Nutrition Risk Manual

101 Underweight Women

Definition/Cut-Off Value:

Pregnant Women

- Pre-pregnancy Body Mass Index (BMI) < 18.5

Non-Breastfeeding Women

- Current Body Mass Index (BMI) < 18.5

Breastfeeding Women Who Are < 6 Months Postpartum

- 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 included in this section 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.

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	BMI < 18.5
Breastfeeding	I	N
Non-Breastfeeding	VI	N

Parameters for Auto Assignment

Will be auto assigned if pre-pregnancy BMI is < 18.5
Will be auto assigned for non-breastfeeding and breastfeeding women < 6 months postpartum if pre-pregnancy BMI is < 18.5
Will be auto assigned for breastfeeding women ≥ 6 months postpartum if current BMI < 18.5

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned.

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. Pre-pregnancy 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.

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 of which need to be addressed.

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) infants, 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.

Justification for High Risk

Participants who begin a pregnancy underweight are at increased risk of having a low-weight gain during pregnancy. Low pre-pregnancy BMI and low weight gain in the 2nd and 3rd trimester significantly increases risk for inter-uterine growth retardation (IUGR) and may increase risk for preterm delivery (1). Low pre-pregnancy weight is also associated with a higher incidence of miscarriage, small for gestational age (SGA) infants, and low birth weight infants. Low birth weight (LBW) infants have an increased risk of developing obesity problems and cardiovascular disease later in life (4).

This suggests that infants are predisposed to life threatening diseases even before they are born.

Underweight participants with a BMI of 18.5 or less have probable-protein-energy malnutrition and may have a deficiency of folate and zinc (2). Dietetic intervention can help improve eating habits and promote optimal weight gain (1). When BMI increases and there is appropriate weight gain, risk of delivering a SGA baby is decreased (3). WIC provides individual counseling on diet and weight gain, helping participants gain an appropriate amount of weight, and increasing their baby's birth weight.

Additional Counseling Guidelines

Pregnant Participants

- Inform of risks to infant, such as:
    - Low-birth weight
    - Fetal growth restriction
    - Perinatal mortality
    - Pre-term delivery
- Inform of risks to mother, such as:
    - Antepartum hemorrhage
    - Premature rupture of membranes
    - Anemia
    - Endometritis
    - Cesarean delivery

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”	<111 lbs	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.				

References

1. *Institute of Medicine*. “Weight gain during pregnancy: reexamining the guidelines (Prepublication Copy).” National Academy Press, Washington, D.C.; 2009. www.nap.edu. Accessed June 2009.

2. *Institute of Medicine.* "WIC Nutrition Risk Criteria: A Scientific Assessment." National Academy Press, Washington, D. C.; 1996.

3. "National Heart, Lung, and Blood Institute (NHLBI), National Institutes of Health (NIH). Clinical guidelines on the identification, evaluation, and treatment of Overweight and obesity in adults." NIH Publication No. 98-4083, 1998. www.nih.gov. Accessed June 2009.

4. Crowel, DT. "Weight Changes in the Postpartum Period: A Review of the Literature." *Journal of Nurse-Midwifery*. Vol. 40, No. 5, September/October 1995; pgs 418-423.

5. Parker, JD, Abrams, B. "Prenatal Weight Gain Advice: An examination of the recent prenatal weight gain recommendations of the Institute of Medicine." *Obstet Gynecol*, 1992; 79:664-9.

6. Siega-Riz AM, Adair LS, Hobel CJ. "Institute of Medicine maternal weight gain recommendations and pregnancy outcomes in a predominately Hispanic population." *Obstet Gynecol*, 1994; 84:565-73.

7. Suitor CW, editor. "Maternal Weight Gain: A report of an expert work group." *Arlington, Virginia: National Center for Education in Maternal and Child Health*; 1997. Sponsored by Maternal and Child Health Bureau, Health Resources and Services Administration, Public Health Services, U.S. Department of Health and Human Services.

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High Risk References

1. Abayomi, J., Watkinson, H., Topping, J., Hackett, A. "Obesity and Underweight Among First Trimester Pregnant Women." *Br J Midwifery*. 2007; 15(3):143-147.

2. Hauger MS, Gibbons L, Vik T, Belizan JM. "Pre-pregnancy Weight Status and the Risk of Adverse Pregnancy Outcome." *Acta Obstet Gynecol Scand*. 2008; 87:953-959.

