeding and Postpartum postpartum women who are extremely preoccupied with rapid weight loss after delivery.

Recent Major Surgery, Trauma, Burns

Definition/ cut-off value

Major surgery, trauma or burns severe enough to compromise nutritional status.

Surgery – Caesarean Section

Any occurrence:

- within the past two (≤ 2) months may be self reported
- more than two (> 2) months previous must have the continued need for nutritional support diagnosed by a physician or a health care provider working under the orders of a physician.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	III (VI for Surgery –C-Section)
Infants	I
Children	III

Justification

The body's response to injuries such as major surgeries, physical trauma, or burn may adversely affect nutrient requirements needed for recovery, leading to malnutrition. The catabolic response to these injuries causes a hypermetabolic state in the body. This alteration in metabolism not only increases the individual's calorie and protein needs, but they also increase the needs for certain vitamins, minerals, fatty acids, and amino acids. (1)
Proper wound healing is essential in the recovery of surgeries, physical trauma, and burns. Normal wound healing is a complex process and involves three phases: inflammation, proliferation, and remodeling (1, 2). Each phase of wound healing involves growth factors, other biologically active molecules, and specific vitamins and minerals such as Vitamin A, Vitamin C, and Zinc. The process of wound healing does not always follow the three stages sequentially and can sometimes move forward or regress based on nutrition status and response to treatment (3, 4). Even after a wound is closed, the individual's metabolic rate and need for additional nutrition can remain high (5).
Factors that can prevent proper wound healing or can increase the time needed for a wound to heal include (2, 6):

- Malnutrition prior to the surgery, injury or burn
- Infections

- Diabetes
- Poor blood flow
- Obesity
- Age
- Heavy alcohol use
- Stress
- Medications
- Smoking

Because healing is a complex process and is impacted by a variety of factors, it is inappropriate to expect a set recovery time for an individual based solely on the type and severity of the injury (7). For some individuals, they may no longer be at increased nutritional risk within a couple weeks of their injury. For others, recovery from the same type and severity of injury may take months.

Major Surgery and Wound Healing

Many types of surgeries are completed as noninvasive procedures and do not result in large incisions that require additional medical and nutritional care to heal. However, many surgical procedures (including cesarean sections) do involve incisions that, if left unaddressed, could lead to infection. Major surgeries are surgeries that involve a risk to the life of the individual and include operations on organs within the body (8). Removal of a portion of the large or small intestine, heart surgery, and bariatric surgery are examples of major surgeries. Minor surgeries are surgeries that involve little risk to the individual and include operations on the superficial structures of the body (9). Ear tubes, the most common childhood surgery performed with anesthesia, are an example of a minor surgery that does not impact nutrition status (10).

Cesarean sections are considered a major surgery and, therefore, require additional assessment and education in the WIC clinic. In the US, the rate of cesarean delivery rose from 19.7% of singleton births in 1996 to 31.3% of singleton births in 2011 (11). Reasons for a cesarean delivery include: multiple pregnancy, labor fails to progress, medical concerns for the infant, problems with the placenta, a large infant, breech position, maternal infections, and medical conditions in the mother (i.e. diabetes or high blood pressure) (12).

Nutritional Considerations for Major Surgery/Wound Healing

The role of specific nutrients in wound healing continues to be explored and studies are conducted regularly to assess the role vitamins, minerals, fatty acids, amino acids, and carbohydrates play in proper wound healing. Nutrient supplements above the Recommended Dietary Allowance (RDA) may be necessary to aid in wound healing. However, before using any additional supplement to assist in wound healing, energy and protein requirements of the individual must be met (13, 14). Amino acids are essential to the repair of damaged tissue in the body. Amino acids are divided into three categories: essential (must be obtained through foods), nonessential (can be produced in the body), and conditionally essential (produced in the body except in cases of injury or illness). Arginine and Glutamine are examples of conditionally essential amino acids. The following table highlights the roles of these nutrients in the wound healing process:

Nutrient	Role in Wound Healing
Arginine	Involved in secretion of growth hormone
Omega-3 fatty acids	Reduces wound infections
Vitamin C	Collagen synthesis
Vitamin A	Immune function and cellular communication
Vitamin E	Antioxidant
Vitamin D	Modulates cell growth Neuromuscular and immune function Reduces inflammation
Magnesium	Co-factor for enzymes involved in protein and collagen synthesis
Copper	Co-factor for cross-linking of collagen
Zinc	Involved in RNA and DNA polymerase
Iron	Aids in the synthesis of some growth hormones and connective tissue

Following a cesarean section, a breastfeeding mother may experience difficulty finding a comfortable nursing position that does not cause pain with the incision. She may also have difficulty breastfeeding if the infant is drowsy due to the pain medication administered during the procedure. A referral to a lactation specialist can help ensure that the mother is successful in reaching her breastfeeding goals.

Physical Trauma

Physical trauma is usually a result of accidents and injuries that often lead to fractures, wounds, and subsequent hospitalization. Physical trauma can be divided into blunt force trauma, penetrating trauma, and trauma from surgery. Blunt force trauma is the result of an object (or force) striking the body, causing concussions, lacerations or fractures. Penetrating trauma is trauma that occurs as a result of an object piercing the skin, causing an open wound (7). Fracture healing is a process that begins with a hemorrhage and progresses through three stages: inflammatory, reparative, and remodeling.

Physical trauma can also be a result of domestic and/or child abuse. In addition to the physical effects of abuse, victims of abuse often experience acute and ongoing psychological and emotional trauma that may also impact an individual's nutrition status. Poor appetite, undesirable food choices, and using food for coping can impact both women and children. Children may also begin hoarding food in cases of abuse or neglect. For more information on the impact of abuse, see Risk #901 *Recipient of Abuse*.

Nutritional Considerations for Physical Trauma

In addition to an increase in energy, protein, and micronutrients needed for proper wound healing, physical trauma that includes fractures requires additional nutrients for proper bone healing. In some cases, the physical trauma will lead to temporary or lifelong difficulty with self-feeding. Research on the roles specific nutrients play in fracture healing continues to expand. Key nutrients for bone health include calcium, phosphorus, fluoride, magnesium, sodium, vitamin D, vitamin A, vitamin K, vitamin C, vitamin B6, folate, and vitamin B12. Meeting RDAs set for these nutrients is important for bone health and bone healing (19).

For some individuals, intakes above the RDA may be recommended by their medical provider to assist in bone healing; however, some nutrients including fluoride, sodium, and vitamin A may negatively impact bone health when intake is above the recommended level (19).

Burns

Burns can be caused by heat (including hot surfaces, fires, and hot liquids), chemicals, electricity, sunlight or nuclear radiation. There are three stages of burns based on what layers of the skin are burned. A first-degree burn only affects the outer layer of the skin (epidermis). A second-degree burn damages the epidermis and the layer directly under the epidermis (dermis). A third-degree burn damages the epidermis, dermis, and damages the tissue underneath the skin. (20)

Burns are also classified based on the surface area of the body that has been burned (Percent Total Body Surface Area or TBSA). For example, a burn that covers one hand and arm would be 9% TBSA, whereas a burn that covers a person's back would be 18% TBSA (21). Increases in the surface area affected by the burn result in a greater potential for fluid loss and infection (21). Inhalation burns are burns that occur inside an individual's lungs and internal organs. Once discharged from the hospital, enteral feedings may be prescribed to aid in healing.

Nutritional Considerations for Burns

The nutrition status of burn patients is monitored very closely during hospitalization and after discharge. Following a severe burn, the body goes into a catabolic state and the body begins to breakdown skeletal muscle (5). This state increases the requirements for energy, protein, carbohydrates, fats, vitamins, minerals, and antioxidants (22). Damaged blood vessels also increase fluid loss and can lead to dehydration or shock (19). Nutrition care in the hospital setting for individual's recovering from burns may also include parenteral or enteral nutrition support depending on the severity of the burns. Glutamine, a conditionally essential amino acid, can improve the healing of burns (23).

Implications for WIC Nutrition Services

Most surgeries, physical traumas, and burns are unexpected. The education and supplemental food that WIC provides can help ensure that the individual is in good nutritional health prior to the surgery, physical trauma or burn. Following a major surgery, physical trauma, and/or burn, an individual will be at increased nutritional risk until the injury has completely healed. WIC staff can improve outcomes following an injury by:

- Assuring that vitamin and mineral intakes meet the RDAs (unless amounts that exceed the RDAs are recommended by their medical provider).
- Assuring that energy and protein intake preserve lean muscle mass and body weight.
- Recommending a participant speak with their medical provider about a multivitamin supplement when diet alone cannot meet the RDAs for vitamins and minerals.

- Referring to community resources for smoking cessation, support groups, food assistance, and safe living environments (in cases of physical abuse).
- Referring to a lactation educator if women experience difficulty breastfeeding following a cesarean section.

Other Medical Conditions

Definition/ cut-off value

Diseases or conditions with nutritional implications that are not included in any of the other medical conditions. The current condition, or treatment for the condition, must be severe enough to affect nutritional status.
Includes, but is not limited to:

- juvenile rheumatoid arthritis (JRA)
- lupus erythematosus
- cardiorespiratory diseases
- heart disease
- cystic fibrosis
- persistent asthma (moderate or severe) requiring daily medication

Presence of medical condition(s) diagnosed by a physician as self reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	III
Infants	I
Children	III

Justification

Juvenile rheumatoid arthritis (JRA) is the most common pediatric rheumatic disease and most common cause of chronic arthritis among children. JRA puts individuals at risk of anorexia, weight loss, failure to grow, and protein enery malnutrition.

Lupus erythematosus is an autoimmune disorder that affects multiple organ systems. Lupus erythematosus increases the risk of infections, malaise, anorexia, and weight loss. In pregnant women, there is increased risk of spontaneous abortion and late pregnancy losses (after 28 weeks gestation).

Cardiorespiratory diseases affect normal physiological processes and can be accompanied by failure to thrive and malnutrition. Cardiorespiratory diseases put individuals at risk for growth failure and malnutrition due to low calorie intake and hypermetabolism.

Cystic fibrosis (CF), a genetic disorder of children, adolescents, and young adults characterized by widespread dysfunction of the exocrine glands, is the most common lethal hereditary disease of the Caucasian race.

Many aspects of the disease of CF stress the nutritional status of the patient directly or indirectly by affecting the patient's appetite and subsequent intake. Gastrointestinal losses occur in spite of pancreatic enzyme replacement therapy. Also, catch-up growth requires additional calories. All of these factors contribute to a chronic energy deficit, which can lead to a marasmic type of malnutrition. The primary goal of nutritional therapy is to overcome this energy deficit.

Studies have shown variable intakes in the CF population, but the intakes are usually less than adequate and are associated with a less than normal growth pattern.

Asthma is a chronic inflammatory disorder of the airways, which can cause recurrent episodes of wheezing, breathlessness, chest tightness, and coughing of variable severity. Persistent asthma requires daily use of medication, preferably inhaled anti-inflammatory agents. Severe forms of asthma may require long-term use of oral corticosteroids which can result in growth suppression in children, poor bone mineralization, high weight gain, and, in pregnancy, decreased birth weight of the infant. High doses of inhaled corticosteroids can result in growth suppression in children and poor bone mineralization. Untreated asthma is also associated with poor growth and bone mineralization and, in pregnant women, adverse birth outcomes such as low birth weight, prematurity, and cerebral palsy.

Repeated asthma exacerbations ("attacks") can, in the short-term, interfere with eating and in the long-term can cause irreversible lung damage that contributes to chronic pulmonary disease. Compliance with prescribed medications is considered to be poor. Elimination of environmental factors that can trigger asthma exacerbations (such as cockroach allergen or environmental tobacco smoke) is a major component of asthma treatment. WIC can help by providing foods high in calcium and vitamin D, in educating participants to consume appropriate foods and to reduce environmental triggers, and in supporting and encouraging compliance with the therapeutic regimen prescribed by the health care provider.

NOTE: This criterion will usually not be applicable to infants for the medical condition of asthma. In infants, asthma-like symptoms are usually diagnosed as bronchiolitis with wheezing which is covered under Criterion #352, Infectious Diseases.

Depression

Definition/ cut-off value

Presence of clinical depression, including postpartum depression.
Presence of condition diagnosed, documented, or reported by a physician, clinical psychologist, or someone working under a physician's orders, or as self reported by applicant/participant/caregiver. See the Clarification section for more information about self-reporting a diagnosis.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	III

Justification

According to the National Institute of Mental Health (NIMH), nearly 10 percent of the U.S. population ages 18 and older suffers from depression each year, with 6.7 percent suffering from major depressive disorders (1). Although depression can occur at any age, the average onset is around age 30 (1, 2). Depression occurs twice as frequently in women as in men. Depression has a variety of symptoms, but the most common are deep feelings of sadness or a marked loss of interest in pleasure or activities. Other symptoms of depression include: appetite changes resulting in unintended weight losses or gains, insomnia or oversleeping, loss of energy or increased fatigue, restlessness or irritability, feelings of worthlessness or inappropriate guilt and difficulty thinking, concentrating or making decisions (1-3). Further, depression can increase the risk for some chronic diseases such as coronary heart disease, myocardial infarction, chronic pain syndromes, premature aging, and impaired wound healing. Therefore, untreated depression has the potential to impact long term health status (4). For information about children and depression, please see the Clarification section.

Pregnancy and Depression

Depression is common during pregnancy. Between 14 and 23 percent of pregnant women will experience depressive symptoms (5, 6). Several studies have found that depression risk is highest during the last trimester of pregnancy (4). Women who experience depression during pregnancy are found to be less likely to seek prenatal care (3). They may also suffer from episodes of nausea/vomiting or initiate/increase the use of drugs, alcohol and nicotine (4). Pregnant women with depression may be at risk for preeclampsia, preterm delivery or delivery of low birth weight infants and have higher perinatal mortality rates (5, 6).

Pregnant Adolescents

In the United States, 10 percent of women become pregnant during adolescence (7). The prevalence of teen pregnancy is highest among African and Native Americans, lower socioeconomic groups, and those living in stressful family environments. The prevalence rate of depression among pregnant adolescents is between 16 and 44 percent, which is almost twice as high as among their adult counterparts and non-pregnant adolescents (7). Adolescence is a stage of rapid metabolic, hormonal, physiological and developmental changes. Depressive symptoms are likely to emerge when the physiologic and psychological changes that occur during pregnancy are superimposed upon normal developmental change. (8)
Teens who are under stress, lack social and/or family support, experience significant loss, or who have attention, learning or conduct disorders are at greater risk for developing clinical depression (9). Depression in young people often occurs with mental disorders, substance abuse disorders, or physical illnesses, such as diabetes (10). Pregnant adolescents with depressive symptoms are more likely to delay or refuse prenatal care and have subsequent, short interval pregnancies (within 24 months), both of which have shown to result in poor pregnancy outcomes (11, 12).

Antidepressant Use in Pregnancy

Negative consequences for the newborn such as fetal growth changes and shorter gestation periods have been associated with both depression symptoms and use of antidepressant medications during pregnancy. Although rare, some studies have linked fetal malformations, cardiac defects, pulmonary hypertension and reduced birth weight to antidepressant use during pregnancy, however, more research in this area is needed. (4, 6, 13) For more information about specific drug therapies used for treating depression, please see the Clarification section (14).

A fetus exposed to antidepressants throughout pregnancy or during the last trimester may, in rare instances, experience temporary withdrawal symptoms— such as jitters or irritability — at birth (15, 16). Some health care providers may suggest tapering dosages until after birth to minimize newborn withdrawal symptoms though it is unclear whether this method can reduce harmful effects. This strategy may also be unsafe for new mothers as they enter the postpartum period — a time of increased risk of mood swings and problems with anxiety. Therefore, it is imperative that prenatal women discuss the risks and benefits of antidepressant therapy with their health care provider.

Postpartum Depression and Related Mood Disorders

Postpartum depression was historically hypothesized to be caused by low estrogen and progesterone levels immediately following birth, however, this hypothesis has been found to have limited scientific support (17). Emerging studies have found that reproductive hormones have an indirect relationship on depression because of the influence on stress hormones, immune markers or sleep quality. The incidence of postpartum depression in new mothers can range from approximately 12 to 25 percent, to up to 35 percent or more in some high-risk groups. High risk groups include: women of low income, younger age, low education level and histories of stressful life events or

traumatic experiences. Some studies have higher percentage rates for depression because they include both subjects with diagnosed major depression and those with depressive symptoms, thus accounting for the wide range in rates. (4)

Postpartum depression is distinguished from "baby blues" - a common reaction following delivery - both by its duration and the debilitating effects of the indifference the mother has about herself and her children (17). "Baby blues" are characterized by mild depressive symptoms, tearfulness (often for no discernible reason), anxiety, irritableness, mood fluctuations, increased sensitivity and fatigue. The "blues" typically peak four to five days after delivery, may last hours to days and resolve by the 10th postnatal day (18).

Inflammation and Depression

Inflammation was once recognized as one of several risk factors for depression. New research has found that inflammation is not *a* risk factor—but rather it is *the* risk factor that underlies all others. This represents a shift in how inflammation contributes to depression. Emerging research has revealed that depression is associated with inflammation manifested by increased levels of proinflammatory cytokines. Common experiences of new motherhood; sleep disturbance, postpartum pain and past or current psychological trauma, act as stressors that cause proinflammatory cytokine levels to rise. This finding may explain why psychosocial, behavioral and physical risk factors increase the risk of depression (19). Additionally, inflammation levels normally rise during the last trimester of pregnancy, which may explain, as stated in the Pregnancy and Depression section above, the higher risk for experiencing depression during pregnancy (4).

Breastfeeding and Depression

Successful breastfeeding has a protective effect on maternal mental health because it attenuates stress and modulates the inflammatory response. Conversely, breastfeeding difficulties such as nipple pain can increase the risk of depression and should be addressed promptly. (19)

Implications for WIC Nutrition Services

Individuals diagnosed with depression can benefit from WIC nutrition services and supplemental foods. Through participant-centered counseling, WIC staff can, as necessary:

- Reinforce and support the treatments and therapies prescribed by the participant's health care provider.
- Make referrals to the primary health care provider and/or to other appropriate mental health and social service programs. A 2010 brief from the Urban Institute , recognized the WIC Program as a viable access point to identify and refer mothers with depressive symptoms (20). To learn more about mental health resources in your area please access the U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration's website. http://store.samhsa.gov/mhlocator or http://www.samhsa.gov/prevention/.

- Provide follow-up to ensure that the woman is receiving the necessary mental health treatment.
- Encourage food choices that promote nutritional well-being (to include good sources of Omega-3's for their anti-inflammatory properties).
- Educate about the increased risk of depressive symptoms during the third trimester of pregnancy as well as the prevalence, risks and signs of postpartum depression.
- Provide adequate breastfeeding education, assessment and support (e.g., peer counseling) to women with existing depression; both prenatally and in the postpartum period.

A supplement to this criterion was developed to provide WIC State and local agencies with more information about the treatment of depression and WIC's role in providing nutrition services to women at risk of or diagnosed with depression: *Guidance for Screening and Referring Women with or At Risk for Depression*.

Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Depression may be present in young children; however, it is generally not diagnosed until later in life. At this time, there is no evidenced-based research to support the diagnosis of depression as a risk criterion for WIC children participants. It is important to note, however, that a child's health may be at risk if the mother has a diagnosis of depression.

Nutrition Risk Criterion #902; *Woman or Infant/Child of Primary Caregiver with Limited ability to Make Feeding Decisions or Prepare Food*, is an appropriate risk criterion assignment for an infant or child of a WIC mother diagnosed with clinical depression.