3. Ricci E, Parazzini F, Chiaffarino F, Cipriani S, Polverino G. "Pre-Pregnancy Body Mass Index, maternal weight gain during pregnancy and risk of small-for-gestational age birth: Results from a case-control study in Italy." *J Matern Fetal Neonatal Med.* 2010; 23(6):501-505.

4. Watanabe H, Inoue K, Doi M, Matsumoto M, Ogasawara K, Fukuoka H, Nagai Y. "Risk factors for term small for gestational age infants in women with low pre-pregnancy body mass index." *J Obstet Gynaecol Res.* 2010; 36(3):506-512.

5. Choi SK, Park IY, Shin JC. "The effects of pre-pregnancy body mass index and gestational weight gain on perinatal outcomes in Korean women: a retrospective cohort study." *Reprod Biol Endocrinol*. 2011; 9(6):1-7.

103 Underweight or At Risk of Underweight (Infants and Children)

Definition/Cut-Off Value*:*

Underweight and at risk of underweight are defined as follows:

At Risk of Underweight (Birth to < 24 months)

- 2.3rd and ≤ 5th percentile weight-for-length as plotted on the Centers for Disease Control and Prevention (CDC) Birth to 24 months gender specific growth charts (1).***** 2 -5 years

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

Underweight (Birth to < 24 months)

- ≤ 2.3rd percentile weight-for-length as plotted on the CDC Birth to 24 months gender specific growth charts (1).***** 2 -5 years:

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

*****Based on 2006 World Health Organization international growth standards (3). For the birth to < 24 months "underweight" definition, CDC labels the 2.3rd percentile as the 2nd percentile on the birth to 24 months gender specific growth charts. For more information about the percentile cut-off, please see clarification.

****** Based on National Center for Health Statistics/Centers for Disease Control and Prevention (2000) age/sex specific growth charts

Note: The birth to 24 months and the 2000 CDC growth charts are available at: www.cdc.gov/growthcharts.

Participant Category and Priority Level

Category	Priority	High Risk
Infants	I	≤ 2.3rd %ile
Children	III	≤ 5th %ile

Parameters for Auto Assignment

At Risk of Underweight

- Will be auto assigned for infants and children < 24 months if weight-for-length is > 2.3rd and ≤ 5th percentile.
- Will be auto assigned for children if BMI-for-age is > 5th and ≤ 10th percentile.

Underweight

- Will be auto assigned for infants and children < 24 months if weight-for-length is ≤ 2.3rd percentile.
- Will be auto assigned for children if BMI-for-age is ≤ 5th percentile.

High Risk Flag

The high risk designation will automatically activate for 103b when this risk factor is assigned.

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 preventive 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 preventive nutritional intervention, or at least further evaluation (4).

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).

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, 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 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.

Justification for High Risk

A child whose weight for height is ≤ 5th percentile is universally recognized as underweight and in need of nutrition intervention.

Early detection of low BMI for age, along with prompt improvement in BMI, is likely to be the most effective intervention for preventing growth stunting. Prevention of stunting is most crucial during the first two years of life as it may be irreversible. Low adult height and lower birth weight may also be associated with stunting occurring within the first two years of a child's life (1). Stunting is found to be the strongest predictor of developmental outcome, specifically predicting the initial developmental status and the speed at which new skills are accomplished. Stunting has such a strong influence on development and is the outcome of chronic under-nutrition (2).

In addition to poor growth from under-nutrition, children are also at greater risk of infection when they don't receive adequate nutrients. Prevalence, severity and frequency of infections depend upon several factors including infant and young child feeding habits, nutritional status of the

child and environmental hygiene. Failure to increase nutrients and calories by introducing complementary foods too late can also contribute to under-nutrition and underweight (5).

Under-nutrition is the cause for half of all child deaths worldwide. Insufficient nutrient intake and infection are the main factors which contribute to this statistic, as inadequate nutrient intake leads to deterioration of the immune system. This futher results in an exacerbation of the problem since the infection can further interfere with nutrient absorption (3).

A major reduction in undernutrition can be achieved through supportive health programs and nutrition intervention (3). Lower education levels of parents increases the probability that a child will be underweight, which increases the need for sufficient parental nutrient related education (4). The WIC nutritionist can help improve the nutritional status of children by providing individual counseling and food package tailoring.

Additional Counseling Guidelines

- Discuss issues which may affect participant's weight status, such as:
  - parental body composition
  - recent illnesses
  - developmental delays
  - thyroid abnormalities
- Provide ideas for increasing calories if needed such as:
  - Discuss introducing complementary foods at the appropriate times
  - Providing more frequent snacks or meals
  - Increase use of energy dense foods
- Improve primary caregivers overall nutrient related knowledge
  - Assess caregivers ability to determine child's energy needs and hunger cues
  - Provide nutrition education/materials specific to participant's children

References

1. "Centers for Disease Control and Prevention. Use of World Health Organization and CDC growth charts for children aged 0-59 months in the United States." MMWR 2010; 59(No. RR-9). http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5909a1.htm?s_cid=rr5909a1_w. Accessed September 2010.

2. Kuczmarski RJ, Ogden CL, Grummer-Strawn LM, et al. "CDC growth charts: United States." *Advance Data from Vital and Health Statistics*; no. 314. Hyattsville, Maryland: National Center for Health Statistics. 2000.

3. *World Health Organization*. "WHO child growth standards: Length/height-for-age, weight-for-age, weight for height and body mass index-for-age: Methods and development." Geneva, Switzerland: World Health Organization; 2006. Available at: http://www.who.int/childgrowth/publications/technical_report_pub/en/index.html. Accessed September 2010.

4. *Food and Nutrition Information Center, National Agriculture Library*. "Update of analysis of literature regarding cut-off percentiles for low weight for length in infants." Washington, D.C.; February 5, 1991.

5. Sherry B. Epidemiology of inadequate growth. In: Kessler DB, Dawson P, editors. Failure to thrive and pediatric undernutrition: A transdisciplinary approach. Baltimore: Paul H. Brooks Publishing Company, Inc.; 1999.

6. Metallinos-Katsaras E, Gorman KS. Effects of undernutrition on growth and development. In: Kessler DB, Dawson P, editors. Failure to thrive and pediatric undernutrition: A transdisciplinary approach. Baltimore: Paul H. Brooks Publishing Company, Inc.; 1999. p. 38.

7. Disbrow DD. The Costs and Benefits of Nutrition Services: A Literature Review. J Am Diet Assoc. 1989; 89:S3-66.

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High Risk References

1. Ramachandran P, Gopalan H. "Assessment of Nutritional Status in Indian Preschool Children Using WHO 2006 Growth Standards." *Indian J Med Res*. 2011; 134:47-53.

2. Abubakar A, Holding P, Van de Vijver FJR, Newton C, Van Baar A. "Children at risk for developmental delay can be recognized by stunting, being underweight, ill health, little maternal schooling or high gravidity." *J Child Psychol Psychiatry*. 2010; 51(6):652-659.

3. Nakamori M, Ninh NX, Khan NC, Huong CT, Tuan NA, Mai LB, Hien VTT, Nhung BT, Nakano T, Yoshiike N, Kusama K, Yamamoto S. "Nutritional status, feeding practice and incidence of infectious diseases among children aged 6 to 18 months in northern mountainous Vietnam." *J Med Invest.* 2009; 57:45-53.

4. Nahar B, Ahmed T, Brown KH, Hossain MI. "Risk factors associated with severe underweight among young children reporting to a diarrhea treatment facility in Bangladesh." *J Health Popul Nutr*. 2010; 28(5):476-483.

5. Ramachandran P, Gopalan H. "Undernutrition and risk of infections in preschool children." *Indian J Med Res*. 2009; 130:579-583.

111 Overweight Women

Definition/Cut-Off Value:

Pregnant Women

- pre-pregnancy Body Mass Index (BMI) ≥ 25

Non-Breastfeeding Women

- pre-pregnancy Body Mass Index (BMI) ≥ 25

Breastfeeding Women less than 6 Months Postpartum

- pre-pregnancy 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 which can be found in risk factor 101, 131, or 133. 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	High Risk
Pregnant	I	BMI ≥ 30*
Breastfeeding Women	I	N
Non-Breastfeeding Women	VI	N

Parameters for Auto Assignment

Auto assigned for pregnant women when pre-pregnancy BMI ≥ 25

Auto assigned for non-breastfeeding and breastfeeding women who are less than 6 months postpartum when the pre-pregnancy BMI is ≥ 25

Auto assigned for breastfeeding women who are ≥ 6 months postpartum when the current BMI is ≥ 25

High Risk Flag

For pregnant women who have a pre-pregnancy BMI ≥ 30, it is necessary to manually select the high risk box in the VISION risk screen

*The follow-up for this risk factor may be conducted in nutrition education classes when weights are checked for all pregnant women.