There are three major classes of antidepressants. Of the three classes listed below, the first two, Tricyclic antidepressants (TCAs) and Selective serotonin reuptake inhibitors (SSRIs) are generally viewed as safe options for pregnant and breastfeeding women. MAOIs such as Nardil (Phenelzine) and Parnate (Tranylcypromine) are always contraindicated during pregnancy and breastfeeding as reproductive safety has not been established. (20)

- **Tricyclic antidepressants (TCAs)** are the oldest, least expensive and most studied of the antidepressants with a proven track record of effectiveness and include medications such as Amitriptyline (Elavil) and Desipramine (Norpramin). Noted drawbacks are complex dosing, unpleasant side effects and risk of suicide.

- **Selective serotonin reuptake inhibitors (SSRIs)** are used most frequently in pregnant and breastfeeding mothers. Sertraline (Zoloft) and paroxetine (Paxil) are recommended first line treatments for breastfeeding women due to fewer side effects than other antidepressants and a once-a-day dosing schedule. Paroxetine (Paxil) is generally discouraged during pregnancy because it has been associated with fetal heart defects when taken during the first three months of pregnancy. Infants of mothers on these medications should be monitored for the following symptoms: sedation, agitation, irritability, poor feeding and GI distress.

- **Monoamine oxidase inhibitors (MAOIs)** work by inhibiting the enzyme monoamine oxidase to allow for more norepinephrine and serotonin to remain available in the brain. As stated above, these types of medications are **always** contraindicated during pregnancy and breastfeeding as reproductive safety has not been established. Furthermore, MAOIs have many drug and diet contraindications.

Developmental Delays, Sensory or Motor Delays Interfering with the Ability to Eat

Definition/ cut-off value

Developmental, sensory or motor disabilities that restrict the ability to chew or swallow food or require tube feeding to meet nutritional needs. Includes but not limited to:

- minimal brain function
- feeding problems due to a developmental disability such as pervasive development disorder (PDD) which includes autism
- birth injury
- head trauma
- brain damage
- other disabilities

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	III
Infants	I
Children	III

Justification

Infants and children with developmental disabilities are at increased risk for nutritional problems. Education, referrals, and service coordination with WIC will aid in early intervention of these disabilities. Prenatal, lactating and non-lactating women with developmental, sensory or motor disabilities may have: 1) feeding problems associated with muscle coordination involving chewing or swallowing, thus restricting or limiting the ability to consume food and increasing the potential for malnutrition or 2) to use enteral feedings to supply complete nutritional needs which may potentially increase the risk for specific nutrient deficiencies. Education, referrals, and service coordination with WIC will assist the participant, parent or caregiver in making dietary changes/adaptations and finding assistance to assure that she or her infant or child is consuming an adequate diet.

Pervasive Developmental Disorder (PDD) is a category of developmental disorders with autism being the most severe. Young children may initially have a diagnosis of PDD with a more specific diagnosis of autism usually occurring at 2 ½ to 3 years of age or older. Children with PDD have very selective eating habits that go beyond the usual "picky eating" behavior and that may become increasingly selective over time, I.e., food they used to eat will be refused. This picky behavior can be related to the color, shape texture or temperature of a food.

Common feeding concerns include:

- Difficulty with transition to textures, especially during infancy;
- Increased sensory sensitivity; restricted intake due to color, texture, and/or temperature of foods;
- Decreased selection of foods over time;
- Difficulty accepting new foods; difficulty with administration of multivitamin/mineral supplementation and difficulty with changes in mealtime environment.

Nutrition education, referrals and service coordination with WIC will assist the participant, parent or caregiver in making dietary changes/adaptations and finding assistance to assure she or her infant or child is consuming a nutritionally adequate diet.

Pre-Diabetes

Definition/ cut-off value

Impaired fasting glucose (IFG) and/or impaired glucose tolerance (IGT) are referred to as pre-diabetes. These conditions are characterized by hyperglycemia that does not meet the diagnostic criteria for diabetes mellitus (1). (See Clarification for more information.) Presence of pre-diabetes diagnosed by a physician as self-reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Participant category and priority level

Category	Priority
Breastfeeding Women	I
Non-Breastfeeding Women	III

Justification

An individual who is identified as having pre-diabetes is at relatively high risk for the development of type 2 diabetes and cardiovascular disease (CVD).

The Expert Committee on the Diagnosis and Clarification of Diabetes Mellitus (2, 3) recognized a group of individuals whose glucose levels, although not meeting criteria for diabetes, are nevertheless too high to be considered normal. The blood tests used to measure plasma glucose and to diagnose pre-diabetes include a fasting plasma glucose test and a glucose tolerance test (see Clarification for more information). Individuals with a fasting plasma glucose level between 100-125 mg/dl are referred to as having impaired fasting glucose (IFG). Individuals with plasma glucose levels of 140-199 mg/dl after a 2-hour oral glucose tolerance test are referred to as having impaired glucose tolerance (IGT).

Many individuals with IGT are euglycemic and, along with those with IFG, may have normal or near normal glycosylated hemoglobin (HbA1c) levels. Often times, individuals with IGT manifest hyperglycemia only when challenged with the oral glucose load used in standardized oral glucose tolerance test.

The prevalence of IFG and IGT increases greatly between the ages of 20-49 years. In people who are >45 years of age and overweight (BMI >25), the prevalence of IFG is 9.3%, and for IGT, it is 12.8% (4).

Screening for pre-diabetes is critically important in the prevention of type 2 diabetes. The American Diabetes Association recommends (5) that testing to detect pre-diabetes should be considered in all asymptomatic adults who are overweight (BMI >25) or obese (BMI >30) and who have one or more additional risk factors (see Table 1 in Clarification).

IFG and IGT are not clinical entities in their own right but, rather, risk factors for future diabetes as well as CVD. (Note: During pregnancy, IFG and IGT are diagnosed as gestational diabetes.) They can be observed as intermediate stages in many of the disease processes. IFG and IGT are associated with the metabolic syndrome, which includes obesity (especially abdominal or visceral obesity), dyslipidemia (the high-triglyceride and/or low HDL type), and hypertension. Dietary recommendations include monitoring of calories, reduced carbohydrate intake and high fiber consumption. Medical nutrition therapy (MNT) aimed at producing 5-10% loss of body weight and increased exercise have been variably demonstrated to prevent or delay the development of diabetes in people with IGT. However, the potential impact of such interventions to reduce cardiovascular risk has not been examined to date (2, 3).

WIC nutrition services can support and reinforce the MNT and physical activity recommendations that participants receive from their health care providers. In addition, WIC nutritionists can play an important role in providing women with counseling to help them achieve or maintain a healthy weight after delivery.

The WIC food package provides high fiber, low fat foods emphasizing consumption of whole grains, fruits, vegetables and dairy products. This will further assist WIC families in reducing their risk for diabetes.

Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Hyperglycemia is identified through a fasting blood glucose or an oral glucose tolerance test (1).

Impaired fasting glucose (IFG) is defined as fasting plasma glucose (FPG) >100 or >125 mg/dl (>5.6 or >6.1 mmol/l), depending on study and guidelines (2).

Impaired glucose tolerance (IGT) is defined as a 75-g oral glucose tolerance test (OGTT) with 2-h plasma glucose values of 140-199 mg/dl (7.8-11.0 mmol/l).

The cumulative incidence of diabetes over 5-6 years was low (4-5%) in those individuals with normal fasting and normal 2-h OGTT values, intermediate (20-34%) in those with IFG and normal 2-h OGTT or IGT and a normal FPG, and highest (38-65%) in those with combined IFG and IGT (4).

Recommendations for testing for pre-diabetes and diabetes in asymptomatic, undiagnosed adults are listed in Table 1 below.

Table 1. Criteria and Methods for Testing for Pre-Diabetes and Diabetes in Asymptomatic Adults

1. Testing should be considered in all adults who are overweight (BMI > 25*) and have additional risk factors:
   - physical inactivity
   - first-degree relative with diabetes
   - members of a high-risk ethnic population (e.g., African American, Latino, Native American, Asian American, Pacific Islander)
   - women who delivered a baby weighing >9 lb or were diagnosed with gestational diabetes mellitus
   - hypertension (blood pressure >140/90 mmHg or on therapy for hypertension)
   - HDL cholesterol level <35 mg/dl and/or a triglyceride level >250 mg/dl
   - women with polycystic ovarian syndrome (PCOS)
   - IGT or IFG on previous testing
   - other clinical conditions associated with insulin resistance (e.g., severe obesity and acanthosis nigricans)
   - history of CVD

2. In the absence of the above criteria, testing for pre-diabetes and diabetes should begin at age 45 years.

3. If results are normal, testing should be repeated at least at 3-year intervals, with consideration of more frequent testing depending on initial results and risk status.

4. To test for pre-diabetes or diabetes, either an FPG test or 2-hour oral glucose tolerance (OGTT; 75-g glucose load), or both, is appropriate.

5. An OGTT may be considered in patients with impaired fasting glucose (IFG) to better define the risk of diabetes.

6. In those identified with pre-diabetes, identify and if appropriate, treat other CVD risk factors.

*At-risk BMI may be lower in some ethnic groups.

Maternal Smoking

Definition/ cut-off value

Any smoking of tobacco products, i.e., cigarettes, pipes, or cigars.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	VI

Justification

Research has shown that smoking during pregnancy causes health problems and other adverse consequences for the mother, the unborn fetus and the newborn infant such as: pregnancy complications, premature birth, low-birth-weight, stillbirth, infant death, and risk for Sudden Infant Death Syndrome (SIDS) (1). Women who smoke are at risk for chronic and degenerative diseases such as: cancer, cardiovascular disease and chronic obstructive pulmonary disease. They are also at risk for other physiological effects such as loss of bone density (2).

Maternal smoking exposes the infant to nicotine and other compounds, including cyanide and carbon monoxide, in-utero and via breastmilk (3). In-utero exposure to maternal smoking is associated with reduced lung function among infants (4). In addition, maternal smoking exposes infants and children to environmental tobacco smoke (ETS). (See #904, Environmental Tobacco Smoke).

Because smoking increases oxidative stress and metabolic turnover of vitamin C, the requirement for this vitamin is higher for women who smoke (5). The WIC food package provides a good source of vitamin C. Women who participate in WIC may also benefit from counseling and referral to smoking cessation programs.

Alcohol and Substance Abuse

Definition/ cut-off value

For Pregnant Women:

- Any alcohol use.
- Any illegal substance use and/or abuse of prescription medications.
- Any marijuana use in any form.

For Breastfeeding and Non-Breastfeeding Women:

- Alcohol Use (1):
  - High Risk Drinking: Routine consumption of ≥8 drinks per week or ≥4 drinks on any day.
  - Binge Drinking: Routine consumption ≥4 drinks within 2 hours.

  Note: A serving or standard size drink is: 12 oz. beer; 5 oz. wine; or 1 ½ fluid ounces 80 proof distilled spirits (e.g., gin, rum, vodka, whiskey, cordials or liqueurs).
- Any illegal substance use and/or abuse of prescription medications.
- Any marijuana use in any form (breastfeeding women only).

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Postpartum Women	VI

Justification

Substance use and misuse during pregnancy and postpartum may have physical and mental health consequences ranging from mild to serious (2). The use of alcohol, marijuana, illegal drugs and misuse of prescription drugs can threaten both maternal and fetal health. Misuses of prescription drugs include using medications as follows: for nonmedical reasons, prescribed for someone else, more often than the prescribed frequency, in larger-than-prescribed doses, and/or over a longer time than prescribed (3).

Substance use is known to lead to vitamin and mineral deficiencies that threaten physical and mental health, damage vital organs and the nervous system, and decrease immunity. Malnutrition occurs when the substance replaces other dietary nutrients or as a result from improper nutrient metabolism, absorption, utilization, or excretion even though the diet may be adequate. Harmful lifestyles are often associated with addiction, such as poor eating patterns, lack of exercise, and changes in sleep patterns. These compounding factors result in an increased risk of long-term health problems, including metabolic syndrome, diabetes, hypertension, weight problems, and eating disorders. People with substance addiction may suffer from calorie and

protein malnutrition. In one study over 90% were underweight and 70% had vitamin D deficiency and low levels of vitamin C. Another study showed that 50% were deficient either in iron or vitamins (vitamins A, C, and E being the most common). (4)

Substance use can impact the family and parenting in a number of ways, and may be linked with poor
parenting practices, child neglect, and abuse due to (2):

- Impairments (both physical and mental) caused by alcohol or other drugs.
- Domestic violence, which may be a result of substance use.
- Expenditure of often limited resources on purchasing alcohol or other drugs.
- Frequent arrests, incarceration, and court dates.
- Time spent seeking out manufacturing or using alcohol or other drugs.
- Estrangement from primary family and related support.

While substance use has long been a public health concern, there is growing recognition that the United States is facing an epidemic due to an increase in opioid misuse, use disorders, and overdose, and that disparities exist between men and women with regard to both prescription opioid and heroin use (5). Although between 1999 and 2014 men were more likely than women to die of opioid overdoses, the gap in mortality has been closing (6). Between 1999 and 2010, overdose deaths from prescription pain killers increased more than 400% among women, compared to an increase of 237% among men (7). Although nonmedical use of prescription opioids among women has generally been decreasing since then, heroin use among women has been increasing, and at a faster rate among women than among men (8, 9, 10). For example, between 2002 and 2013, heroin use among women increased 100% compared to an increase of 50% among men (5).

Predictors of substance use among women of child bearing age include (2, 11, 12):

- Early Substance Use – Tobacco or marijuana use at an early age (12- 18 years of age) is a risk factor for continued use as an adult.
- Prepregnancy Substance Use – Alcohol and drug use prior to pregnancy is a predictor of continued use during pregnancy.
- Demographic Characteristics – Use and substance choice vary by demographic group:
    - Substance use after pregnancy is more likely for Native Americans and African Americans.
    - African American women and economically disadvantaged women are more likely to use illicit substances, particularly cocaine.
    - White women and women with higher education levels are more likely to use alcohol.
- Trauma – Substance use is increased among women who:

- Were raised by parents who abused substances.
- Have experienced physical and/or sexual abuse.
- Have experienced intimate partner violence.

- Mental Health – Women with a diagnosis of substance use or chemical dependency may have one or more psychiatric disorders.

Alcohol and Substance Use during Pregnancy

Maternal substance use during and after pregnancy can have a long-term impact on both the mother and her child and can impact many areas of life such as: (2, 13, 14)

- Obstetrical and Prenatal Complications - Substance use (and withdrawal from them) during pregnancy may cause constriction of uterine blood vessels leading to insufficient blood flow to the placenta, separation of the placenta from the uterus, maternal hypertension, maternal hemorrhage, and/or premature labor. These complications may in turn increase risk of fetal loss, premature birth and still birth.
- Personal Health and Safety – Substance use is associated with increased likelihood of death by illness, accident or suicide; intimate partner violence; sexually transmitted diseases and unintended pregnancy. Although 31% to 47% of U.S. pregnancies are unintended, the proportion of unintended pregnancies for women with opioid use disorder was higher than 85%, according to recent research.
- Societal Impacts - Substance use is associated with an unstable family structure, separation and divorce, and potential for involvement of Child Protective Services (CPS). The Child Abuse Prevention and Treatment Act [42 U.S.C. § 5106a(b)] requires States to have policies and procedures in place to notify CPS agencies of substance-exposed newborns and to establish a plan of safe care for newborns identified as being affected by illegal substance abuse or having withdrawal symptoms resulting from prenatal drug exposure. For more information about State-specific requirements please see: https://www.childwelfare.gov/topics/systemwide/laws-policies/state/.
- Impact on Children - Children who are exposed to alcohol and other substances prior to birth can experience long-term cognitive, behavioral, social and emotional developmental consequences.

Based on data collected by the Substance Abuse and Mental Health Services Administration (SAMHSA), in 2012-2013 alcohol use among pregnant women aged 15-44 was 9.4%; 2.3% reported binge drinking and 0.4% reported heavy

drinking. These rates were lower than the rates for non-pregnant women in the same age group (55.4%, 24.6% and 5.3% respectively). Alcohol use in 2012-2013 was lower among pregnant women aged 15 to 44 during the second and third trimesters than during the first trimester (5.0% and 4.4% vs. 19.0%). (3)

Nutritional needs during pregnancy are 10 to 30 percent greater than normal (15). Alcohol can disrupt body functions by causing nutrient deficiencies of vitamins and minerals (4). Alcohol inhibits fat absorption and thereby impairs absorption of vitamins A, E, and D which are normally absorbed along with dietary fats. Deficiencies of minerals such as calcium, magnesium, iron, and zinc are common in people who misuse alcohol, although alcohol itself does not seem to affect the absorption of these minerals (4).

There is no safe consumption of alcohol during pregnancy. Exposure to alcohol in utero can damage the developing fetus at any stage and is the leading preventable cause of birth defects and intellectual and neurodevelopmental disabilities (16, 17). Not only can nutritional deficiencies of a mother who misuses alcohol adversely affect the nutrition of the fetus, but alcohol itself can also restrict nutrient flow to the fetus. These prenatal factors can result in the infant being born with a Fetal Alcohol Spectrum Disorder (FASD). Fetal Alcohol Syndrome (FAS) is the most severe type of FASD. Fetal Alcohol Syndrome can affect children in different ways. A child with FAS might have abnormal facial features, growth and central nervous system problems as well as problems with learning, memory, attention span, communication, vision, or hearing (18). (See risk 382 - *Fetal Alcohol Syndrome* for more information.)

In 2012 and 2013 illicit drug use (to include marijuana use) among pregnant women aged 15 to 44 was 5.4%. This was lower than the rate among women in this age group who were not pregnant (11.4%). Illicit drug use in 2012-2013 was lower among pregnant women aged 15 to 44 during the third trimester than during the first and second trimesters (2.4%t vs. 9.0% and 4.8%). (3)

Marijuana is the illicit drug used most frequently by women of child-bearing age (19). There is no known safe amount of marijuana use during pregnancy. Marijuana contains tetrahydrocannabinol (THC), which is the chemical in marijuana that makes one feel “high”. Marijuana may be ingested in the form of marijuana edibles (cookies, brownies, candy, etc.) or inhaled when smoked. When inhaled, the smoke goes in to the lungs and immediately passes through the membranes and enters the bloodstream (2). THC can pass from the mother to the unborn child through the placenta if marijuana is ingested or inhaled during pregnancy. Children who are exposed to THC prior to birth can experience decreased academic ability, cognitive function and ability to remain attentive (20). Although some states have legalized marijuana for a variety of medical conditions upon a doctor’s recommendation, as well as for recreational use, marijuana has been shown to have negative effects on brain development. Therefore, it is recommended that pregnant and breastfeeding women not use marijuana (2).

National Surveys on Drug Use and Health done by SAMHSA indicate that an annual average of about 21,000 pregnant women aged 15 to 44 misused

opioids in the past month (21). The percentage of women misusing opioids in the past month was lower among pregnant women aged 15 to 44 than among non-pregnant women in that age range (0.9% vs. 2.6%) (21). Opiates and synthetic narcotics (e.g., heroin, oxycodone, Vicodin, Narco, Percocet, morphine, dilaudid) have serious health risks associated with their use including endocarditis; coma or sudden death from overdose; risk of HIV; and, if injected, viral hepatitis and other infections (2). A mother's use of these substances during pregnancy can lead to neonatal abstinence syndrome (NAS), which is a series of withdrawal symptoms experienced by an infant after birth due to intrauterine exposure to substances. Prenatal exposure to opioids increases the risk of low birth weight, stillbirth and sudden infant death syndrome (see risk 383 - *Neonatal Abstinence Syndrome* for more information).