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. 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 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 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 (4).

The percentage of adolescents who are overweight is increasing 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.

Justification for High Risk

Overweight and obese women are at higher risk for complications in pregnancy outcome. The risk of pregnancy complications dangerously increases with the greater degree of maternal obesity. Compared with normal-weight women, risk of gestational diabetes (GDM) increases two-fold in overweight women and eight-fold in obese women. Pre-eclampsia is twice as prevalent in overweight women and three times as high in obese women. Obese women more commonly have cesarean deliveries and associated morbidities (6).

Beginning a pregnancy overweight or obese not only increase likelihood of caesarean section, delivery complications, pre-eclampsia and GDM, but also gestational hypertensive disorders (1) and fetal macrosomia (2). Gaining excessive weight during pregnancy can lead overweight mothers to emergency caesarean delivery (4), allowing for greater risk of delivery complications and lengthy hospital stay (1). Maternal overweight and obesity is a major public health concern largely due to pregnancy complications and preventable risks associated with pre-pregnancy BMI. When intervention for healthy weight occurs before gestation, pre-pregnancy BMI is a modifiable risk factor (2) and prevents infection and hemorrhaging in postpartum women (4). There is an urgent public need for programs promoting more favorable BMI for the benefits of decreased risk for type-2 diabetes mellitus, hypertension and cardiovascular disease (3, 5)

Pregnancy complications due to obesity affect not only the mother, but also have adverse health outcomes on the baby (4). Preterm delivery (PTD) is associated with a high BMI and chances

significantly increase with being excessively overweight. There is a protective effect against PTD with a body mass up to 24 kg/m2, however, there is a detrimental effect from greater body mass (2).

Obese women are more likely to have a low socioeconomic background when compared to women with a normal BMI (4). As WIC serves a low income population, the counseling provided before, during and after pregnancy can be an effective preventative strategy to eliminate the adverse effects of high pre-pregnancy weight.

Additional Counseling Guidelines

Pregnant Participants

- Inform of increased risks, such as:
  - Diabetes Mellitus
  - Hypertension
  - Blood Clots
  - Pre-term Birth
  - Macrosomia
  - Difficult Labor
  - Complications with C-Section
- Explain that weight-loss is not recommended during pregnancy
  - However, pregnancy is a good time to focus on healthy dietary and physical activity behaviors.

References

1. *Institute of Medicine*. "Weight Gain During Pregnancy: Reexamining the Guidelines (Prepublication Copy)." National Academy Press; Washington D.C.; 2009. www.nap.edu. Accessed June 2009.

2. Bodnar LM, Catov JM, Klbanoff MA, Ness RB, Roberts JM. "Pre-pregnancy body mass index and the occurrence of severe hypertensive disorders of pregnancy." *Epidemiology.* 2007;18(2):234-239.

3. "National Heart, Lung, and Blood Institute (NHLBI), National Institutes of Health(NIH). Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults." NIH Publication No. 98-4083, 1998. www.nhlbi.nih.gov. Accessed June 2009.

4. Crowell DT. "Weight changes in the postpartum period: a review of the literature." *Journal of Nurse-Midwifery*. Vol. 40, No. 5, September/October 1995; pgs 418-423.

Additional Related References

1. Naye, R.L. "Maternal Body Weight and Pregnancy Outcome." *American Journal Clin. Nutr.*; 1990; 52:273-279.

2. Parker JD, Abrams B. "Prenatal Weight Gain Advice: an examination of the recent prenatal weight gain recommendations of the Institute of Medicine." *Obstet Gynecol*, 1992; 79:664-9.

3. Siega-Riz AM, Adair LS, Hobel CJ. "Institute of Medicine maternal weight gain recommendations and pregnancy outcomes in a predominately Hispanic population." *Obstet Gynecol*, 1994; 84:565-73.

4. Suitor CW, editor. "Maternal weight gain: a report of an expert work group." Arlington, Virginia: National Center for Education in Maternal and Child Health; 1997. Sponsored by Maternal and Child Health Bureau, Health Resources and Services Administration, Public Health Service, U.S. Department of Health and Human Services.

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High Risk References

1. Abdullah AM, Callaway LK, O'Callaghan J, Williams GM, Najman JM, Alati R, Clavarino A, Lawlor DA. "Associations of maternal pre-pregnancy obesity and excess pregnancy weight gains with adverse pregnancy outcomes and length of hospital stay." *BCM Pregnancy and Childbirth*. 2011; 11:62.

2. Kosa JL, Guendelman S, Pearl M, Graham S, Abrams B, Kharrazi. "The Association between pre-pregnancy BMI and preterm delivery in a diverse southern California population of working women." *Matern Child Health J*. 2011; 15:772-781.

3. Osuji CU, Nzerem BA, Meludu S, Dioka CE, Nwobodo E, Amilo GI. "The Prevalence of Overweight/obesity and Dislipidemia amongst a group of women attending 'August' meeting." *Niger Med J*. 2010; 51:155-159.

4. Athukorala C, Rumbold A, Willson K, Crowther C. "The risk of adverse pregnancy outcomes in women who are overweight or obese." *BMC Pregnancy and Childbirth*. 2010; 10:56.

5. Hillemeier MM, Weisman CS, Chuang C, Downs DS, McCall-Hosenfeld J, Camacho F. "Transition to overweight or obesity among women of reproductive age." *Journal of Women's Health*. 2011; 20:703-710.

6. "Position of the American Dietetic Association and American Society for Nutrition: Obesity, Reproduction, and Pregnancy Outcomes." *Journal of the American Dietetic Association.* 2009; 109:918-927.

113 Obese (Children 2-5 Years of Age)

Definition/Cut-Off Value:

Obesity for children 2-5 years of age is defined as follows:

2 to 5 years of age and ≥ 95th percentile Body Mass Index (BMI) or weight-for-stature as plotted on the 2000 Centers for Disease Control and Prevention (CDC) 2-20 years gender specific growth charts (1,2) (available at: www.cdc.gov/growthcharts).*

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

Participant Category and Priority Level

Category	Priority	High Risk
Children (2-5 years of age)	III	Y

Parameters for Auto Assignment

Auto assigned if weight-for-length (for children with a recumbent length) or BMI-for-age is ≥ 95th percentile

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned

Justification

One of the most important public health issues in the United States today is the rapid and significant increase in the prevalence of obesity in children and adolescents. The National Health and Nutrition Examination Survey (NHANES) from the mid-1960s to the early 2000s document this 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).

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).

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 that an obese child (≥95th percentile) undergo a medical assessment and careful evaluation to identify any underlying health risks or secondary complications (3). Obesity can result from excessive energy intake, decreased energy expenditure, or a medical condition that impairs the regulation of energy metabolism. In addition, obesity 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.

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 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/families.html

• MyPryramid for Preschoolers: http://www.mypyramid.gov/preschoolers/index.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.

Justification for High Risk

The United States has been experiencing a childhood obesity epidemic since the 1970's as rates have increased and nearly tripled. The Centers for Disease Control (CDC) estimates that of children and adolescents aged 2-19, approximately 17% are obese (1). At-risk overweight children are more likely to be overweight as an adolescent than children who are not at-risk. Consequently, being overweight in adolescence is predictive of obesity in adulthood (2). A study conducted in Utah public elementary schools found that the rate of childhood overweight or obesity was 20.4% in 2010 (4).

Children with a BMI > 85th percentile are more than 5 times as likely to be overweight at age 12 years and are more likely to continue gaining weight, reaching overweight status by adolescence (2).

Complications from childhood overweight and obesity can include a combination of physical and social complaints such as: obstructive sleep apnea, breathing problems, disorders of the nervous system, increased blood pressure, irregular lipid profiles, nonalcoholic fatty liver disease, type 2 diabetes, gallstones, orthopedic disorders, various skin conditions, psychiatric disorders and early commencement of puberty (5). It has also been found that waist circumference and a BMI > 85th and > 95th percentiles are associated with biomarkers that are related to cardiovascular disease risk in preschool-age children, though these associations vary by ethnicity (6).