For a summary of the effects of alcohol, marijuana, opioids and more information about the effects of other specific drugs during pregnancy, see table on page 5.

Alcohol and Substance Use during Breastfeeding

The breastfeeding mother should minimize alcohol use and avoid the use of other substances since most maternally ingested substances are transferred to human milk, though the concentration and potential danger to the breastfed baby is affected by interaction among a variety of factors. The American Academy of Pediatrics (AAP) recommends that the ingestion of beverages containing alcohol be minimized and limited to occasional intake for breastfeeding women. The following are recommendations for breastfeeding women who choose to drink (2, 22, 23, 24):

- Consult with health care provider before consuming alcohol.
- Do so only if breastfeeding is well established, consistent and predictable (no earlier than 3 months postpartum).
- Minimize ingestion of alcoholic beverages and limit it to occasional intake.
- Consume only a single alcoholic drink and wait at least 4 hours before breastfeeding or expressing milk to ensure the alcohol is not present in the milk.
- Breastfeed the infant or express human milk before consuming the alcohol.

Due to the lipophilic nature of THC found in marijuana, it is tremendously fat-soluble and therefore is readily transferred to human milk. Marijuana can impact the neurobehavioral development of the infant, and the AAP considers it to be a contraindication to breastfeeding. (2, 22, 23)

The maternal use of illegal substances and the misuse of prescription medicine is a contraindication to breastfeeding. However, according to the AAP, appropriate maternal use of prescribed medication is not a categorical contraindication to breastfeeding. For situations in which the mother is undergoing pharmacologic therapy, breastfeeding must balance the benefits to infants and mother against the potential risk of substance exposure to the infant. For example, research has shown that adequately nourished narcotic-dependent mothers should be encouraged to breastfeed if they are enrolled in a supervised medication-assisted treatment program and have negative

toxicology screens for HIV and illicit drugs. (22) (See risk 383 - *Neonatal Abstinence Syndrome* for more information.)

The following table is a summary of effects of specific drugs on the mother, birth outcomes and breastfeeding (2). For more information, please see the *Substance Use and Prevention Manual: Screening, Education and Referral Resource Guide for Local WIC Agencies*: https://wicworks.fns.usda.gov/resources/wic-substance-use-prevention-guide.

Substance	Effects on Mother	Effects on Birth outcomes	Effects on Baby
Alcohol	• Impaired judgement, reflexes, memory and coordination • Heart and liver damage • Pancreatitis • Peptic ulcers • Malnutrition • Alteration of menstrual cycle	• Miscarriage • Stillbirth • Low birth weight • Preterm delivery • Increased incidence of fetal distress at delivery • Sudden Infant Death Syndrome • Fetal Alcohol Spectrum Disorders	• Reduced growth • Reduced milk consumption • Delayed motor development • Altered postnatal growth, sleep patterns, and/or psychomotor patterns
Marijuana	• Increased blood pressure • Increased heart rate • Rapid pulse • Anxiety sensory distortions	• Visual abnormalities • Ocular hypertelorism (widely spaced eyes) • Severe epicanthus (skin folds at the corner of the upper eyelids)	• Poor sucking • Sedation • Reduced muscle tone • Delayed growth • Delayed motor development
Amphetamines (e.g. methamphetamine and dextro-amphetamine)	• Irritability and confusion • Decreased appetite • Convulsions • Stroke • Heart failure	• Premature delivery • Low birth weight • Small for gestational age	• Poor sleep patterns • Irritability • Extreme agitation • Hallucinations • Seizures
Cocaine and Crack	• Increased heart rate • Increased blood pressure • Sudden death from cardiac arrhythmia or respiratory arrest • Irritability • Separation of the placenta from the uterus prior to delivery	• Preterm delivery • Reduced head circumference • Increased risk of spontaneous abortion • Increased risk of seizures • Neurological abnormalities	• High blood pressure • Seizures • Choking • Irritability • Neuro-behavioral problems
Opiates & Synthetic	• Endocarditis	• Low birth weight • Still birth	• Irritability

Narcotics (e.g. heroin, morphine, codeine, oxycodone, and hydrocodone)	• Decreased appetitie • Respiratory depression • Coma or sudden from overdose	• Neonatal Abstinence Syndrome • Sudden Infant Death Syndrome	• Extreme agitation • Seizures • Poor sleep patterns • Hallucinations
Sedative – Hypnotics (e.g. benzodiazepines, barbiturates, and sleep medications)	• Apprehensiveness • Convulsions • Dilated pupils • Respiratory Depression • Confusion • Slurred speech	• Increased risk of fetal malformations	• Restlessness • Tremor • Apnea • Diarrhea • Vomiting • Poor feeding

*The effect of substances on the baby should be carefully considered when providing support to breastfeeding dyads as these effects may be barriers to successful breastfeeding.

Implications for WIC Nutrition Services

Through established linkages and coordination with local resources, WIC staff are required to refer participants suspected of substance use, and those who disclose substance use, to existing assessment agencies for professional evaluation and treatment, as appropriate. In addition to providing referrals and coordinating/facilitating services, WIC's role in preventing substance abuse is to educate women participants, parents, and caretakers of participating infants and children about substance use–related problems with the intended effects of increasing participants' access to information about the dangers of substance use and abuse during pregnancy and breastfeeding as well as postpartum. WIC also provides supplemental foods that are rich in the nutrients lost from alcohol and substance misuse. WIC staff can assist participants by:

- Providing referrals (and follow-up on the referral) for professional assessment and treatment. Do not advise a woman who uses narcotics to stop use on her own. This step should be taken only under the supervision of a physician or treatment specialist.
- Encouraging women to improve their lifestyle and health habits during pregnancy and postpartum, since the concern for fetal health and/or the desire to be a good role model can be a powerful motivator to reduce or stop substance use (25).
- Emphasizing the importance of substance abuse treatment during the postpartum period to safeguard the health of the mother and reduce the risk in subsequent pregnancies.
- Recommending the Dietary Guidelines for Americans to address nutrition deficiencies associated with substance use.
- Providing breastfeeding promotion and support to women enrolled in supervised medication- assisted treatment programs.
- Recommending that the ingestion of beverages containing alcohol be minimized and limited to occasional intake for breastfeeding women. Provide instruction to wait at least 4 hours after consuming one alcoholic drink before breastfeeding or expressing milk. (If the

appropriate amount of time has elapsed the woman may breastfeed or express her milk – it is not necessary to pump and discard the milk.)

- Referring to community resources for alcohol and substance use support groups.

Oral Health Conditions

Definition and cut-off value

Oral health conditions include, but are not limited to:

- Dental caries, often referred to as "cavities" or "tooth decay", is a common chronic, infectious, transmissible disease resulting from tooth-adherent specific bacteria, that metabolize sugars to produce acid which, over time, demineralizes tooth structure (1).
- Periodontal diseases are infections that affect the tissues and bone that support the teeth. Periodontal diseases are classified according to the severity of the disease. The two major stages are gingivitis and periodontitis. Gingivitis is a milder and reversible form of periodontal disease that only affects the gums. Gingivitis may lead to more serious, destructive forms of periodontal disease called periodontitis.(2)

  More information on types of periodontal disease is available at: http://www.perio.org/consumer/2a.html.
- Tooth loss, ineffectively replaced teeth or oral infections which impair the ability to ingest food in adequate quantity or quality

Presence of oral health conditions diagnosed, documented, or reported by a physician, dentist, or someone working under a physician's orders, or as self reported by applicant/participant/caregiver. See Clarification for more information about self-reporting a diagnosis.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	VI
Infants	I
Children	III

Justification

Oral health reflects and influences general health and wellbeing. Good oral health care and nutrition during pregnancy, infancy and childhood are often overlooked factors in the growth and development of the teeth and oral cavity.

Infants and Children

The Centers for Disease Control and Prevention (CDC) reports that dental caries may be the most prevalent infectious disease in U.S. children. More than 40% of children have tooth decay by the time they reach kindergarten. Infants that consume sugary foods, are of low socioeconomic status, and whose mothers have a low education level, are 32 times more likely to have caries at the age of 3 years than children who do not have those risk factors. Despite its high prevalence, early childhood caries (ECC) is a preventable disease. (3)

ECC may develop as soon as teeth erupt. Bacteria, predominantly mutans streptococci (MS), metabolize simple sugars to produce acid that demineralizes teeth, resulting in cavities. The exact age at which MS colonization occurs in children is controversial, but it does not happen until teeth erupt. The earlier colonization occurs, the greater the risk of caries. MS typically originates in the mother and is transmitted to the child via saliva (often through cup and utensil sharing). Elevated maternal levels of MS, due to active or untreated caries and frequent sugar consumption, increase the risk of transmission. In addition, recent evidence suggests that exposure to environmental tobacco smoke increases the likelihood of MS colonization in children. (4)

Historically, ECC has been attributed to inappropriate and prolonged bottle use; formally called "baby bottle tooth decay." However, recent studies indicate that the disease is multifactorial, which suggests any feeding practice that allows frequent sugar consumption in the presence of MS may result in caries formation: propped bottles containing sweetened liquids or formula, frequent consumption of juice or sweetened liquids from infant and "sippy" cups, and frequent snacking of high cariogenic foods. (4)

The frequency of sugar consumption is the main dietary variable in caries etiology. After bacteria metabolize sugar into acid, it takes 20-40 minutes for the acid to be neutralized or washed away by saliva. Therefore, if sugars are frequently consumed, the potential for demineralization is greater. Although MS can metabolize many different carbohydrates, they produce acid most efficiently from sugars, especially sucrose. Sugars within the cellular structure of food (such as fructose in whole fruit) are thought to be less cariogenic than sugars intentionally added to foods. (4) See Table 1 for more information on the cariogenic potential of children's foods and snacks.

Milk is widely consumed, especially by children, and thus the interaction between different kinds of milk consumed and caries development has been a research topic of interest. Lactose is one of the least cariogenic sugars because it is poorly metabolized by MS. Researchers have reported cows' milk to be a protective, anticariogenic agent due to its high concentration of calcium and phosphate. The buffering activity of proteins present in cows' milk also might allow the formation of very stable complexes of calcium phosphate. Other anticariogenic properties in cows' milk include antibacterial enzymes, vitamin D and fluoride. (4,5)

Infant formulas, on the other hand, have a high potential for inducing caries due to their high carbohydrate variability. The cariogenic potential of human

milk is inconclusive. Human milk has been found to contain more lactose (8.3%) than cows' milk (4.9%). A higher human milk lactose concentration and the possibility that lactose fermentation of cows' milk is slower than in human milk, may make human milk caries risk slightly higher. Some evidence indicates that breastfeeding for over 1 year during the night after tooth eruption might be associated with ECC, however other investigations showed no relationship between prevalence of caries and breastfeeding. Regardless of the type of milk consumed, sufficient dental care and cleaning after drinking milk/formula and breastfeeding can help prevent ECC. Avoiding inappropriate dietary practices, such as frequent juice consumption or snacking on highly cariogenic foods also remain important ECC preventive practices. (4,5)

Table 1: Cariogenic Potential of Children's Food and Snack

Noncariogenic	Low Cariogenicity	High Cariogenicity
Cheese	Flavored Milk	Breakfast Bars
Chicken	Fresh fruits	Cake
Cottage Cheese	Whole grain products	Candies**
Eggs		Cookies
Flavored Club Soda		Doughnuts
Nuts and seeds*		Granola bars
Plan Cow's Milk (unflavored)		Pretzels
Plain Yogurt		Raisins and other dried fruits
Popcorn*		Soda crackers
Seltzer		Sweetened beverages (including fruit juice)
Vegetables		Sweetened dry cereals

*Not appropriate for infants and toddlers due to choking problems

**Sticky candy and/or slowly eaten candy are extremely cariogenic.

Adapted from: Faine, MP. Nutrition and oral health. In: Proceedings of Promoting Oral Health of Children with Neurodevelopmental Disabilities and Other Special Health Care Needs. May 4-5, 2001. Seattle, WA.

Women

Maternal periodontal disease and dental caries may impact pregnancy outcome, and the offspring's risk of developing early and severe dental caries. Periodontal disease and caries may also increase the women's risk of atherosclerosis, rheumatoid arthritis and diabetes. These oral health problems are highly prevalent in women of childbearing age, particularly among low-income women and members of racial and ethnic minority groups. Socioeconomic factors, lack of resources to pay for care, barriers to access

care, lack of public understanding of the importance of oral health and effective self-care practices all represent underlying reasons cited for observed inadequacies in oral health. (6)

Maternal periodontal disease, a chronic infection of the gingiva (gums) and supporting tooth structures, has been associated with preterm birth, low birthweight and development of preeclampsia (6, 7). Studies indicate that periodontal infection can result in placental-fetal exposure and, when coupled with a fetal inflammatory response, can lead to preterm delivery (7). Additionally, in a cohort of 164 young, minority, pregnant and postpartum women, the preterm/low birthweight rate was 5.4% lower among women who received periodontal treatment than those who did not receive treatment (7). In a case-control study, researchers found that preeclamptic patients were 3.5 times more likely to have periodontal disease than normotensive patients (6). (See nutrition risk criterion #304 *History of Preeclampsia* for more information.)

Fluoride and Fluorosis

Use of fluorides for the prevention and control of caries is documented to be both safe and highly effective. Fluoride, a naturally occurring substance, has several caries-protective mechanisms of action, including enamel remineralization and altering bacterial metabolism to help prevent caries. Excessive intake of fluoride can cause dental fluorosis which is a change in the appearance of the tooth's enamel. In the U.S., fluorosis appears mostly in the very mild or mild form - as barely visible lacy white markings or spots. The severe form of dental fluorosis, staining and pitting of the tooth surface, is rare in the U.S. The CDC reports that 32% of American children have some form of dental fluorosis, with 2.45% of children having the moderate to severe stages. (8, 9, 10, 11)

Parents and caregivers may have questions and concerns about fluoride content in water supplies and in infant formula. Fluoridated water can be found in communities that supplement tap water with fluoride and it may also be found in well water. The CDC's *My Water's Fluoride* website: http://apps.nccd.cdc.gov/MWF/Index.asp, allows consumers in currently participating States to learn the fluoridation status of their water system.

All formula, including powdered, concentrate and ready-to-feed, contain fluoride, but most infant formula manufacturers ensure low levels of fluoride (8). WIC State and local agencies should refer caregivers of formula fed infants with questions regarding the use of fluoridated vs. non-fluoridated water to prepare infant formula to the infants' health care provider.

Dental Care and Anxiety

It is reported that 50% of the U.S. population does not seek regular dental care. Of the entire U.S. population, 8-15% has dental phobias. Dental fear can be directly learned from previous painful or negative experiences or indirectly learned from family, friends and the media. Negative portrayal of dentistry by these sources adds to an individual's anxiety. Anxiety and/or fear of dental

procedures may prevent participants from seeking necessary dental care during high risk periods of the life cycle (e.g., pregnancy). Dental providers are learning to understand the causes of dental fear, have techniques to assess the level of fear and have modified treatments to accommodate patients with high anxiety levels. (12)

Oral Health Problems and Special Health Care Needs

The following special health care needs can increase the risk for oral health problems and can also make the overall effects of poor oral health more severe (13):

- **Prematurity and intrauterine malnutrition**- can have adverse effects on an individual's oral health. A study of infants who weighed <2000g at birth indicated more porous dental enamel and subsurface lesions. Infants with very low birthweights (<1500g) are more apt to have enamel defects of the primary teeth. Malnutrition in the first few months of life (when oral structures develop) can increase the risk for oral problems.
- **Gastroesophageal Reflux Disease (GERD)-** common among children with cerebral palsy, Down syndrome and other conditions. GERD can contribute to oral health problems. As acidic gastric contents are regurgitated, primary and permanent teeth can be eroded.
- **Failure to thrive and other problems with weight gain and growth-** frequent meals and snacks (which may contribute to caries development) may be needed to maintain an adequate energy intake, or if mealtime is longer than usual, the demineralization period may exceed remineralization. Delayed weaning and children sipping on a bottle throughout the day, could also contribute to oral health problems.
- **Craniofacial malformations**– individuals with these malformations are at higher risk of developing oral problems. For example, children with cleft lip/palate disorders have more decayed, missing, and filled teeth than children without.
- **Compromised immune function**- individuals with AIDS or those who take immunosuppressive medications are more susceptible to oral infections such as candidiasis, viral infections, dental caries, and periodontal disease.
- **Down syndrome (Trisomy 21) -** individuals with Down syndrome often have delayed dental development*, may be missing permanent teeth, and may have under-developed teeth or teeth with thin enamel. In addition, the potential for eating problems and GERD make oral care for individuals with Down's especially important. (13)

*Delayed Tooth Eruption (DTE) is the emergence of a tooth into the oral cavity at a time that deviates significantly from norms established for different races, ethnicities, and sexes. Variation in the normal eruption of teeth is a common finding, but significant deviations from established norms should alert the clinician to further investigate the patient's health and development. Eruption depends on genetics, growth of the jaw, muscular action and other factors. DTE is seen in children with certain genetic disorders, particularly Down syndrome, and in children with general developmental delays that involve the oral musculature. Whenever DTE is generalized, the child should

be examined for systemic diseases affecting eruption, such as endocrine disorders, organ failures, metabolic disorders, drugs and inherited disorders. (14) Additional information about tooth eruption is available at: http://www.ada.org/2930.aspx.

Dentate Status, Diet Quality and General Health

By the time individuals reach adulthood, the human mouth has progressed from 20 primary teeth to 32 permanent (adult) teeth (2). The extent to which tooth loss can adversely affect nutritional status is not completely known. However, diet quality tends to decline as the degree of dental impairment increases. Studies have shown that intake of vitamin A, fiber, calcium and other key nutrients decline as the number of teeth decline. In The Health Professionals study, participants without teeth had diets that contained fewer vegetables, less carotene and fiber, and more cholesterol, saturated fat, and calories than persons with 25 teeth or more (15). Despite the trend toward increased tooth retention throughout adult life in developed countries, 11% of adults aged 25 and older have lost all of their natural teeth. This number increases to 30% for people over age 65 and is even higher in those living in poverty. Loss of teeth is not a normal result of the aging process; the major cause of tooth loss is extractions resulting from dental caries and/or periodontal disease. (15)

Implications for WIC Nutrition Services

To help prevent oral health problems from developing and ensure the best possible health and developmental outcomes, WIC staff can encourage participants and caregivers to:

Diet

- Breastfeed infants during the first year of life and beyond as mutually desired.
- Avoid having an infant/child sleep with a bottle. Any bottle taken to bed should contain only water. (See Risks 425.3 and 411.2)
- Gradually introduce a cup between 6 and 12 months of age, wean from the bottle by 12 months of age.
- Drink/provide only water and milk between meals.
- Limit sugary foods and drinks (if sweets are eaten, it's best to restrict to mealtimes.)
- Avoid carbonated beverages and juice drinks. (See Risk 425.2)
- Limit the intake of 100% fruit juice to no more than 4-6 ounces per day.
- Establish eating patterns that are consistent with the Dietary Guidelines for Americans and the infant feeding practice guidelines of the American Academy of Pediatrics.
- Consume/provide a varied, balanced diet during gestation and throughout childhood to set the stage for optimal oral health. (1,3,4,15)

Oral Hygiene

- Wipe the gums of even a very small infant with a soft washcloth or soft toothbrush, even prior to tooth eruption, to establish a daily oral hygiene routine (17, 18).
- Brush teeth (including an infant's, as soon as teeth erupt) thoroughly twice daily (morning and evening) and floss at least once every day.
- Minimize saliva sharing activities (i.e., sharing a drinking cup and utensils). (1,3,4,15)

Fluoride

- Use fluoride toothpaste approved by the American Dental Association ("pea-size" for 2-5 year olds and, "smear" for under the age of two and at moderate or high caries risk). (1)
- Rinse every night with an alcohol-free over-the- counter mouth rinse with 0.05% sodium fluoride (guidance for woman participant and caregiver only). (3)
- Contact the infant's (if formula fed) health care provider with questions regarding the use of local drinking water or bottled water to prepare infant formula. (3)
- Talk to the dentist about fluoride supplements. These may be of benefit in reducing dental decay for children living in fluoride-deficient areas (See Risk 411.11).
- Check if the public water systems have added fluoride at: http://apps.nccd.cdc.gov/MWF/Index.asp.
- Access the following website for more information about fluoride: http://www.cdc.gov/fluoridation/safety.htm.

Referrals

- Establish a dental home within 6 months of eruption of the first tooth and no later than 12 months of age. (3)
- See a dentist for examinations (every 6 months) and/or restoration of all active decay as soon as possible. (WIC staff should provide dental referrals as necessary.)

Oral Health Resources/Handouts

- Summary of Pediatric Oral Health Anticipatory Guidance: http://www.aafp.org/afp/2004/1201/p2113.html#afp20041201p2113-t2.
- Table: Oral health and dietary management for mothers and children (see page 3 of pdf.) http://www.sciencedirect.com/science/article/pii/S0002822398000443.
- Oral Health Care During Pregnancy: A National Consensus Statement: http://www.mchoralhealth.org/materials/consensus_statement.html.

- *Your Baby's Teeth:* http://www.aafp.org/afp/2004/1201/p2121.html.
- *Two Healthy Smiles: Tips to Keep You and Your Baby Healthy:* http://www.mchoralhealth.org/PDFs/pregnancybrochure.pdf.
- *Tips for Good Oral Health Care During Pregnancy:* http://www.mchoralhealth.org/PDFs/OralHealthPregnancyHandout.pdf.
- *A Healthy Smile for Your Baby* (English): http://www.mchoralhealth.org/PDFs/babybrochure.pdf.
- *A Healthy Smile for Your Baby* (Spanish): http://www.mchoralhealth.org/PDFs/babybrochure_sp.pdf.

Fetal Alcohol Syndrome

Definition/ cut-off value

Fetal Alcohol Syndrome (FAS) is based on the presence of retarded growth, a pattern of facial abnormalities, and abnormalities of the central nervous system, including mental retardation (1).

Presence of FAS diagnosed by a physician as self reported by applicant/participant/caregiver; or as reported or documented by a physician, or someone working under physician's orders.

Participant category and priority level

Category	Priority
Infants	I
Children	III

Justification

FAS is a combination of permanent, irreversible birth defects attributable solely to alcohol consumption by the mother during pregnancy. There is no known cure; it can only be prevented (1). Symptoms of FAS may include failure to thrive, a pattern of poor growth throughout childhood and poor ability to suck (for infants). Babies with FAS are often irritable and have difficulty feeding and sleeping.

Lower levels of alcohol use may produce Fetal Alcohol Effects (FAE) or Alcohol Related Birth Defects (ARBD) that can include mental deficit, behavioral problems, and milder abnormal physiological manifestations (2). FAE and ARBD are generally less severe than FAS and their effects are widely variable. Therefore, FAE and ARBD in and of themselves are not considered risks, whereas the risk of FAS is unquestionable.

Identification of FAS is an opportunity to anticipate and act upon the nutritional and educational needs of the child. WIC can provide nutritional foods to help counter the continuing poor growth and undifferentiated malabsorption that appears to be present with FAS. WIC can help caregivers acknowledge that children with FAS often grow steadily but slower than their peers. WIC can also educate the caregiver on feeding, increased calorie needs and maintaining optimal nutritional status of the child.

Alcohol abuse is highly concentrated in some families (3). Drinking, particularly abusive drinking, is often found in families that suffer from a multitude of other social problems (4). A substantial number of FAS children come from families, either immediate or extended, where alcohol abuse is common, even normative. This frequently results in changes of caregivers or foster placements. New caregivers need to be educated on the special and continuing nutritional needs of the child.

The physical, social, and psychological stresses and the birth of a new baby, particularly one with special needs, places an extra burden upon the recovering woman. This puts the child at risk for poor nutrition and neglect (e.g., the caregiver may forget to prepare food or be unable to adequately provide all the foods necessary for the optimal growth and development of the infant or child.) WIC can provide supplemental foods, nutrition education and referral to medical and social services which can monitor and provide assistance to the family.

Neonatal Abstinence Syndrome

Definition/ cut-off value

Neonatal abstinence syndrome (NAS) is a drug withdrawal syndrome that occurs among drug-exposed (primarily opioid-exposed) infants as a result of the mother's use of drugs during pregnancy (1). NAS is a combination of physiologic and neurologic symptoms that can be identified immediately after birth and can last up to 6 months after birth (2,3).

This condition must be present within the first 6 months of birth and diagnosed, documented, or reported by a physician or someone working under a physician's orders, or as self-reported by the infant's caregiver. See the clarification section for more information about self-reporting a diagnosis.

Participant category and priority level

Category	Priority
Infants	I

Justification

Neonatal abstinence syndrome occurs when an infant is born dependent on prescription or illicit drugs the mother was taking during pregnancy. NAS is a combination of withdrawal symptoms that involve multiple bodily systems. It is most commonly associated with chronic opioid exposure during fetal development; however, can also result from chronic intrauterine exposure to other substances including: benzodiazepines, barbiturates, selective serotonin reuptake inhibitors and ethanol (3). Although these nonopioid substances can lead to NAS, these infants typically respond well to non-pharmacological methods of intervention (4).

Withdrawal in the newborn varies based on the type of substance, dose, and timing of exposure (4). Opioid is a general term for a variety of illicit and prescription drugs that decrease pain. Prescription opioid pain relievers include oxycodone, hydrocodone, codeine, morphine, and fentanyl. Opioids are water soluble and are, therefore, able to move easily across the placenta to the infant. This transfer of opioids increases as gestational age increases (3).

Heroin is an illegal opioid that is synthesized from morphine and can be injected, inhaled, or smoked. About 23% of individuals who use heroin become dependent (5). Furthermore, those who take any form of opioid, including prescription opioids as directed for chronic pain, can become addicted. Due to the risk of the transmission of infectious diseases such as Human Immunodeficiency Virus (HIV) and Hepatitis C, women who become pregnant while using illicit opioids, such as heroin, are often put on opioid maintenance therapy. Opioid maintenance therapy involves the prescribed use of either

methadone or buprenorphine. These prescribed opioids can still lead to NAS; however, since they are not injected, they decrease the risk of the mother contracting blood borne infectious diseases. Opioid maintenance therapy can also help protect the fetus from repeated opioid withdrawal in utero (6).

The incidence of NAS has increased from 1.2 to 3.39 per 1,000 live births from 2000 to 2009 in the United States. This increased incidence is due to an increase in antepartum opioid use from 1.19 to 5.63 per 1,000 live births in the same period (7). In another study, it was reported that 5.9% of all women who were pregnant in 2012 reported some illicit drug use during pregnancy (4). Infants born with NAS are often premature, have low birth weights, and are growth-restricted (see risks #142 Preterm or Early Term Delivery, #141 Low Birth Weight, and #151 Small for Gestational Age for more information about these conditions). (3) In addition to the concerns of exposure to substances in utero, additional factors, including social, nutritional, physical, and mental health problems can also contribute to the health status of the infant. An increased risk of certain birth defects has also been associated with early pregnancy opioid use (8). These birth defects include: spina bifida, hydrocephaly, glaucoma, gastroschisis, and heart defects (9).

Neonatal Abstinence Syndrome Symptoms

Symptoms of NAS generally involve the central nervous system, autonomic nervous system, and the gastrointestinal tract (3). The severity of the infant's symptoms is commonly assessed using the Modified Finnegan Score Sheet. The Modified Finnegan Score Sheet consists of 21 symptoms that are associated with NAS. Following the determination of a baseline score, infants are assessed every 4 hours unless the severity of the symptoms requires more frequent monitoring (10). The following list includes symptoms associated with NAS (1, 6):

- Loud, high-pitched crying
- Sweating
- Yawning
- Sleep disturbances
- Feeding difficulties
- Poor weight gain
- Excessive sucking
- Regurgitation
- Diarrhea

Neonatal Abstinence Syndrome Treatment

Infants with NAS typically have longer hospital stays, can experience serious complications, and have costly treatment (2). The first treatment option for infants with NAS is to manage symptoms without medication by rooming in with the mother, encouraging skin-to-skin contact, swaddling, having a calm environment, avoiding overstimulation, and supporting breastfeeding (11). Infants who are at risk for NAS and who room-in with their mothers are not only at a lower risk of needing pharmacological treatment for NAS, but they also have a shortened hospital stay (12). If withdrawal is severe or if the initial treatment is not successful in managing symptoms of NAS, medications such as morphine, methadone, phenobarbital or clonidine may be used. An infant given these medications may have side effects that could include: slow or shallow

breathing, slow heart rate, difficulty waking-up, excessive sleepiness, constipation, and fewer wet diapers (11).

Nutritional Considerations for Neonatal Abstinence Syndrome

The timing and type of feedings play an important role in the management of NAS symptoms. Infants with NAS may have impaired feeding behaviors such as excessive sucking, regurgitation, diarrhea and poor feeding that is characterized by fussiness, crying, and sleepiness (13, 14). Infants with NAS have higher caloric requirements due to their energy expenditure. This combined with the impaired feeding behaviors may result in difficulty with weight gain (14). The American Academy of Pediatrics (AAP) recommends breastfeeding if not contraindicated (15). The AAP also recommends that infants with NAS be fed frequent small volumes of human milk or high calorie formula, as needed, in a quiet and calm environment, to aid the infant in tolerating feedings and improving digestion and to allow for adequate growth (11, 15).

The Academy of Breastfeeding Medicine recommends breastfeeding for women who are on a prescribed stable dose of methadone maintenance because the concentrations of methadone in human milk are low (16). Studies have indicated that, although the amount of methadone in human milk is dependent on the mother's dose, the methadone transferred in human milk averages less than 2.8% of the maternal dose (17). Breastfeeding has been found to provide protection against the development of NAS symptoms and lessen the severity of symptoms, which would decrease the need for pharmacological intervention for the infant (18, 19, 20). The amount of methadone that is in human milk is small and therefore, it is thought that breastfeeding, and not the methadone in human milk, is responsible for its protective impact against NAS (18). Gradual weaning, when mutually desired by the mother and infant, is recommended for breastfeeding women who are being treated for opioid addiction. Gradual weaning (rather than an abrupt stop to breastfeeding) decreases the risk of the infant developing NAS (11, 17).

Implications for WIC Nutrition Services

NAS can be a difficult subject to talk about with WIC participants due to the stigma of addiction. In the WIC clinic, caregivers may not be forthcoming with the infant's diagnosis of NAS and an addiction history of the mother may not be available at the initial assessment. WIC staff can assist caregivers by:

- Educating to recognize infant hunger cues.
- Reviewing feeding frequency and/or formula type and amount to help manage gastrointestinal symptoms of NAS.
- Providing growth monitoring to assess adequate weight gain.
- Encouraging supportive interventions to include:
  - -Skin-to-skin contact
  - -Swaddling
  - -Quiet environment with little stimulation
- Encouraging breastfeeding unless medically contraindicated.
- Providing referrals for support services such as drug and alcohol counseling, parenting support, and medical evaluations.

- Encouraging mothers who are on medication-assisted therapy (e.g., methadone or buprenorphine) and who are breastfeeding, to speak with their health care provider if they have questions about the timing and dose of their medication.
- Educating mothers who are on medication-assisted therapy and who are breastfeeding on the importance of gradual weaning when mutually desired by the mother and infant.

Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

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Failure to Meet Dietary Guidelines for Americans

Definition/ cut-off value

Women and children two years of age and older who meet the income, categorical, and residency eligibility requirements may be presumed to be at nutrition risk for failure to meet Dietary Guidelines for Americans [Dietary Guidelines] (1). Based on an individual's estimated energy needs, the failure to meet Dietary Guidelines risk criterion is defined as consuming fewer than the recommended number of servings from one or more of the basic food groups (grains, fruits, vegetables, milk products, and meat or beans)

Note: The *Failure to meet Dietary Guidelines* for Americans risk criterion can only be used when a complete nutrition assessment has been completed and no other risk criteria have been identified. This includes assessing for risk #425, Inappropriate Nutrition Practices for Children or risk #427, Inappropriate Nutrition Practices for Women.

Participant category and priority level

Category	Priority
Pregnant Women	IV
Breastfeeding Women	IV
Non-Breastfeeding Women	VI
Children ≥ 2 years of age	V

Justification

The 1996 Institute of Medicine (IOM) report, *WIC Nutrition Risk Criteria: A Scientific Assessment*, raised questions on the quality of traditional dietary assessment methods (e.g., 24-hour recall and food frequency questionnaires) and recommended further research on the development and validation of diet assessment methodologies (2). In response to the 1996 IOM report, the Food and Nutrition Service (FNS) commissioned the IOM to review the use of various dietary assessment tools and to make recommendations for assessing inadequate diet or inappropriate dietary patterns, especially in the category of failure to meet Dietary Guidelines (see Clarification) (3).

The IOM Committee on Dietary Risk Assessment in the WIC Program approached this task by using the Food Guide Pyramid* recommended number of servings, based on energy needs, as cut-off points for each of the five basic food groups to determine if individuals were meeting the Dietary Guidelines. As a result of the review of the cut-off points for food groups and dietary assessment methods, the IOM published the 2002 report, Dietary Risk Assessment in the WIC Program. The IOM Committee's findings related to dietary risk, the summary evidence, and the Committee's concluding recommendation are provided below. (4)

IOM Committee Findings Related to Dietary Risk (4) (For more information, refer to the specific pages listed)

- A dietary risk criterion that uses the WIC applicant's usual intake of the five basic Pyramid* food groups as the indicator and the recommended number of servings based on energy needs as the cut-off points is consistent with *failure to meet Dietary Guidelines.* (page 130)
- Nearly all U.S. women and children usually consume fewer than the recommended number of servings specified by the Food Guide Pyramid* and, therefore, would be at dietary risk based on the criterion *failure to meet Dietary Guidelines*. (page 130)
- Even research-quality dietary assessment methods are not sufficiently accurate or precise to distinguish an **individual's** eligibility status using criteria based on the Food Guide Pyramid or on nutrient intake. (page 131)

Supporting Evidence Supporting a Presumed Dietary Risk Criterion (4) (For more information, refer to the specific page listed)

- Less than 1 percent of all women meet recommendations for all five Pyramid* groups. (page 127)
- Less than 1 percent of children ages 2 to 5 years meet recommendations for all five Pyramid groups. (page 127)
- The percentage of women consuming fruit during 3 days of intake increases with increasing income level. (page 127)
- Members of low-income households are less likely to meet recommendations than are more affluent households. (page 127)
- Food-insecure mothers are less likely to meet recommendations for fruit and vegetable intake than are food-secure mothers. (page 127)
- The percentage of children meeting recommendations for fat and saturated fat as a percentage of food energy increases with increasing income level. (page 127)
- Low-income individuals and African Americans have lower mean Healthy Eating Index scores than do other income and racial/ethnic groups. (page 127)

**The Food Guide Pyramid was the Dietary Guidelines icon at the time the 2002 IOM Committee on Dietary Risk Assessment in the WIC Program conducted the review. The Dietary Guidelines icon has been changed to MyPlate. Although the icon has changed, the Findings and the Supporting Research are still applicable to this criterion. Please see Clarification for more information.*

Summary Evidence Suggesting that Dietary Assessment Methods are Not Sufficient to Determine a WIC Applicant's Dietary Risk (4) (For more information, refer to the specific page number)

- 24-hour diet recalls and food records are not good measures of an individual's usual intake unless a number of independent days are observed. (page 61)
- On average, 24-hour diet recalls and food records tend to underestimate usual intake–energy intake in particular. (page 61)
- Food Frequency Questionnaires and diet histories tend to overestimate mean energy intakes. (page 61)

IOM Committee Concluding Recommendation (4) (For more information, refer to the specific page number)

"In summary, evidence exists to conclude that nearly all low-income women in the childbearing years and children ages 2 to 5 years are at dietary risk, are vulnerable to nutrition insults, and may benefit from WIC's services. Further, due to the complex nature of dietary patterns, it is unlikely that a tool will be developed to fulfill its intended purpose with WIC, i.e., to classify individuals accurately with respect to their true dietary risks. Thus, any tools adopted would result in its classification of the eligibility status of some, potentially many, individuals. By presuming that all who meet the Program's categorical and income eligibility requirements are at dietary risk, WIC retains its potential for preventing and correcting nutrition-related problems while avoiding serious misclassification errors that could lead to denial of services to eligible individuals." (page 135)

Implications for WIC Nutrition Services

As indicated in the 2002 IOM report, most Americans (including most WIC participants fail to adhere to the *Dietary Guidelines*. Through participant-centered counseling, WIC staff can:

- Guide the participant in choosing healthy foods and age-appropriate physical activities as recommended in the *Dietary Guidelines.*
- Reinforce positive lifestyle behaviors that lead to positive health outcomes.
- Discuss nutrition-related topics of interest to the participant such as food shopping, meal preparation, feeding relationships, and family meals.
- Refer participants, as appropriate, to the Supplemental Nutrition Assistance Program (SNAP), community food banks and other available nutrition assistance programs.

Clarification

The recommendation and findings of the IOM Committee were developed using the 2000 Dietary Guidelines as the standard for a healthy diet. Subsequent to the 2002 IOM report, the *Dietary Guidelines* have been updated with the release of the *2005 and 2010 Dietary Guidelines*.

Although the subsequent editions of the *Dietary Guidelines* are different from the 2000 edition, there is no evidence to suggest that the 2002 IOM recommendation and findings are invalid or inaccurate. The fact remains that diet assessment methodologies may not reflect usual intakes and therefore are insufficient to determine an individual's eligibility status. In addition, future research will be necessary to determine if there is a change in the IOM finding that nearly all Americans fail to consume the number of servings from the basic food groups as recommended in the *Dietary Guidelines.*

Inappropriate Nutrition Practices for Infants

Definition/ cut-off value	Routine use of feeding practices that may result in impaired nutrient status, disease, or health problems. These practices, with examples, are outlined below. Refer to "Attachment to 411-Justification and References" for this criterion.

Participant category and priority level	**Category**	**Priority**
	Infants	IV

Inappropriate Nutrition Practices for Infants	**Examples of Inappropriate Nutrition Practices (including but not limited to)**
411.1 (Substitute for breastmilk or formula) Routinely using a substitute(s) for breast milk or for FDA approved iron-fortified formula as the primary nutrient source during the first year of life.	Examples of substitutes: ▪ Low iron formula without iron supplementation; ▪ Cow's milk, goat's milk, or sheep's milk (whole, reduced fat, low-fat, skim), canned, evaporated or sweetened condensed milk; and ▪ Imitation or substitute milks (such as rice- or soy-based beverages, non-dairy creamer), or other "homemade concoctions."
411.2 (Routinely using Nursing Bottles or Cups Improperly) Routinely using nursing bottles or cups improperly.	▪ Using a bottle to feed fruit juice. ▪ Feeding any sugar-containing fluids, such as soda/soft drinks, gelatin water, corn syrup solutions, sweetened tea. ▪ Allowing the infant to fall asleep or be put to bed with a bottle at naps or bedtime. ▪ Allowing the infant to use the bottle without restriction (e.g., walking around with a bottle) or as a pacifier. ▪ Propping the bottle when feeding. ▪ Allowing an infant to carry around and drink throughout the day from a covered or training cup. ▪ Adding any food (cereal or other solid foods) to the infant's bottle.