Obesity rates have been shown to be high among low-income children and it is estimated that one out of every seven low-income preschool children is obese (7). Two-thirds of WIC participants live at or below the poverty line (8). Low income status in the early years of a child's life correlates with an increased risk for overweight as adults compared to those who had higher incomes during this period of time (9).

Childhood overweight and obesity is also common among minority populations -- including those of Hispanic origin (10). In 2008, 42.1% of WIC participants identified themselves as Hispanic/Latino (8). Results from the National Health and Nutrition Examination Survey (NHANES) 2007-2008 study support this disparity (3). Among participants of NHANES, 26.8% of Mexican American boys were obese, nearly double the rate of obesity found in non-Hispanic Caucasian boys where the rate was estimated at 16.7%. Obesity levels in this group have also increased more rapidly than in non-Hispanic Caucasian populations with obesity rates in Mexican American boys rising from 14.1% to 26.8% between 1988-1994 and 2007-2008 while the increase seen in non-Hispanic Caucasian boys was from 11.6% to 16.7%.

Children whose BMI percentile is at or above the 95th percentile have the potential for more complications than those children with BMI levels between the 85th and 94th percentiles. It has been reported that when BMI is at or above the 95th percentile, body fat levels are likely to be high, and it is less likely that excess weight is due to increased lean body mass. It has therefore been recommended that clinicians change the terminology used to identify this group from "overweight" to "obese" which denotes excess body fat. The expert committee urges those working with this population to be empathetic and careful with choice of words when addressing

a child's weight status, which may mean using these clinical terms for documentation only, and using other terms that may be more neutral during visits with families (5).

Additional Counseling Guidelines

- First step in weight control for most overweight children is not weight loss
  - Goal should be to maintain baseline weight or to gain weight at a slower rate
- Weight goals can be achieved through modest changes in diet and activity
  - Avoid short term diets or physical activity programs that promote rapid weight loss rather than long term changes
  - Emphasize the importance of the whole family making changes—not just the participant who is overweight!
  - Help caregiver to teach and model healthy attitudes toward food and physical activity without emphasizing body weight
- Help participant pick one or two goals to work on
  - Start slowly, and help participant monitor changes and progress
  - Suggested Diet Behavior goals could include:
    - healthy eating habits
    - eating three meals per day and choosing healthy, low calorie snacks
    - modestly reducing fat in the family's diet (Don't restrict fat in children less than 2 years of age.)
    - drinking low fat and non fat milk after the age of 2
    - limiting the consumption of high sugar foods like soda and juice (Do not forbid sweets and desserts. Emphasize moderation.)
    - being aware of portion sizes, especially high fat and high sugar foods
    - limit the frequency of high calorie fast food meals
    - eating a variety of foods by introducing new foods often
    - drinking more water
    - engaging in physical activities that the whole family enjoys
    - reducing the time in front of the TV (Limit TV and computer games to no more than 1 to 2 hours per day)

References

1. Kuczmarski RJ, Ogden CL, Grummer-Strawn LM, et al. CDC growth charts: United States. Advance data from vital and health statistics; no. 314. Hyattsville (MD): National Center for Health Statistics. 2000.

2. Grummer-Strawn LM, Reinold C, Krebs NF. Use of World Health Organization and CDC growth charts for children aged 0-59 Months in the United States. CDC Morbidity and Mortality Weekly Report (September 2010); no 59(rr09); 1-15. Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5909a1.htm?s_cid=rr5909a1_w.

Accessed September 2010.

3. Barlow SE, Expert Committee. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary report. Pediatrics. 2007; 120; S164-S192.

4. Ogden CL, Flegal KM. Changes in Terminology for Childhood Overweight and Obesity. National health statistics reports; no. 25. Hyattsville (MD): National Center for Health Statistics. 2010.

5. U.S. Department of Health and Human Services. The Surgeon General's vision for a healthy and fit nation. Rockville (MD): U.S. Department of Health and Human Services, Office of the Surgeon General. 2010.

6. Krebs NF, Himes JH, Jacobson D, Nicklas TA, Guilday P, Styne D. Assessment of child and Adolescent Overweight and Obesity. Pediatrics 2007; 120 Suppl 4:S103-S228.