411 (Continued)

411.3 (Introducing Solids Before 6 Months & Inappropriate Food or Drinks) Routinely offering complementary foods* or other substances that are inappropriate in type or timing. **Complementary foods are any foods or beverages other than human milk or infant formula.*	Examples of inappropriate complementary foods: ▪ Introducing any food other than human milk or iron-fortified infant formula before 6months of age. ▪ Adding sweet agents such as sugar, honey, or syrups to any beverage (including water) or prepared food, or used on a pacifier; ▪ Caregiver pre-chews food for infant.
411.4 (Feeding that Disregards Developmental Needs) Routinely using feeding practices that disregard the developmental needs or stage of the infant.	▪ Inability to recognize, insensitivity to, or disregarding the infant's cues for hunger and satiety (e.g., forcing an infant to eat a certain type and/or amount of food or beverage or ignoring an infant's hunger cues). ▪ Feeding foods of inappropriate consistency, size, or shape that put infants at risk of choking. ▪ Not supporting an infant's need for growing independence with self-feeding (e.g., solely spoon-feeding an infant who is able and ready to finger-feed and/or try self-feeding with appropriate utensils). ▪ Feeding an infant food with inappropriate textures based on his/her developmental stage (e.g., feeding primarily pureed or liquid foods when the infant is ready and capable of eating mashed, chopped or appropriate finger foods).
411.6 (Improper Dilution of Formula) Routinely feeding inappropriately diluted formula.	▪ Failure to follow manufacturer's dilution instructions (to include stretching formula for household economic reasons). ▪ Failure to follow specific instructions accompanying a prescription.
411.7 (Limiting Exclusive Breastfeeding) Routinely limiting the frequency of nursing of the exclusively breastfed infant when human milk is the sole source of nutrients.	Examples of inappropriate frequency of nursing: ▪ Scheduled feedings instead of demand feedings; and ▪ Less than 8 feedings in 24 hours if less than 2 months of age

411.9 (Lack of Sanitation – Handling Breastmilk/formula) Routinely using inappropriate sanitation in preparation, handling, and storage of expressed human milk or formula.	Limited or no access to a: ▪ Safe water supply (documented by appropriate officials, e.g. municipal or health department authorities); ▪ Heat source for sterilization; and/or ▪ Refrigerator or freezer for storage. Failure to properly prepare, handle, and store bottles, storage containers or breast pumps properly; examples include: Human Milk ▪ Thawing/heating in a microwave ▪ Refreezing ▪ Adding freshly expressed unrefrigerated human milk to frozen human milk ▪ Adding freshly pumped chilled human milk to frozen human milk in an amount that is greater than the amount of frozen human milk ▪ Feeding thawed refrigerated human milk more than 24 hours after it was thawed ▪ Saving human milk from a used bottled for another feeding ▪ Failure to clean breast pump per manufacturer's instruction ▪ Feeding donor human milk acquired directly from individuals or the Internet. Formula ▪ Failure to prepare and/or store formula per manufacturer's or physician instructions ▪ Storing at room temperature for more than 1 hour ▪ Using formula in a bottle one hour after the start of a feeding ▪ Saving formula from a used bottle for another feeding ▪ Failure to clean baby bottle properly

Attachment to 411
Justification and References

Inappropriate Nutrition Practices for Infants

Justification

411.1 Routinely using a substitute(s) for breast milk or for FDA approved iron-fortified formula as the primary nutrient source during the first year of life.

During the first year of life, breastfeeding is the preferred method of infant feeding. The American Academy of Pediatrics (AAP) recommends breast milk for the first 12 months of life because of its acknowledged benefits to infant nutrition, gastrointestinal function, host defense, and psychological well-being (1). For infants fed infant formula, iron-fortified formula is generally recommended as a substitute for breastfeeding (1- 4). Rapid growth and increased physical activity significantly increase the need for iron and utilizes iron stores (1). Body stores are insufficient to meet the increased iron needs making it necessary for the infant to receive a dependable source of iron to prevent iron deficiency anemia (1). Iron deficiency anemia is associated with cognitive and psychomotor impairments that may be irreversible, and with decreased immune function, apathy, short attention span, and irritability (1, 5). Feeding of low-iron infant formula can compromise an infant's iron stores and lead to iron deficiency anemia. Cow's milk has insufficient and inappropriate amounts of nutrients and can cause occult blood loss that can lead to iron deficiency, stress on the kidneys from a high renal solute load, and allergic reactions (1, 3, 5-8). Sweetened condensed milk has an abundance of sugar that displaces other nutrients or causes over consumption of calories (9). Homemade formulas prepared with canned evaporated milk do not contain optimal kinds and amounts of nutrients infants need (1, 5, 8, 9). Goat's milk, sheep's milk, imitation milks, and substitute milks do not contain nutrients in amounts appropriate for infants (1, 3, 5, 10, 11).

411.2 Routinely using nursing bottles or cups improperly.

Dental caries is a major health problem in U.S. preschool children, especially in low-income populations (12). Eating and feeding habits that affect tooth decay and are started during infancy may continue into early childhood. Most implicated in this rampant disease process is prolonged use of baby bottles during the day or night, containing fermentable sugars, (e.g., fruit juice, soda, and other sweetened drinks), pacifiers dipped in sweet agents such as sugar, honey or syrups, or other high frequency sugar exposures (13). The AAP and the American Academy of Pedodontics recommend that juice should be offered to infants in a cup, not a bottle, and that infants not be put to bed with a bottle in their mouth (14, 15). While sleeping with a bottle in his or her mouth, an infant's swallowing and salivary flow decreases, thus creating a pooling of liquid around the teeth (16). The practice of allowing infants to carry or drink from a bottle or training cup of juice for periods throughout the day leads to excessive exposure of the teeth to carbohydrate, which promotes the development of dental caries (14).

Allowing infants to sleep with a nursing bottle containing fermentable carbohydrates or to use it unsupervised during waking hours provides an almost constant supply of carbohydrates and sugars (1). This leads to rapid demineralization of tooth enamel and an increase in the risk of dental caries due to prolonged contact between cariogenic bacteria on the susceptible tooth surface and the sugars in the consumed liquid (1, 17). The sugars in the liquid pool around the infant's teeth and gums feed the bacteria there and decay is the result (18). The process may start before the teeth are even fully erupted. Upper incisors (upper front teeth) are particularly

vulnerable; the lower incisors are generally protected by the tongue (18). The damage begins as white lesions and progresses to brown or black discoloration typical of caries (18). When early childhood caries is severe, the decayed crowns may break off and the permanent teeth developing below may be damaged (18). Undiagnosed dental caries and other oral pain may contribute to feeding problems and failure to thrive in young children (18).

Unrestricted use of a bottle, containing fermentable carbohydrates, is a risk because the more times a child consumes solid or liquid food, the higher the caries risk (1). Cariogenic snacks eaten between meals place the toddler most at risk for caries development; this includes the habit of continually sipping from cups (or bottles) containing cariogenic liquids (juice, milk, soda, or sweetened liquid) (18). If inappropriate use of the bottle persists, the child is at risk of toothaches, costly dental treatment, loss of primary teeth, and developmental lags on eating and chewing. If this continues beyond the usual weaning period, there is a risk of decay to permanent teeth.

Propping the bottle deprives infants of vital human contact and nurturing which makes them feel secure. It can cause: ear infections because of fluid entering the middle ear and not draining properly; choking from liquid flowing into the lungs; and tooth decay from prolonged exposure to carbohydrate-containing liquids (19).

Adding solid food to a nursing bottle results in force-feeding, inappropriately increases the energy and nutrient composition of the formula, deprives the infant of experiences important in the development of feeding behavior, and could cause an infant to choke (1, 10, 20, 21).

411.3 Routinely offering complementary foods or other substances that are inappropriate in type or timing.

Infants, especially those living in poverty, are at high risk for developing early childhood caries (13). Most implicated in this disease process are: prolonged use of baby bottles containing fermentable sugars, (e.g., fruit juice, soda, and other sweetened drinks) during the day or night; pacifiers dipped in sweet agents such as sugar, honey or syrups; or other high frequency sugar exposures (14).

The AAP recommends exclusive breastfeeding through 6 months of age (1). Feeding solid foods too early (i.e., before 6 months of age) by, for example, adding diluted cereal or other solid foods to bottles deprives infants of the opportunity to learn to feed themselves (4, 11, 23). The major objection to the introduction of solids before 6 months of age is based on the possibility that it may interfere with establishing sound eating habits and may contribute to overfeeding (6,24). In early infancy, the infant possesses an extrusion reflex that enables him/her to swallow only liquid foods (1, 13, 25). The extrusion reflex is normally diminished by 6 months of age (1). Breast milk or iron-fortified infant formula is all the infant needs. Gastric secretions, digestive capacity, renal capacity and enzymatic secretions are low, which makes digestion of solids inefficient and potentially harmful (6, 24, 25). Furthermore, there is the potential for antigens to be developed against solid foods, due to the undigested proteins that may permeate the gut; however, the potential for developing allergic reactions may primarily be in infants with a strong family history of atopy (6, 24). If solid foods are introduced before the infant is developmentally ready, breast milk or iron-fortified formula necessary for optimum growth is displaced (1, 25). Around 6 months of age, the infant is developmentally ready for solid foods when: the infant is better able to express certain feeding cues such as turning head to indicate satiation; oral and gross motor skills begin to develop that help the infant to take solid foods; the extrusion reflex disappears; and the infant begins to sit upright and maintain balance with little or no support (1, 6, 24, 25).
The AAP advises against giving fruit juice to infants younger than 6 months since it offers no nutritional benefit at this age (1). Offering juice before solid foods are introduced into the diet could risk having juice replace breast milk or infant formula in the diet (15). This can result in reduced intake of protein, fat, vitamins, and minerals such as iron, calcium, and zinc (26). It is prudent to give juice only to infants who

can drink from a cup (15).

411.4 Routinely using feeding practices that disregard the developmental needs or stage of the infant.
Infants held to rigid feeding schedules are often underfed or overfed. Caregivers insensitive to signs of hunger and satiety, or who over manage feeding may inappropriately restrict or encourage excessive intake. Findings show that these practices may promote negative or unpleasant associations with eating that may continue into later life, and may also contribute to obesity. Infrequent breastfeeding can result in lactation insufficiency and infant failure-to-thrive. Infants should be fed foods with a texture appropriate to their developmental level. (3, 5, 10, 12, 20, 22)

411.6 Routinely feeding inappropriately diluted formula.
Over dilution can result in water intoxication resulting in hyponatremia; irritability; coma; inadequate nutrient intake; failure to thrive; poor growth (1, 3, 5, 10, 20, 32). Under dilution of formula increases calories, protein, and solutes presented to the kidney for excretion, and can result in hypernatremia, tetany, and obesity (3, 5, 10, 20, 32).
Dehydration and metabolic acidosis can occur (3, 5, 10, 32). Powdered formulas vary in density so manufacturer's scoops are formula specific to assure correct dilution (5, 20). One clue for staff to identify incorrect formula preparation is to determine if the parent/caregiver is using the correct manufacturer's scoop to prepare the formula.

411.7 Routinely limiting the frequency of nursing of the exclusively breastfed infant when breast milk is the sole source of nutrients.
Exclusive breastfeeding provides ideal nutrition to an infant and is sufficient to support optimal growth and development in the first 6 months of life (5). Human colostrum and milk have been studied extensively. They are composed of a mixture of nutritive components and other bioactive factors that are easy to digest and absorb and have strong physiologic effects upon the infant, and their composition changes over time to meet the infant's changing nutritional needs (1).

Frequent breastfeeding is critical to the establishment and maintenance of an adequate milk supply for the infant (5, 33-37). Inadequate frequency of breastfeeding may lead to lactation failure in the mother and dehydration, poor weight gain, diarrhea, vomiting, illness, and malnourishment in the infant (5, 35, 38-43). Exclusive breastfeeding protects infants from early exposure to contaminated foods and liquids (41). Infants who receive human milk more than infant formulas have a lower risk of being overweight in childhood and adolescence (44, 45). In addition, a summary report of several primary studies and meta-analyses has reported that a history of breastfeeding is associated with a reduction in the risk of otitis media, gastroenteritis, hospitalization for lower respiratory tract infections, atopic dermatitis, sudden infant death syndrome, childhood asthma, childhood leukemia, and type 1 and 2 diabetes (46).

411.9 Routinely using inappropriate sanitation in preparation, handling, and storage of expressed breastmilk or formula.
Lack of sanitation in the preparation, handling and storage of expressed human milk or formula may cause gastrointestinal infection. The water used to prepare concentrated or powdered infant formula and prepare bottles and nipples (for formula and human milk) must be safe for consumption. Water contaminated with toxic substances (such as nitrates, lead, or pesticides) poses a hazard to an infant's health and should NOT be used (10). In addition, a heat source is necessary to sterilize bottles and other items used in the storage of both human milk and formula. Adequate refrigeration (40 Degrees Fahrenheit or below) is necessary to safely store human milk and prepared formula (10).

Human Milk

Published guidelines on the handling and storage of human milk may differ among pediatric nutrition authorities (1, 10, 52-55). However, there is consensus on the following human milk feeding, handling, and storage practices that are considered inappropriate and unsafe (10, 52, 56-58):

- Thawing frozen human milk in the microwave oven
- Refreezing human milk
- Adding freshly expressed unrefrigerated human milk to already frozen milk in a storage container
- Feeding previously frozen human milk thawed in the refrigerator that has been refrigerated for more than 24 hours
- Saving human milk from a used bottle for use at a subsequent feeding
- Failure to clean a breast pump per manufacturer's instruction
- Feeding donor human milk acquired directly from individuals or the internet

Another consideration when recommending length of storage time is its effect on protective properties in human milk. There is evidence that after 48 hours of refrigeration, human milk significantly loses important antibacterial and antioxidant properties (60). These properties of human milk are specifically important for the prevention of necrotizing enterocolitis, retinopathy, and bronchopulmonary dysplasia of premature infants (5). Although some properties may be reduced with longer refrigerated storage, this does not diminish the overall superiority of human milk over formula, as formula does not contain these protective properties or many of the other benefits of human milk.

Participant circumstances (e.g., adequate refrigeration, safe water, heat source), the health of the infant and health care provider directions need to be considered when recommending the length of time human milk should be stored.

If the breastfeeding mother uses a breast pump, it is essential for her to fully understand the importance of the specific manufacturer's instructions for cleaning the breast pump. Improper cleaning of breast pumps and pump parts can increase the risk of expressed human milk contamination (58).

With increased awareness of the benefits and efforts to promote breastfeeding, more mothers are choosing to breastfeed, as evidenced by data from CDC in the Breastfeeding Report Card (61). But in situations such as illness, physical inability to produce human milk, decisions to not breastfeed, or adoptive parents seeking human milk, the desire to provide human milk may prompt parents/caregivers to turn to alternate methods of obtaining human milk to feed their infant. Since the cost of banked human milk can be prohibitive for WIC clients, these mothers may turn to informal milk sharing from known sources such as friends or relatives, or from unknown sources such as internet sites or other advertisements.

A study that evaluated human milk shared via the internet concluded that there was a high overall rate of bacterial growth and contamination, which suggests poor collection, storage, and shipping practices (62). In another study, researchers looked at current and past infection among potential donors to a human milk bank. It was revealed that a minimum of 3% of potential donors had positive serology for disease conditions such as syphilis, HIV, hepatitis B, hepatitis C, HTLV-1 or HTLV-2 (63). It was concluded that if these relatively low risk potential donors tested positive then the untested or unscreened women of donor human milk may present a

significant health risk (63). Although sharing human milk between those with an excess milk supply and those seeking milk for their infant may be growing in popularity (often facilitated by web sites established to link providers and recipients), both the AAP and the Food and Drug Administration (FDA) recommend against feeding infants human milk obtained directly from individuals or through the internet (59, 64). Obtaining donor human milk via these means is discouraged due to the lack of adequate screening for infectious diseases and the risk of contamination (59).

The FDA suggests that a decision to give donor human milk should be made in consultation with the infant's health care provider and only screened donor human milk should be used. Also, caregivers should consult with the infant's health care provider on where to obtain screened donor human milk (59). Due to the lack of Federal guidelines and standards pertaining to the operation, quality, and safety of human milk banks and potential liability concerns, the U.S. Department of Agriculture, Food and Nutrition Service does not authorize banked human milk as an allowable substitute for WIC-eligible formulas (see WIC Policy Memorandum 2000-2: Use of Banked Human Breast Milk in the WIC Program).

Formula

Formula must be properly prepared in a sanitary manner to be safe for consumption. Furthermore, prepared infant formula is a perishable food, and must be handled and stored properly in order to be safe for consumption (4, 10).

Most babies who are hospitalized for vomiting and diarrhea are bottle fed. This has often been attributed to the improper handling of formula rather than sensitivities to the formula. In rare cases, the contaminated powdered formulas may cause infections in preterm or immune compromised infants. To reduce the risk of infection in infants it is important that formulas be carefully prepared and handled. All formula should be prepared according to the manufacturer's instruction on the label, or those given by the health care provider.

Manufacturers' instructions vary, depending on the product, in the length of time it is considered safe to store prepared infant formula without refrigeration before bacterial growth accelerates to an extent that the infant is placed at risk (1). Published guidelines on the handling and storage of infant formula indicate that it is unsafe to use prepared formula which (1):

- Has been held at room temperature longer than 1 hour or longer than recommended by the manufacturer
- Has been held in the refrigerator longer than the safe storage time indicated by the manufacturer
- Remains in a bottle one hour after the start of feeding
- Remains in a bottle from an earlier feeding
- Is fed using improperly cleaned baby bottles

Inappropriate Nutrition Practices for Children

Definition/ cut-off value	Routine use of feeding practices that may result in impaired nutrient status, disease, or health problems. These practices, with examples, are outlined below. Refer to "Attachment to 425-Justification and References" for this criterion.

Participant category and priority level	**Category**	**Priority**
	Children	V

Inappropriate Nutrition Practices for Children	**Examples of Inappropriate Nutrition Practices (including but not limited to)**
425.1 (Inappropriate Milk Type/Milk Substitute) Routinely feeding inappropriate beverages as the primary milk source.	Examples of inappropriate beverages as primary milk source: • Non-fat or reduced-fat milks (between 12 and 24 months of age, unless allowed by State agency policy for a child for whom overweight or obesity is a concern) or sweetened condensed milk; and • Goat's milk, sheep's milk, imitation or substitute milks (that are unfortified or inadequately fortified), or other "homemade concoctions."
425.2 (Routinely Feeding Sugar Drinks) Routinely feeding a child any sugar-containing fluids.	Examples of sugar-containing fluids: • Soda/soft drinks; • Gelatin water; • Corn syrup solutions; • Sweetened tea; and • 12 or more ounces of any fruit juice per day.
425.3 (Routinely Using Nursing Bottles or Cups Improperly) Routinely using nursing bottles or cups improperly.	• Using a bottle to feed: ➢ Fruit juice, or ➢ Diluted cereal or other solid foods. • Allowing the child to fall asleep or be put to bed with a bottle at naps or bedtime. • Allowing the child to use the bottle without restriction (e.g., walking around with a bottle) or as a pacifier. • Using a bottle for feeding or drinking beyond 14 months of age. • Using a pacifier dipped in sweet agents such as sugar, honey, or syrups. • Allowing a child to carry around and drink throughout the day from a covered or training cup.

425.4 (Feeding that Disregards Developmental Needs) Routinely using feeding practices that disregard the developmental needs or stages of the child.	• Inability to recognize, insensitivity to, or disregarding the child's cues for hunger and satiety (e.g., forcing a child to eat a certain type and/or amount of food or beverage or ignoring a hungry child's requests for appropriate foods). • Feeding foods of inappropriate consistency, size, or shape that put children at risk of choking. • Not supporting a child's need for growing independence with self-feeding (e.g., solely spoon-feeding a child who is able and ready to finger-feed and/or try self-feeding with appropriate utensils). • Feeding a child food with an inappropriate texture based on his/her developmental stage (e.g., feeding primarily pureed or liquid food when the child is ready and capable of eating mashed, chopped or appropriate finger foods).
425.9 (Eating Non-food Items - Pica) Routine ingestion of nonfood items (pica).	Examples of inappropriate nonfood items: • Ashes; • Carpet fibers; • Cigarettes or cigarette butts; • Clay; • Dust; • Foam rubber; • Paint chips; • Soil; and • Starch (laundry and cornstarch).

3/05

Attachment to 425
Justification and References

Inappropriate Nutrition Practices for Children

Justification:

425.1 Routinely feeding inappropriate beverages as the primary milk source.

Goat's milk, sheep's milk, imitation and substitute milks (that are unfortified or inadequately fortified) do not contain nutrients in amounts appropriate as a primary milk source for children (1-4).

Non-fat and reduced-fat milks are not recommended for use with children from 1 to 2 years of age because of the lower calorie density compared with whole-fat products (1, 5). The low-calorie, low-fat content of these milks requires an increase in caloric intake to meet energy needs. Infants and children under two using reduced fat milks gain at a slower growth rate, lose body fat as evidenced by skinfold thickness, lose energy reserves, and are at risk of inadequate intake of essential fatty acids. Additionally, essential fatty acids are a critical component of infant and child brain development with deficits early in life leading to significantly altered brain structure and function (6-8). Similar malnourishment has been associated with negative health outcomes including, but not limited to, slower language development, poorer motor function, lower IQ, poorer school performance, and eyesight problems (9).

WIC Regulations [7 CFR 246.10(e)], however, include the option for WIC State agencies to issue reduced-fat milk and/or reduced-fat yogurt to children (1 to 2 years of age) for whom overweight or obesity is a concern, as determined by the Competent Professional Authority (CPA) (Food Package Guidance, May 2014). This option is consistent with the American Academy of Pediatrics (AAP) recommendation in the clinical report: Lipid Screening and Cardiovascular Health in Childhood (10). The AAP identifies parental history of obesity, lipidemia, and cardiovascular disease as determinants for a child for whom overweight or obesity is a concern. WIC State agencies that choose to authorize reduced-fat milk and/or reduced-fat yogurt for the 1 year old child must develop policy that defines the assessment criteria the CPA will use to determine if the child should be given reduced-fat dairy products. For example, a State agency may choose to use existing nutrition risk criteria: #114 *Overweight or At Risk of Overweight (Infants and Children)* and/or # 115 High Weight-for-Length *(Infants and Children <24 Months of Age)* to identify children to receive reduced-fat milk. For more information about the required State agency policy for issuing reduced fat milk to children 12 months to 2 years of age, please see the Food and Nutrition Service, Food Package Guidance issued May 2014.

425.2 Routinely feeding a child any sugar-containing fluids.

Abundant epidemiologic evidence from groups who have consumed low quantities of sugar as well as from those who have consumed high quantities shows that sugar – especially sucrose – is the major dietary factor affecting the prevalence and progression of dental caries (11). Consumption of foods and beverages high in fermentable carbohydrates, such as sucrose, increases the risk of early childhood caries and tooth decay (11, 12).

425.3 Routinely using nursing bottles, cups, or pacifiers improperly.

Dental caries are a major health problem in U.S. preschool children, especially in low-income populations (13). Most implicated in this rampant disease process is prolonged use of baby bottles, during the day or 05/2015 425 Dietary: Inappropriate Nutrition Practices for Children 2 of 7 night, containing fermentable sugars, (e.g., fruit juice, soda, and other sweetened drinks); pacifiers dipped in sweet agents such as sugar, honey or syrups; or other high frequency sugar exposures (11). Solid foods such as cereal should not be put into a bottle for feeding; this is a form of force feeding (14) and does not encourage the child to eat the cereal in a more developmentally-appropriate way.

Additional justification for the examples include:

- The American Academy of Pediatrics (AAP) and the American Academy of Pedodontics recommend that children not be put to bed with a bottle in their mouth (15, 16). While sleeping with a bottle in his or her mouth, a child's swallowing and salivary flow decrease, resulting in a pooling of liquid around the teeth (17). Propping the bottle can cause: ear infections because of fluid entering the middle ear and not draining properly; choking from liquid flowing into the lungs; and tooth decay from prolonged exposure to carbohydrate-containing liquids (18).
- Pediatric dentists recommend that parents be encouraged to have infants drink from a cup as they approach their first birthday, and that infants are weaned from the bottle by 12-14 months of age (19).
- The practice of allowing children to carry or drink from a bottle or cup of juice for periods throughout the day leads to excessive exposure of the teeth to carbohydrates, which promotes the development of dental caries (15). Allowing toddlers to use a bottle or cup containing fermentable carbohydrates unsupervised during waking hours provides an almost constant supply of carbohydrates and sugars (1). This leads to rapid demineralization of tooth enamel and an increase in the risk of dental caries due to prolonged contact between cariogenic bacteria on the susceptible tooth surface and the sugars in the consumed liquid (1, 19). The sugars in the liquid pool around the child's teeth and gums feed the bacteria there and result in decay (20). The process may start before the teeth are even fully erupted. Upper incisors (upper front teeth) are particularly vulnerable; the lower incisors are generally protected by the tongue (20). The damage begins as white lesions and progresses to brown or black discoloration typical of caries (20). When early childhood caries are severe, the decayed crowns may break off and the permanent teeth developing below may be damaged (20). Undiagnosed dental caries and other oral pain may contribute to feeding problems and failure to thrive in young children (20). Use of a bottle or cup, containing fermentable carbohydrates, without restriction is a risk because the more times a child consumes solid or liquid food, the higher the caries risk (1). Cariogenic snacks eaten between meals place the toddler most at risk for caries development; this includes the habit of continually sipping from cups (or bottles) containing cariogenic liquids (juice, milk, soda, or sweetened liquid) (20). If inappropriate use of the bottle persists the child is at risk of toothaches, costly dental treatment, loss of primary teeth, and developmental lags on eating and chewing. If this continues beyond the usual weaning period there is a risk of decay to permanent teeth.

425.4 Routinely using feeding practices that disregard the developmental needs or stages of the child.

The interactions and communication between a caregiver and child during feeding and eating influence a child's ability to progress in eating skills and consume a nutritionally adequate diet.

The interactions and communication between a caregiver and child during feeding and eating influence a child's ability to progress in eating skills and consume a nutritionally adequate diet. These interactions comprise the "feeding relationship" (14). A dysfunctional feeding relationship, which could be characterized by a caregiver misinterpreting, ignoring, or overruling a young child's innate capability to regulate food intake based on hunger, appetite, and satiety can result in poor dietary intake and impaired growth (21, 22). Parents who consistently attempt to control their children's food intake may give children few opportunities to learn to control their own food intake (23). This could result in inadequate or excessive food intake, future problems with food regulation, and problems with growth and nutritional status. Instead of using approaches such as bribery, rigid control, struggles, or short-order cooking to manage eating, a healthier approach is for parents to provide nutritious, safe foods at regular meals and snacks, allowing children to decide how much, if any, they eat (1, 22). Young children should be able to eat in a matter-of-fact way sufficient quantities of the foods that are given to them, just as they take care of other daily needs (3). Research indicates that restricting access to foods (i.e., high fat foods) may enhance the interest of 3- to 5-year old children in those foods and increase their desire to obtain and consume those foods. Stringent parental controls on child eating have been found to potentiate children's preference for high-fat energy dense foods, limit children's acceptance of a variety of foods, and disrupt children's regulation of energy intake (24, 25). Forcing a child to clean his or her plate may lead to overeating or development of an aversion to certain foods (12). The toddler and preschooler are striving to be independent (12). Self-feeding is important even though physically they may not be able to handle feeding utensils or have good eye-hand coordination (12). Children should be able to manage the feeding process independently and with dispatch, without either unnecessary dawdling or hurried eating (3, 17). Self-feeding milestones include (1): During infancy, older infants progress from semisolid foods to thicker and lumpier foods to soft pieces to finger-feeding table food (14). By 15 months, children can manage a cup, although not without some spilling. At 16 to 17 months of age, well-defined wrist rotation develops, permitting the transfer of food from the bowl to the child's mouth with less spilling. The ability to lift the elbow as the spoon is raised and to flex the wrist as the spoon reaches the mouth follows. At 18 to 24 months, they learn to tilt a cup by manipulation with the fingers. Despite these new skills, 2-year-old children often prefer using their fingers to using the spoon. Preschool children learn to eat a wider variety of textures and kinds of food (3, 12). However, the foods offered should be modified so that the child can chew and swallow the food without difficulty (3).

425.9 Routine ingestion by child of nonfood items (Pica).

Pica is the compulsive eating of nonnutritive substances and can have serious medical implications (38). Pica is observed most commonly in areas of low socioeconomic status and is more common in women (especially pregnant women) and in children (35). Pica has also been seen in children with obsessive compulsive disorders, mental retardation, and sickle cell disease (39-41). Complications of this disorder include: iron-deficiency anemia, lead poisoning, intestinal obstruction, acute toxicity from soil contaminants, and helminthic infestations (39, 42, 43).

427

Inappropriate Nutrition Practices for Women

Definition/ cut-off value	Routine nutrition practices that may result in impaired nutrient status, disease, or health problems. These practices with examples are outlined below. Refer to "Attachment to 427 - Justification and References" for this criterion.

	Category	Priority
Participant category and priority level	**Pregnant Women**	**IV**
	Breastfeeding Women	**IV**
	Non-Breastfeeding Women	**VI**

Inappropriate Nutrition Practices for Women	Examples of Inappropriate Nutrition Practices (including but not limited to)
427.3 **(Eating Non-food Items - Pica)** Compulsively ingesting non-food items (pica).	Non-food items: • Ashes; • Baking soda; • Burnt matches; • Carpet fibers; • Chalk; • Cigarettes; • Clay; • Dust; • Large quantities of ice and/or freezer frost; • Paint chips; • Soil; and • Starch (laundry and cornstarch).

Inappropriate Nutrition Practices for Women

Justification

427.3 Compulsively ingesting non-food items (pica).

Pica, the compulsive ingestion of non-food substances over a sustained period of time, is linked to lead poisoning and exposure to other toxicants, anemia, excess calories or displacement of nutrients, gastric and small bowel obstruction, as well as, parasitic infection (23). It may also contribute to nutrient deficiencies by either inhibiting absorption or displacing nutrient dense foods in the diet.

Poor pregnancy outcomes associated with pica-induced lead poisoning, include lower maternal hemoglobin level at delivery (24) and a smaller head circumference in the infant (25). Maternal transfer of lead via breastfeeding has been documented in infants and can result in a neuro-developmental insult depending on the blood lead level and the compounded exposure for the infant during pregnancy and breastfeeding (26, 27, 28).

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Dietary Risk Associated with Complementary Feeding Practices

Definition/ cut-off value

An infant or child who has begun to or is expected to begin to 1) consume complementary foods and beverages, 2) eat independently, 3) be weaned from breast milk or infant formula, or 4) transition from a diet based on infant/toddler foods to one based on the *Dietary Guidelines for Americans*, is at risk of inappropriate complementary feeding.

A complete nutrition assessment, including for risk #411, Inappropriate Nutrition Practices for Infants, or #425, Inappropriate Nutrition Practices for Children, must be completed prior to assigning this risk.

Participant category and priority level

Category	Priority
Infants 4 to 12 months	IV
Children 12 through 23 months	V

Justification

Overview

Complementary feeding is the gradual addition of foods and beverages to the diet of the infant and young child. (1, 2) The process of adding complementary foods should reflect the physical, intellectual, and behavioral stages as well as the nutrient needs of the infant or child. Inappropriate complementary feeding practices are common and well documented in the literature. Caregivers often do not recognize signs of developmental readiness and, therefore, offer foods and beverages that may be inappropriate in type, amount, consistency, or texture. Furthermore, a lack of nationally accepted feeding guidelines for children under the age of two might lead caregivers to assume that all foods are suitable for this age range.

The 2000 WIC Participant and Program Characteristics study (PC 2000) shows greater percentages of anthropometric and biochemical risk factors in children ages 6 to 24 months than in children 24 to 60 months of age. (3)

These differences could reflect physical manifestations of inappropriate complementary feeding practices. Although PC 2000 shows a lower dietary risk in the 6 to 24 month age group, this risk is probably under-reported due to the high incidence of other higher priority nutrition risks.

AGE	ANTHOPOMETRIC RISK (%)	BIOCHEMICAL RISK (%)	DIETARY RISK (%)
6-11M	40	16	55
1 YEAR	41	14	76
2 YEAR	37	12	80
3 YEAR	32	9	80
4 YEAR	35	7	79

The Institute of Medicine (IOM), in their report, *Summary of Proposed Criteria for Selecting the WIC Food Packages* identified specific nutrients with potential for inadequacy or excess for WIC participants. For breast-fed infants 6 through 11 months, the nutrients of concern for potential inadequacy are iron and zinc while those for children 12 through 23 months are iron, vitamin E, fiber and potassium. The nutrients of concern for excessive intake in children 12 through 23 months are zinc, preformed vitamin A, sodium and energy. (4)

To manage complementary feeding successfully, caregivers must make decisions about what, when, where, and how to offer foods according to the infant's or child's:

- Requirement for energy and nutrients;
- Fine, gross, and oral motor skills;
- Emerging independence and desire to learn to self-feed; and
- Need to learn healthy eating habits through exposure to a variety of nutritious foods. (1, 2, 5, 6, 7)

How WIC Can Help

The WIC Program plays a key role not only in the **prevention** of nutrition-related health problems, but also in the **promotion** of lifelong healthy eating behaviors. The process of introducing complementary foods provides a unique opportunity for WIC staff to assist caregivers in making appropriate feeding decisions for young children that may have lifelong implications.

Prevention of Nutrition-Related Health Problems

- Zinc deficiency: Zinc is critical for growth and immunity, as well as brain development and function. The concentration of zinc in breast milk declines to a level considered inadequate to meet the needs of infants 7 to 12 months of age. (8, 9) Complementary food sources of zinc, such as meats or zinc-fortified infant cereals, should be introduced to exclusively breastfed infants by 7 months.

- Iron deficiency: Hallberg states, "The weaning period in infants is especially critical because of the especially high iron requirements and the importance of adequate iron nutrition during this crucial period of development."(10) According to the Centers for Disease Control and Prevention (CDC), children less than 24 months of age, especially those between 9 and 18 months, have the highest rate of iron deficiency of any age group. (11) In the third National Health and Nutrition Examination Survey (NHANES III), children ages 1 to 2, along with adolescent girls, had the highest rates of overt anemia, while 9 % were iron deficient. (12) Meanwhile, the Pediatric Nutrition Surveillance 2003 Report noted anemia rates of 16.2 % in 6 to 11 month-old infants, 15.0 % in 12 to 17 month-olds, and 13.5 % in 18-23 month old children. (13)

  Picciano et al. reported that the intake of iron decreased from 98% of the recommended amount at 12 months to 76% at 18 months of age. (14) In WIC clinics, Kahn et al. found that the incidence of anemia was significantly more common in 6 to 23 month old children than in 23 to 59 month-olds. The 6 to 23 month-old was also more likely than the older child to develop anemia despite a normal hemoglobin test at WIC certification. (15)

  Feeding practices that may prevent iron deficiency include:
  - Breastfeeding infants exclusively until 4 to 6 months of age;
  - Feeding only iron-fortified infant formula as a substitute for or supplement to breast milk until age 1;
  - Offering a supplemental food source of iron to infants, between 4 to 6 months or when developmentally ready;
  - Avoiding cow's milk until age 12 months; and
  - Limiting milk consumption to no more than 24 ounces per day for children aged 1 to 5 years. (11)

- Obesity: Much of the literature on obesity indicates that learned behaviors and attitudes toward food consumption are major contributing factors. Proskitt states, "The main long term effect of weaning on nutritional status could be through attitudes toward food and meals learned by infants through the weaning process. This may be a truly critical area for the impact of feeding on later obesity." (16)

  Birch and Fisher state, "An enormous amount of learning about food and eating occurs during the transition from the exclusive milk diet of infancy to the omnivore's diet consumed by early childhood." The authors believe that parents have the greatest influence on assuring eating behaviors that help to prevent future overweight and obesity. (17)

  The American Academy of Pediatrics (AAP) states, "…prevention of overweight is critical, because long-term outcome data for successful treatment approaches are limited…" and, "Families should be educated and empowered through anticipatory guidance to recognize the impact they have on their children's development through lifelong habits of physical activity and nutritious eating." (1) Parents can be reminded that they are role models and teachers who help their children adopt healthful eating and lifestyle practices.

- Tooth decay: Children under the age of 2 are particularly susceptible to Early Childhood Caries (ECC), a serious public health problem. (18) In some communities, the incidence of ECC can range from 20% to 50%. (19) Children with ECC appear to be more susceptible to caries in permanent teeth at a later age. (1, 20)
  Dental caries can be caused by many factors, including prolonged use of a bottle and extensive use of sweet and sticky foods. (21) The Avon Longitudinal Study of Pregnancy and Childhood examined 1,026 children aged 18 months and found that baby bottles were used exclusively for drinking by 10 % of the children and for at least one feeding by 64% of the children. Lower income families were found to use the bottle more frequently for carbonated beverages than higher income families. (22)
  Complementary feeding practices that caregivers can use to prevent oral health problems include:
  - Avoiding concentrated sweet foods like lollipops, candy and sweetened cereals.
  - Avoiding sweetened beverages. Introducing fruit juice after 6 months of age (1) and only feeding it in a cup; and limiting fruit juice to 4-6 ounces/day.
  - Weaning from a bottle to a cup by 12 to 14 months. (23)

Promotion of Lifelong Healthy Eating Behaviors

- Timing of introduction of complementary foods:
  The AAP, Committee on Nutrition (CON) states that, "… complementary foods may be introduced between ages 4 and 6 months…" but cautions that actual timing of introduction of complementary foods for an individual infant may differ from this (population based) recommendation. Furthermore, the AAP-CON acknowledges a difference of opinion with the AAP, Section on Breastfeeding, which recommends exclusive breastfeeding for at least 6 months. (1)

  Early introduction of complementary foods before the infant is developmentally ready (i.e., before 4-6 months of age) is associated with increased respiratory illness, allergy in high-risk infants, and decreased breast milk production (7).