High Risk References

1. CDC 2011 b: Centers for Disease Control and Prevention. U.S. Obesity Trends. http://www.cdc.gov/obesity/data/trends.html#National. Accessed October 3, 2011.

2. Nader PR, O'Brien M, Houts R, Bradley R, Belsky J, Crosnoe R, Griedman S, Zuguo M, Susman E. Identifying Risk for Obesity in Early Childhood. *Pediatrics.* 2006; 118:e594-e601. doi: 10.1542/peds.2005-2801

3. Ogden C, Carrol M. Prevalence of obesity among children and adolescents: United States, Trends 1963-1965 through 2007-2008. http://www.cdc.gov/nch/data/hestat/obesity_child_07_08/obesity_child_07_08.pdf Accessed September 9, 2011.

4. PANO: Physical Activity, Nutrition, and Obesity Program, Bureau of Health Promotion, Utah Department of Health. Childhood overweight in Utah 2010. http://health.utah.gov/obesity/documents/HW_Elem_Project_2010.pdf.

5. Barlow: Barlow SE. "Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary Report." *Pediatrics.* 2007;120:S164-S192. doi:10.1542/peds.2007-2329C

6. Messiah SE, Arheart KL, Natale RA, Hlaing WM, Lipshultz SE, Miller TL. "BMI, waist circumference, and selected cardiovascular disease risk factors among preschool-age children." *Obesity*. 2011:1-8. doi: 10.1038/oby.2011.353

7. Centers for Disease Control and Prevention. Overweight and obesity. http://www.cdc.gov/obesity/childhood/data.html. Accessed September 9, 2011.

8. Connor: Connor, P., Bartlett, S., Mendelson, M., Condon, K., & Sutcliffe, J., et al. (2010). *WIC Participant and Program Characterictics 2008*. Published January 2010. http://www.fns.usda.gov/ora.

9. Ziol-Guest KM, Duncan G J, Kaili A. "Early Childhood Poverty and Adult Body Mass Index." *American Journal of Public Health.*2009; 99(3): 527-532. doi: 10.2105/AJPH.2007.130575

10. Centers for Disease Control and Prevention. Vital Signs: State-Specific Obesity Prevalence Among Adults — United States, 2009. *Morbidity and Mortality Weekly Report, 59*. http://www.cdc.gov/mmwr/pdf/wk/mm59e0803.pdf.

114 Overweight or At Risk of Overweight (Infants and Children)

Definition/Cut-Off Value:

The risk factors are limited to:

Overweight

- Being 2-5 years of age and ≥ 85th and < 95th percentile Body Mass Index (BMI)-for-age or weight-for-stature as plotted on the 2000 Centers for Disease Control and Prevention (CDC) 2-20 years gender specific growth charts (1,2).*****

At Risk of Overweight

- Being < 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.******

- Being ≥ 12 months (child of obese mother) and having a biological mother with a ~~(~~BMI ≥ 30~~)~~ at the time of the child's 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) having a biological father with a BMI ≥ 30 at the time of certification.**

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

***** *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 measurements taken by staff at the time of certification.*

Note: The 2000 CDC 2 – 20 years growth charts are available at: www.cdc.gov/growthcharts.

Participant Category and Priority Level

Category	Priority	High Risk
Infants	I	N
Children	III	Y

***Only high risk if it is determined by CPA that child's weight trajectory or other factors put them at high risk for continued problems related to excess weight gain.**

Parameters for Auto Assignment

Auto assigned for children 2-5 years of age when BMI-for-age or weight-for-stature is ≥ 85 and < 95 percentile.

Auto assigned for infants < 12 months of age when biological mother has a BMI ≥ 30 at time of conception or at any point in the first trimester of the pregnancy.

Auto assigned for children ≥ 12 months of age when biological mother has a BMI ≥ 30 based on the Nutrition Interview.

Auto assigned for infant or child if biological father has a BMI ≥ 30 based on Nutrition Interview.

High Risk Flag

The high risk designation must be manually selected if the CPA determines the child is high risk.

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 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.

• MyPryramid for Preschoolers: http://www.mypyramid.gov/preschoolers/index.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.