  Infants with a strong family history of food allergy should be breastfed for as long as possible and should not receive complementary foods until 6 months of age. The introduction of the major food allergens such as eggs, milk, wheat, soy, peanuts, tree nuts, fish and shellfish should be delayed until well after the first year of life as guided by the health care provider. (7, 24) Delayed introduction of complementary foods, on the other hand, is also associated with feeding difficulties. Northstone et al found that introduction of textured foods after 10 months of age resulted in more feeding difficulties later on, such as picky eating and/or refusal of many foods. To avoid these and other developmental problems, solid foods should be introduced no later than 7 months, and finger foods between 7 and 9 months of age. (25)

- Choosing Appropriate Complementary Foods and Beverages:
  Complementary foods should supply essential nutrients and be developmentally appropriate. (7) The WIC Infant Feeding Practices Study (WIC-IFPS) found that by 6 months of age, greater than 80% of mothers introduced inappropriate dairy foods (i.e., yogurt, cheese, ice cream and pudding), 60% introduced sweets/snack foods (defined as chips, pretzels, candy, cookies, jam and honey), and 90% introduced high protein foods (beans, eggs and peanut butter) to their infants. This study also found that, among the infants who received supplemental drinks by 5 months of age, three-quarters had never used a cup, concluding that most infants received supplemental drinks from the bottle. By one year of age, almost 90% of WIC infants received sweetened beverages and over 90% received sweet/snack foods. (26)

The Feeding Infants and Toddlers Study (FITS) found that WIC infants and toddlers consumed excess energy but inadequate amounts of fruits and vegetables. In addition, WIC toddlers consumed more sweets, desserts and sweetened beverages than non-WIC toddlers. (27)

Sixty-five percent of all food-related choking deaths occur in children under the age of 2. Children in this age group have not fully developed their oral-motor skills for chewing and swallowing. For this reason, they should be fed foods of an appropriate consistency, size, and shape. Foods commonly implicated in choking include hot dogs, hard, gooey or sticky candy, nuts and seeds, chewing gum, grapes, raisins, popcorn, peanut butter and hard pieces of raw fruits and vegetables and chunks of meat or cheese. (1, 28, 29)

- Introducing a Cup: Teaching an infant to drink from a cup is part of the process of acquiring independent eating skills. A delay in the initiation of cup drinking prolongs the use of the nursing bottle that can lead to excess milk and juice intake and possible Early Childhood Caries (ECC). Weaning from a bottle to a cup should occur by 12 to14 months of age. (23)

- Helping The Child Establish Lifelong Healthy Eating Patterns: Lifelong eating practices may have their roots in the early years. Birch and Fisher state that food exposure and accessibility, the modeling behavior of parents and siblings, and the level of parental control over food consumption influence a child's food preferences. Inappropriate feeding practices may result in under- or over-feeding and may promote negative associations with eating that continue into later life.

  Normal eating behaviors such as spitting out or gagging on unfamiliar food or food with texture are often misinterpreted as dislikes or intolerances leading to a diminished variety of foods offered. Infants have an innate preference for sweet and salty tastes. Without guidance, an infant may develop a lifelong preference for highly sweetened or salty foods rather than for a varied diet. (17)

  A young child gradually moves from the limited infant/toddler diet to daily multiple servings from each of the basic food groups as described in the Dietary Guidelines. (30) The toddler stage (ages 1-2 years) may frustrate caregivers since many toddlers have constantly changing food preferences and erratic appetites. In addition, toddlers become skeptical about new foods and may need to experience a food 15-20 times before accepting it. (31)

Caregivers can be guided and supported in managing common toddler feeding problems. Feeding practices that caregivers can use to facilitate a successful transition to a food group-based diet include:

- Offering a variety of developmentally appropriate nutritious foods;
- Reducing exposure to foods and beverages containing high levels of salt and sugar;
- Preparing meals that are pleasing to the eye and include a variety of colors and textures;Setting a good example by eating a variety of foods;
- Offering only whole milk from age 1-2; (Lower fat milk can be introduced after that age.)
- Providing structure by scheduling regular meal and snack times
- Allowing the child to decide how much or whether to eat;
- Allowing the child to develop eating/self-feeding skills; and
- Eating with the child in a pleasant mealtime environment without coercion.

Possibility of Regression

Definition/ cut-off value

A participant who has previously been certified eligible for the Program may be considered to be at nutritional risk in the next certification period if the competent professional authority determines there is a possibility of regression in nutritional status without the benefits that the WIC Program provides. The State must limit the use of regression as a nutrition risk criterion to one time following a certification period.

Participant category and priority level

Category	Priority
Breastfeeding Women	IV
Non-Breastfeeding Women	VI
Infants	IV
Children	V

Justification

On occasion, a participant's nutritional status may be improved, to the point that s/he rises above the cutoff of the initial risk condition by the end of the certification period. This occurs most frequently with those conditions that contain specific cutoffs or thresholds, such as anemia or inappropriate growth. Removal of such individuals from the Program can result in a "revolving-door" situation where the individual's recently improved nutritional status deteriorates quickly, so that s/he then re-enters the Program at equal or greater nutrition risk status than before. Therefore, WIC Program regulations permit State agencies to certify previously certified individuals who do not demonstrate a current nutrition risk condition based on the possibility of their reverting to the prior existing risk condition if they do not continue to receive WIC benefits. This provision may be used only once following a certification period. Such applicants shall not be considered to be at nutrition risk based on the possibility of regression for consecutive certification periods.

This policy is consistent with the preventive nature of the WIC Program, and enables State and local agencies to ensure that their previous efforts to improve a participant's nutrition status, as well as to provide referrals to other health care, social service, and/or public assistance programs are not wasted.

Applicants who are certified based on the possibility of regression should be placed either in the same priority for which they were certified in the previous certification period; a priority level lower than the priority level assigned in the previous certification period, consistent with WIC regulations 246.7(e)(4); or in priority VII, if the State agency uses that priority level.

Competent Professional Authorities and other certifying staff should keep in mind that every nutrition risk condition does not necessarily lead itself to the possibility of regression. For example, gestational diabetes or gingivitis of pregnancy are not conditions to which a new mother could regress, since they are directly associated with pregnancy, and the breastfeeding or non-breastfeeding women cannot regress to being pregnant if she is no longer receiving WIC benefits.

Competent Professional Authorities and other certifying staff should keep in mind that every nutrition risk condition does not necessarily lead itself to the possibility of regression. For example, gestational diabetes or gingivitis of pregnancy are not conditions to which a new mother could regress, since they are directly associated with pregnancy.

Transfer of Certification

Definition/ cut-off value

Person with current valid Verification of Certification (VOC) document from another State or local agency. The VOC is valid through the end of the current certification period, even if the participant does not meet the receiving agency's nutritional risk, priority or income criteria, or the certification period extends beyond the receiving agency's certification period for that category, and shall be accepted as proof of eligibility for Program benefits. If the receiving agency is at maximum caseload, the transferring participant must be placed at the top of any waiting list and enrolled as soon as possible. (1, 2) This criterion would be used primarily when the VOC card/document does not reflect another (more specific) nutrition risk condition or if the participant was certified based on a nutrition risk condition not in use by the receiving State agency (1).

Participant category and priority level

Category	Priority
Pregnant Women	1
Breastfeeding Women	1
Postpartum Women	3
Infants	1
Children	3

Justification

Local agencies must accept Verification of Certification (VOC) documents from participants. A person with a valid VOC document shall not be denied participation in the receiving State because the person does not meet that State's particular eligibility criteria. Once a WIC participant has been certified by a local agency, the service delivery area into which s/he moves is obligated to honor that commitment. (1, 2)

Implications for WIC Nutrition Services

Transferring participants should receive the food package offered in the receiving State agency according to their category and nutritional needs. The receiving agency should explain any differences in the authorized supplemental foods. Participants who are eligible to receive WIC formula (infant formula, exempt infant formula, or WIC-eligible nutritionals) in Food Package III must have one or more qualifying conditions, as determined by a health care professional licensed to write medical prescriptions under State law (1, 2).

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Presumptive Eligibility for Pregnant Women

Definition/ cut-off value

A pregnant woman who meets WIC income eligibility standards but has not yet been evaluated for nutrition risk, for a period of up to 60 days.

Participant category and priority level

Category	Priority
Pregnant Women*	IV

* up to 60 days certification

Justification

In some cases, State or local agencies may not have the essential equipment or staff onsite to perform the necessary bloodwork assessment for pregnant women. There has been some concern that the bloodwork data requirement could be an impediment to the enrollment of eligible pregnant women early in pregnancy. Early enrollment is an important WIC Program objective, as well as a legislative requirement.

In response to these concerns, Congress amended the Child Nutrition Act in 1994 to allow State agencies to consider pregnant women who are income eligible for the WIC Program to be presumed to be nutritionally at risk and thus eligible to participate in the Program. These women may be certified immediately upon application without the results of a nutrition risk evaluation. However, the nutrition risk evaluation must be completed not later than 60 days from the date the pregnant woman is certified for participation. Ideally, States should complete the full nutrition risk assessment at certification or at the earliest possible date thereafter. This would allow the WIC staff to initiate appropriate counseling on nutrition and diet, as well as complete and appropriate health care referrals, at the earliest opportunity. This information is also invaluable in developing an appropriate food package for the pregnant woman.

Clarification

While the nutrition risk assessment must be performed no later than 60 days after the pregnant woman is certified for participation, the hematological test for anemia is not required to be performed within the 60 day period, but rather within 90 days, unless the nutrition risk assessment performed does not identify a qualifying risk factor. Please see Food and Nutrition Service Policy Memorandum #2001-2: *WIC Blood Work Requirements* for more information.

The Centers for Disease Control and Prevention (CDC) defines a trimester as a term of three in the prenatal gestation period with the specific trimesters defined as follows in weeks:

Specific Trimesters Defined (weeks)	
First Trimester	0-13 Weeks
Second Trimester	14-26 Weeks
Third Trimester	27-40 Weeks

Further, CDC begins the calculation of weeks starting with the first day of the last menstrual period. If that date is not available, CDC estimates that date from the estimated date of confinement (EDC). This definition is used in interpreting CDC's Prenatal Nutrition Surveillance System data, comprised primarily of data on pregnant women participating in the WIC Program.

Breastfeeding Mother of Infant at Nutritional Risk

Definition/ cut-off value

A breastfeeding woman whose breastfed infant has been determined to be at nutritional risk.

Participant category and priority level

Category	Priority
Pregnant Women	I, II, or IV*
Breastfeeding Women	I, II, or IV*

*Must be the same priority as at-risk infant.

Justification

A breastfed infant is dependent on the mother's milk as the primary source of nutrition. Special attention should therefore be given to the health and nutritional status of the mother (5). Lactation requires approximately 500 additional Kcal per day as well as increased protein, calcium, and other vitamins and minerals (3, 1). Inadequate maternal nutrition may result in decreased nutrient content of the milk (1).

Breastfeeding Complications or Potential Complications (Women)

Definition/ cut-off value

A breastfeeding woman with any of the following complications or potential complications for breastfeeding:

a. Severe breast engorgement
b. Recurrent plugged ducts
c. Mastitis (fever or flu-like symptoms with localized breast tenderness)
d. Flat or inverted nipples
e. Cracked, bleeding or severely sore nipples
f. Age ≥40 years
g. Failure of milk to come in by 4 days postpartum
h. Tandem nursing (breastfeeding two siblings who are not twins)

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I

Justification

Severe breast engorgement
Severe breast engorgement is often caused by infrequent nursing and/or ineffective removal of milk. This severe breast congestion causes the nipple-areola area to become flattened and tense, making it difficult for the baby to latch-on correctly. The result can be sore, damaged nipples and poor milk transfer during feeding attempts. This ultimately results in diminished milk supply. When the infant is unable to latch-on or nurse effectively, alternative methods of milk expression are necessary, such as using an electric breast pump.

Recurrent plugged ducts
A clogged duct is a temporary back-up of milk that occurs when one or more of the lobes of the breast do not drain well. This usually results from incomplete emptying of milk. Counseling on feeding frequency or method or advising against wearing an overly tight bra or clothing can assist.

Mastitis
Mastitis is a breast infection that causes a flu-like illness accompanied by an inflamed, painful area of the breast - putting both the health of the mother and successful breastfeeding at risk. The woman should be referred to her health care provider for antibiotic therapy.

Flat or inverted nipples
Infants may have difficulty latching-on correctly to nurse when nipples are flat or inverted. Appropriate interventions can improve nipple protractility and skilled help guiding a baby in proper breastfeeding technique can facilitate proper attachment.

Cracked, bleeding or severely sore nipples
Severe nipple pain, discomfort lasting throughout feedings, or pain persisting beyond one week postpartum is atypical and suggests the baby is not positioned correctly at the breast. Improper infant latch-on not only causes sore nipples, but impairs milk flow and leads to diminished milk supply and inadequate infant intake. There are several other causes of severe or persistent nipple pain, including Candida or staph infection. Referrals for lactation counseling and/or examination by the woman's health care provider are indicated.

Age ≥ 40 years
Older women (over 40) are more likely to experience fertility problems and perinatal risk factors that could impact the initiation of breastfeeding. Because involutional breast changes can begin in the late 30's, older mothers may have fewer functioning milk glands resulting in greater difficulty producing an abundant milk supply.

Failure of milk to come in by 4 days postpartum
Failure of milk to come in by 4 days postpartum may be a result of maternal illness or perinatal complications. This may place the infant at nutritional and/or medical risk, making temporary supplementation necessary until a normal breast milk supply is established.

Tandem nursing (breastfeeding two siblings who are not twins)
With tandem nursing the older baby may compete for nursing privileges, and care must be taken to assure that the younger baby has first access to the milk supply. The mother who chooses to tandem nurse will have increased nutritional requirements to assure her adequate milk production.

Breastfeeding Complications or Potential Complications (Infants)

Definition/ cut-off value

A breastfed infant with any of the following complications or potential complications for breastfeeding:

a. jaundice
b. weak or ineffective suck
c. difficulty latching onto mother's breast
d. inadequate stooling (for age, as determined by a physician or other health care professional), and/or less than 6 wet diapers per day

Participant category and priority level

Category	Priority
Infants	I

Justification

a. Jaundice occurs when bilirubin accumulates in the blood because red blood cells break down too quickly, the liver does not process bilirubin as efficiently as it should, or intestinal excretion of bilirubin is impaired. The slight degree of jaundice observed in many healthy newborns is considered physiologic. Jaundice is considered pathologic if it appears before 24 hours, lasts longer than a week or two, reaches an abnormally high level, or results from a medical problem such as rapid destruction of red blood cells, excessive bruising, liver disease, or other illness. When jaundice occurs in an otherwise healthy breastfed infant, it is important to distinguish "breastmilk jaundice" from "breastfeeding jaundice" and determine the appropriate treatment.

In the condition known as "breastmilk jaundice," the onset of jaundice usually begins well after the infant has left the hospital, 5 to 10 days after birth, and can persist for weeks and even months. Early visits to the WIC clinic can help identify and refer these infants to their primary health care provider. Breastmilk jaundice is a normal physiologic phenomenon in the thriving breastfed baby and is due to a human milk factor that increases intestinal absorption of bilirubin. The stooling and voiding pattern is normal. If the bilirubin level approaches 18-20 mg%, the health care provider may choose to briefly interrupt breastfeeding for 24-36 hours which results in a dramatic decline in bilirubin level.

Resumption of breastfeeding usually results in cessation of the rapid fall in serum bilirubin concentration, and in many cases a small increase may be observed, followed by the usual gradual decline to normal.

"Breastfeeding jaundice" is an exaggeration of physiologic jaundice, which usually peaks between 3 and 5 days of life, though it can persist longer. This type of jaundice is a common marker for inadequate breastfeeding. An infant with breastfeeding jaundice is underfed and displays the following symptoms: infrequent or ineffective breastfeeding; failure to gain appropriate weight; infrequent stooling with delayed appearance of yellow stools (i.e., prolonged passage of meconium); and scant dark urine with urate crystals. Improved nutrition usually results in a rapid decline in serum bilirubin concentration.

b. A weak or ineffective suck may cause a baby to obtain inadequate milk with breastfeeding and result in a diminished milk supply and an underweight baby. Weak or ineffective suckling can be due to prematurity, low birth weight, a sleepy baby, or physical/medical problems such as heart disease, respiratory illness, or infection. Newborns who receive bottle feedings before beginning breastfeeding or who frequently use a pacifier may have trouble learning the proper tongue and jaw motions required for effective breastfeeding.

c. Difficulty latching onto the mother's breast may be due to flat or inverted nipples, breast engorgement, or incorrect positioning and breastfeeding technique. Early exposure to bottle feedings can predispose infants to "nipple confusion" or difficulty learning to attach to the breast correctly and effectively extract milk. A referral for lactation counseling should be made.

d. Inadequate stooling or less than 6 wet diapers are probable indicators that the breastfed infant is not receiving adequate milk. Not only is the baby at risk for failure to thrive, but the mother's milk is at risk for rapidly diminishing due to ineffective removal of milk. The breastfed infant with inadequate caloric intake must be identified early and the situation remedied promptly to avoid long-term consequences of dehydration or nutritional deprivation. Although failure to thrive can have many etiologies, the most common cause of inadequate weight gain in the breastfed infant is insufficient milk intake as a result of infrequent or ineffective nursing. Inadequate breastfeeding can be due to infant difficulties with latching on or sustaining suckling, use of a nipple shield over the mother's nipple, impaired let down of milk, a non-demanding infant, excessive use of a pacifier, or numerous other breastfeeding problems. Performing an infant test weighing procedure (weighing the clothed infant before and after breastfeeding) can help confirm suspicions about inadequate milk consumption during breastfeeding and determine whether the "slow gaining" infant is obtaining sufficient milk.

The maximum acceptable weight loss after birth in breastfed infants is 10%, but few babies lose this much weight unless a breastfeeding problem is present. When a baby loses > 8% from birth weight, breastfeeding should be evaluated and appropriate interventions suggested to improve milk intake. Continued weight loss after the mother's milk comes in suggests a problem with milk transfer from breast to baby. By 4 to 5 days of age, breastfed babies should start to gain about an ounce each day, or 5 to 7 ounces each week. Most will surpass their birth weight by 10 to 14 days.

The literature regarding inadequate stooling varies widely in terms of quantification; this condition is best diagnosed by the pediatrician or other health care practitioner.

Infant Up to 6 Months Old of WIC Mother or of a Woman Who Would Have Been Eligible During Pregnancy

Definition/ cut-off value

An infant < 6 months of age whose mother was a WIC Program participant during pregnancy or whose mother's medical records document that the woman was at nutritional risk during pregnancy because of detrimental or abnormal nutritional conditions detectable by biochemical or anthropometric measurements or other documented nutritionally related medical conditions.

Participant category and priority level

Category	Priority
Infants	II

Justification

Federal Regulations designate these conditions for WIC eligibility (1).

WIC participation during pregnancy is associated with improved pregnancy outcomes. An infant whose nutritional status has been adequately maintained through WIC services during gestation and early infancy may decline in nutritional status if without these services and return to a state of elevated risk for nutrition related health problems. Infants whose mother was at medical/nutritional risk during pregnancy, but did not receive those services, may also be thought of as a group at elevated risk for morbidity and mortality in the infant period (2, 3).

WIC participation in infancy is associated with lower infant mortality, decreased anemia for infants and improvements in growth (head circumference, height and weight). Infants on WIC are more likely to consume iron-fortified formula and cereal and less likely to consume cow's milk before one year, thus lowering the risk of developing iron deficiency anemia (2, 3).

Breastfeeding Infant of Woman at Nutritional Risk

Definition/ cut-off value	Breastfeeding infant of woman at nutritional risk	
Participant category and priority level	**Category**	**Priority**
	Infants	**I, II, or IV** (Must be the same priority as at-risk mother.)
Justification	A breastfed infant is dependent on the mother's milk as the primary source of nutrition. Lactation requires the mother to consume an additional 500 Kcal per day (approximately) as well as increased protein, calcium, and other vitamins and minerals (4, 5). Inadequate maternal nutrition may result in decreased nutrient content of the milk (5). Special attention should therefore be given to the health and nutritional status of breastfed infants whose mothers are at nutritional risk (3).	

Homelessness

Definition/ cut-off value

A woman, infant or child who lacks a fixed and regular nighttime residence; or whose primary nighttime residence is:

X a supervised publicly or privately operated shelter (including a welfare hotel, a congregate shelter, or a shelter for victims of domestic violence) designed to provide temporary living accommodations;
X an institution that provides a temporary residence for individuals intended to be institutionalized;
X a temporary accommodation of not more than 365 days in the residence of another individual; or
X a public or private place not designed for, or ordinarily used as, a regular sleeping accommodation for human beings.

Participant category and priority level

Category	Priority
Pregnant Women	IV
Breastfeeding Women	IV
Postpartum Women	VI
Infants	IV
Children	V

Justification

Homeless individuals comprise a very vulnerable population with many special needs. WIC Program regulations specify homelessness as a predisposing nutrition risk condition. Today's homeless population contains a sizeable number of women and children over one-third of the total homeless population in the U.S. Studies show forty-three percent of today's homeless are families and an increasing number of the "new homeless" include economically-displaced individuals who have lost their jobs, exhausted their resources, and recently entered into the ranks of the homeless and consider their condition to be temporary.

Migrancy

Definition/ cut-off value

Categorically eligible women, infants and children who are members of families which contain at least one individual whose principal employment is in agriculture on a seasonal basis, who has been so employed within the last 24 months, and who establishes, for the purposes of such employment, a temporary abode.

Participant category and priority level

Category	Priority
Pregnant Women	IV
Breastfeeding Women	IV
Postpartum Women	VI
Infants	IV
Children	V

Justification

Data on the health and/or nutritional status of migrants indicate significantly higher rates or incidence of infant mortality, malnutrition, and parasitic disease (among migrant children) than among the general U.S. population. Therefore, migrancy has long been stipulated as a condition that predisposes persons to inadequate nutritional patterns or nutritionally related medical conditions.

Recipient of Abuse

Definition/ cut-off value

Battering or child abuse/neglect within past 6 months as self-reported, or as documented by a social worker, health care provider or on other appropriate documents, or as reported through consultation with a social worker, health care provider, or other appropriate personnel.

"Battering" generally refers to violent physical assaults on women.

Child abuse/neglect: "Any recent act or failure to act resulting in imminent risk of serious harm, death, serious physical or emotional harm, sexual abuse, or exploitation of an infant or child by a parent or caretaker (2)."

If State law requires the reporting of known or suspected child abuse or neglect, WIC staff must release such information to appropriate State officials. WIC regulations pertaining to confidentiality do not take precedence over such State law.

Participant category and priority level

Category	Priority
Pregnant Women	IV
Breastfeeding Women	IV
Postpartum Women	VI
Infants	IV
Children	V

Justification

Battering during pregnancy is associated with increased risks of low birth weight, pre-term delivery, and chorioamnionitis, as well as poor nutrition and health behaviors. Battered women are more likely to have a low maternal weight gain, be anemic, consume an unhealthy diet, and abuse drugs, alcohol, and cigarettes.

Serious neglect and physical, emotional, or sexual abuse have short- and long-term physical, emotional, and functional consequences for children. Nutritional neglect is the most common cause of poor growth in infancy and may account for as much as half of all cases of nonorganic failure to thrive.

Woman or Primary Caregiver with Limited Ability to Make Feeding Decisions and/or Prepare Food

Definition/ cut-off value

A woman or an infant/child whose primary caregiver is assessed to have a limited ability to make appropriate feeding decisions and/or prepare food. Examples include, but are not limited to, a woman or an infant/child of caregiver with the following:

- Documentation or self-report of misuse of alcohol, use of illegal substances, use of marijuana, or misuse of prescription medications.
- Mental illness, including clinical depression diagnosed, documented, or reported by a physician or psychologist or someone working under a physician's orders, or as self-reported by applicant/participant/caregiver.
- Intellectual disability diagnosed, documented, or reported by a physician or psychologist or someone working under a physician's orders, or as self-reported by applicant/participant/caregiver.
- Physical disability to a degree which impairs ability to feed infant/child or limits food preparation abilities.
- ≤ 17 years of age.
-

See Clarification (page 5) for more information about self-reporting a diagnosis.

Participant category and priority level

Category	Priority
Pregnant Women	IV
Breastfeeding Women	IV
Non-Breastfeeding Women	VI
Infants	IV
Children	V

Justification

A primary caregiver's ability to make appropriate feeding decisions and prepare suitable food is crucial for the health and nutrition of infants and young children. Infants and children depend entirely on caregivers for food, as well as to learn what, when, and how to eat. A responsive feeding relationship, in which caregivers recognize infant/child cues and respond appropriately in a

warm and nurturing environment, is critical for supporting healthy dietary habits, food preferences, and weight outcomes in children (1). Several situations that might impair the feeding abilities of a caregiver have been identified below as potential nutritional risks for infants and children.

A pregnant or postpartum woman's ability to choose and prepare suitable foods for herself is vital for her own nutritional status and wellbeing. A variety of circumstances can impair a woman's ability to make diet-related decisions or prepare food and thus have been identified as possible nutritional risks for pregnant and postpartum women.

Substance Use

About 1 in 5 children in the US live with at least one caregiver who has a substance use disorder (2). While little research has been conducted on the impact of parental substance misuse on infant/child feeding, much has been learned about the influence of substance misuse on overall parenting and caregiving abilities. Parental substance misuse is *sometimes* associated with the following, which can all potentially have a negative impact on infant/child feeding:

- Impaired parental behaviors – "lower levels of parental involvement, limited or absent parental monitoring, ineffective control of children's behavior, and poor discipline skills" (2).
- Compromised caregiving relationship – Less sensitive and responsive to infant/child's cues and needs (3, 4); and less warm, positive, nurturing, and emotionally available (5).
- Reduced capacity to prioritize infant/child's needs (including feeding needs) over need for substances (2, 4).
- Parental difficulty in controlling emotions and anger (4).
- Reduced likelihood for infants/children to receive adequate medical and dental care (2).
- Chaotic, unpredictable home environment – higher rates of household financial instability, food and housing insecurity, inconsistent employment, domestic violence, and stress (2).
- Parental incarceration (2).
- Increased likelihood of infant/child entering foster care – about 60% of infants and 40% of children in out-of-home care are from families with substance use disorders (2, 4).
- Increased risk of neglect and abuse – children of parents who misuse substances are 3 times as likely to be physically, emotionally, or sexually abused and 4 times as likely to be emotionally or physically neglected (2).

In addition to impacting infants/children, substance use can also impair a woman's ability to choose and prepare suitable foods for herself. People with substance use disorders tend to have impaired decision- making (6, 7), which can extend to diet-related choices. Also, as stated above, substance use can result in difficulty in controlling emotions and anger; a chaotic, unpredictable home environment; and incarceration– all of which can negatively impact ability to choose and prepare foods.

For additional information, please refer to Risk 372 – *Alcohol and Substance Use*.

Mental Illness

Mental illness refers to a wide range of mental health conditions-disorders that affect your mood, thinking and behavior. Examples of mental illness include depression, anxiety disorders, schizophrenia, eating disorders and addictive behaviors (8). Some caregivers with a mental illness can struggle with parenting, including the feeding of infants and young children (1, 9). Depression in particular has been studied for its impact on the caregiver-child feeding relationship. For mothers with depression, they may be less able to detect and respond to an infant's needs, including feeding needs. Depressed mothers are also more likely to be withdrawn, disengaged, and non-interacting, all of which can negatively impact infant/child feeding. Maternal depression may also have a significant impact on breastfeeding dyads, as depression is linked to worrying more about breastfeeding and reporting breastfeeding difficulties (10). In addition, mothers who are depressed tend to have decreased rates of breastfeeding initiation, duration, and exclusivity, compared to mothers who are not depressed (10). There is a scarcity of research on the impact of other forms of mental illness (other than depression) on the caregiver-infant/child feeding relationship. For additional information on depression, please refer to Risk 361 – Depression.

Mental illness can be debilitating to pregnant and postpartum women in a variety of ways, which include impairing the ability to choose and prepare suitable foods. Some studies indicate that poor eating habits may be common among those with a mental illness (11, 12). For example, people with bipolar disorder or schizophrenia are more likely to report only eating once a day, eating alone, and having difficulty with preparing food (11). Individuals with a mental illness also may experience cognitive challenges, which can limit learning and retention of information about nutrition and food preparation. In addition, those with a mental illness may also have limited resources (due to not being able to work) for purchasing foods.

Intellectual Disability

Intellectual disability is a disability characterized by significant limitations in both intellectual functioning and in adaptive behavior, which covers many everyday social and practical skills (13). A limited amount of research has been conducted on the impact of caregiver intellectual disability and infant/child feeding. Some research indicates caregivers with an intellectual disability may be less sensitive to an infant/child's cues (14). Other research indicates some caregivers with an intellectual disability also struggle with interacting positively and demonstrating affection with their infant/child (15). Based on each individual's situation, these concerns could possibly impair a caregiver's ability to provide appropriate infant/child feeding.

Having an intellectual disability, such as Down syndrome, may make it difficult or even impossible for women to choose, prepare, or serve themselves foods and beverages (16). As a result, some women with intellectual disabilities are at risk for developing diseases associated with obesity, inactivity, and poor nutrition and may have very little choice in deciding their dietary intake since it may be determined by a caregiver (17).

Physical Disability
Some physical disabilities have the potential to reduce a caregiver's ability to feed an infant/child appropriately or prepare suitable foods. Likewise, some physical disabilities may limit a woman's ability to feed herself or prepare suitable foods for herself. This risk should be assigned if a caregiver's physical disability restricts or limits food preparation ability or ability to feed an infant/child. It should also be assigned if a woman's physical disability restricts or limits her ability to prepare foods for herself or to feed herself.

17 Years of Age and Younger
In 2015, about 230,000 infants were born to teenage mothers; this is a birthrate of about 22 per 1,000 teenage women (18). Teenage mothers may face several challenges as they raise infants and children, including their ability to interact in a responsive manner. Being a teenage mother is sometimes associated with the following, which can all potentially have a negative impact on infant/child feeding:

- Increased likelihood of a compromised caregiving relationship – Reduced verbal and emotional responsiveness to infant/child (19), reduced sensitivity to needs of infant (19), and impaired ability to provide cognitive stimulation to infant/child (20).
- Increased likelihood of infant/child entering foster care (20).
- Greater likelihood to misuse substances (21).

For additional information regarding pregnant and postpartum adolescents, please refer to Risk 331 – *Pregnancy at a Young Age*.

Implications for WIC Nutrition Services

WIC provides support to women and to infants/children of caregivers with limited ability to make appropriate feeding decisions/prepare food by offering counseling on nutrition, breastfeeding, and infant/child feeding. WIC also provides nutritious foods for women and caregivers to give their infants/children, as well as referrals to support participants' needs. WIC staff can assist participants by:

- Providing individualized nutrition education in an easy-to-understand format that is appropriate for the learning level of the participant/caregiver. Most education materials should be written for a 5th to 7th grade reading level. Be sensitive to the unique learning needs and style of the participant/caregiver, which may mean using food models, posters, and handouts (12).
- Providing referrals to promote parenting and infant/child feeding skills, including referrals to local home visiting programs, parenting programs, and early intervention services.
- Providing referrals to those with substance misuse for professional treatment, referring to community resources for alcohol and substance use support groups, and providing breastfeeding promotion and support to women enrolled in supervised medication-assisted treatment programs.
- Encouraging participants/caregivers with mental illnesses, intellectual disabilities, and physical disabilities to follow health

care provider's plan of care. Coordinate with health care providers as needed.

- Providing individualized food packages, tailored to meet the needs of participants. Some caregivers who have a limited ability to make appropriate feeding decisions/prepare food may be unable to prepare powder or concentrated infant formula. Thus, for the safety of the infant, State WIC Agencies may allow ready-to-feed (RTF) WIC formulas to be issued when it is determined that the caregiver may have difficulty correctly diluting powder or concentrated formulas. Please refer to your State WIC Agency's specific policies regarding the issuance of RTF, as policies vary from state to state.

Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis ("My doctor says that I have/my son or daughter has…") should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.

Foster Care*

Definition/ cut-off value

Entering the foster care system during the previous six months or moving from one foster care home to another foster care home during the previous six months.

Participant category and priority level

Category	Priority
Pregnant Women	IV
Breastfeeding Women	IV
Postpartum Women	VI
Infants	IV
Children	V

Justification

"Foster children are among the most vulnerable individuals in the welfare system. As a group, they are sicker than homeless children and children living in the poorest sections of inner cities." This statement from a 1995 Government Accounting Office report on the health status of foster children confirms research findings that foster children have a high frequency of mental and physical problems, often the result of abuse and neglect suffered prior to entry into the foster care system. When compared to other Medicaid-eligible children, foster care children have higher rates of chronic conditions such as asthma, diabetes and seizure disorders. They are also more likely than children in the general population to have birth defects, inadequate nutrition and growth retardation including short stature.

Studies focusing on the health of foster children often point out the inadequacy of the foster care system in evaluating the health status and providing follow-up care for the children for whom the system is responsible. Because foster care children are wards of a system which lacks a comprehensive health component, the social and medical histories of foster children in transition, either entering the system or moving from one foster care home to another, are frequently unknown to the adults applying for WIC benefits for the children. For example, the adult accompanying a foster child to a WIC clinic for a first-time certification may have no knowledge of the child's eating patterns, special dietary needs, chronic illnesses or other factors which would qualify the child for WIC. Without any anthropometric history, failure to grow, often a problem for foster children, may not be diagnosed even by a single low cutoff percentile.

Since a high proportion of foster care children have suffered from neglect, abuse or abandonment and the health problems associated with these, entry into foster care or moving from one foster care home to another during the previous six months is a nutritional risk for certification in the WIC Program. Certifiers using this risk should be diligent in evaluating and documenting the health and nutritional status of the foster child to identify other risks as well as problems that may require follow-up or referral to other health care programs. This nutritional risk cannot be used for consecutive certifications while the child remains in the same foster home. It should be used as the sole risk criterion only if careful assessment of the applicant's nutritional status indicates that no other risks based on anthropometric, medical or nutritional risk criteria can be identified.

The nutrition education, referrals and service coordination provided by WIC will support the foster parent in developing the skills and knowledge to ensure that the foster child receives appropriate nutrition and health care. Since a foster parent frequently has inadequate information about a new foster child's health needs, the WIC nutritionist can alert the foster parent to the nutritional risks that many foster care children have and suggest ways to improve the child's nutritional status.

904

Environmental Tobacco Smoke Exposure

(also known as passive, secondhand or involuntary smoke)

Definition/ cut-off value

Environmental tobacco smoke (ETS) exposure is defined (for WIC eligibility purposes) as exposure to smoke from tobacco products inside the home. *(1,2,3)

* See Clarification for background information.

Participant category and priority level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Infants	I
Children	III
Non Breastfeeding Women	VI

Justification

ETS is a mixture of the smoke given off by a burning cigarette, pipe, or cigar (sidestream smoke), and the smoke exhaled by smokers (mainstream smoke). ETS is a mixture of about 85% sidestream and 15% mainstream smoke (4) made up of over 4,000 chemicals, including Polycyclic Aromatic Hydrocarbons (PAHs) and carbon monoxide (5). Sidestream smoke has a different chemical make-up than main-stream smoke. Sidestream smoke contains higher levels of virtually all carcinogens, compared to mainstream smoke (6). Mainstream smoke has been more extensively researched than sidestream smoke, but they are both produced by the same fundamental processes.

ETS is qualitatively similar to mainstream smoke inhaled by the smoker. The 1986 Surgeon General's report: *The Health Consequences of Involuntary Smoking. A Report of the Surgeon General* concluded that ETS has a toxic and carcinogenic potential similar to that of the mainstream smoke (7). The more recent 2006 Surgeon General's report, *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General,* reaffirms and strengthens the findings of the 1986 report, and expands the list of diseases and adverse health effects caused by ETS (8).
ETS is a known human carcinogen (2). Women who are exposed to ETS are at risk for lung cancer and cardiovascular diseases (9). Prenatal or postnatal ETS exposure is related to numerous adverse health outcomes among infants and children, including sudden infant death syndrome (SIDS) (10, 11), upper respiratory infections (12), periodontal disease (13), increased severity of asthma/wheezing (12), metabolic syndrome (14), decreased cognitive function (15), lower birth weight and smaller head circumference (16). Infants born to women exposed to ETS during pregnancy have a small decrease in birth weight and a slightly increased risk of intrauterine growth retardation compared to infants of unexposed women (17).

Studies suggest that the health effects of ETS exposure at a young age could last into adulthood. These include cancer (18), specifically lung cancer (19, 20), and cardiovascular diseases (14, 21, 22,). There is strong evidence that ETS exposure to the fetus and/or infant results in permanent lung damage (23, 24, 25, 26).

ETS exposure increases inflammation and oxidative stress (27, 28, 29). Inflammation is associated with asthma (30), cardiovascular diseases (31, 32), cancer (33), chronic obstructive pulmonary disease (34), and metabolic syndrome (14, 35). PAHs are the major class of compounds that contribute to the ETS-related adverse health outcomes. These compounds possess potent carcinogenic and immunotoxic properties that aggravate inflammation.

Oxidative stress is a general term used to describe the steady state of oxidative damage caused by highly reactive molecules known as free radicals. The free radicals can be generated both during the normal metabolic process and from ETS and other environmental pollutants. When free radicals are not neutralized by antioxidants, they can cause oxidative damage to the cells. This damage has been implicated in the cause of certain diseases. ETS provokes oxidant damage similar to that of active smoking (36).

Antioxidants may modulate oxidative stress-induced lung damage among both smokers and non-smokers (22, 27-29, 37-40). Fruits and vegetables are the major food sources of antioxidants that may protect the lung from oxidative stress (1). Research indicates that consuming fruits and vegetables is more beneficial than taking antioxidant supplements (1). This suggests that other components of fruits and vegetables may be more relevant in protecting the lung from oxidative stress. Dietary fiber is also thought to contribute to the beneficial health effects of fruits and vegetables (1).

The Institute of Medicine (IOM) reports that an increased turnover in vitamin C has been observed in nonsmokers who are regularly exposed to tobacco smoke (41). The increased turnover results in lowered vitamin C pools in the body.

Although there are insufficient data to estimate a special requirement for non-smokers regularly exposed to ETS, the IOM urges those individuals to ensure that they meet the Recommended Dietary Allowance for vitamin C (36, 41).

The WIC food package supplements the participant intake of vitamin C. In addition, many WIC State Agencies participate in the WIC Farmers' Market Nutrition Program, which provides coupons for participants to purchase fresh fruits and vegetables. WIC Program benefits also include counseling to increase fruit and vegetable consumption, and to promote a healthy lifestyle, such as protecting participants and their children from ETS exposure. WIC staff may also make appropriate referrals to participants, and/or their caregivers, to other health and social services, such as smoking cessation programs.

Clarification

In a comprehensive scientific report, the Surgeon General concluded that there is no risk-free level of exposure to secondhand smoke (8). However, for the purpose of risk identification, the definition used for this risk criterion is based on the Centers for Disease Control and Prevention (CDC) Pediatric Nutrition Surveillance System (PedNSS) and the Pregnancy Nutrition Surveillance System (PNSS) questions to determine Environmental Tobacco Smoke (ETS) exposure:

1. Does anyone living in your household smoke inside the home? (infants, children)
2. Does anyone else living in your household smoke inside the home? (women)

Because the definition used by other Federal agencies for ETS exposure is specific to "inside the home" and has been validated (3), the definition used for WIC eligibility must also be as specific. In addition, FNS encourages the use of the PedNSS and PNSS ETS exposure questions for WIC nutrition assessment.

There are other potential sources of ETS exposure, such as work and day care environments. However, no other validated questions/definitions could be found that were inclusive of other environments and applicable to WIC.