Justification for High Risk

The United States has been experiencing a childhood obesity epidemic since the 1970's as rates have increased and nearly tripled. The Centers for Disease Control (CDC) estimates that of children and adolescents aged 2-19, approximately 17% are obese (1). At-risk overweight

children are more likely to be overweight as an adolescent than children who are not at-risk. Consequently, being overweight in adolescence is predictive of obesity in adulthood (2). A study conducted in Utah public elementary schools found that the rate of childhood overweight or obesity was 20.4% in 2010 (4).

Children with a BMI > 85th percentile are more than 5 times as likely to be overweight at age 12 years and are more likely to continue gaining weight, reaching overweight status by adolescence (2).

Complications from childhood overweight and obesity can include a combination of physical and social complaints such as: obstructive sleep apnea, breathing problems, disorders of the nervous system, increased blood pressure, irregular lipid profiles, nonalcoholic fatty liver disease, type 2 diabetes, gallstones, orthopedic disorders, various skin conditions, psychiatric disorders and early commencement of puberty (5). It has also been found that waist circumference and a BMI > 85th and > 95th percentiles are associated with biomarkers that are related to cardiovascular disease risk in preschool-age children, though these associations vary by ethnicity (6).

Obesity rates have been shown to be high among low-income children and it is estimated that one out of every seven low-income preschool children is obese (7). Two-thirds of WIC participants live at or below the poverty line (8). Low income status in the early years of a child's life correlates with an increased risk for overweight as adults compared to those who had higher incomes during this period of time (9).

Childhood overweight and obesity is also common among minority populations -- including those of Hispanic origin (10). In 2008, 42.1% of WIC participants identified themselves as Hispanic/Latino (8). Results from the National Health and Nutrition Examination Survey (NHANES) 2007-2008 study support this disparity (3). Among participants of NHANES, 26.8% of Mexican American boys were obese, nearly double the rate of obesity found in non-Hispanic Caucasian boys where the rate was estimated at 16.7%. Obesity levels in this group have also increased more rapidly than in non-Hispanic Caucasian populations with obesity rates in Mexican American boys rising from 14.1% to 26.8% between 1988-1994 and 2007-2008 while the increase seen in non-Hispanic Caucasian boys was from 11.6% to 16.7%.

The health risks of children with a BMI of 85th to 94th percentile vary depending on several factors including body composition, BMI trajectory, family history, and other factors. In the report by Barlow, the expert committee recognizes that some children in this group may have high weight due to high lean body mass, as well as from high body fat levels. Clinical judgment should be used when determining high risk status for this group. The expert committee urges those working with this population to be empathetic and careful with choice of words when addressing a child's weight status, which may mean using these clinical terms for documentation only, and using other terms that may be more neutral during visits with families (5).

Additional Counseling Guidelines

- First step in weight control for most overweight children is not weight loss
  - Goal should be to maintain baseline weight or to gain weight at a slower rate
- Weight goals can be achieved through modest changes in diet and activity
  - Avoid short term diets or physical activity programs that promote rapid weight loss rather than long term changes
  - Emphasize the importance of the whole family making changes—not just the participant who is overweight!
  - Help caregiver to teach and model healthy attitudes toward food and physical activity without emphasizing body weight
- Help participant pick one or two goals to work on
  - Start slowly, and help participant monitor changes and progress
  - Suggested goals could include:
    - Improving healthy eating habits
    - Eating three meals per day and choosing healthy, low calorie snacks
    - Modestly reducing fat in the family's diet (Don't restrict fat in children less than 2 years of age.)
    - Drinking low fat and non fat milk after the age of 2
    - Limiting the consumption of high sugar foods like soda and juice (Do not forbid sweets and desserts. Emphasize moderation.)
    - Being aware of portion sizes, especially high fat and high sugar foods
    - Limit the frequency of high calorie fast food meals
    - Eating a variety of foods by introducing new foods often
    - Drinking more water
    - Engaging in physical activities that the whole family enjoys
    - Reducing the time in front of the TV (Limit TV and computer games to no more than 1 to 2 hours per day.)

References

1. Kuczmarski RJ, Ogden CL, Grummer-Strawn LM, et al. CDC growth charts: United States. Advance data from vital and health statistics; no. 314. Hyattsville, Maryland: National Center for Health Statistics. 2000.

2. Grummer-Strawn LM, Reinold C, Krebs NF. Use of World Health Organization and CDC growth charts for children aged 0-59 Months in the United States. CDC Morbidity and Mortality Weekly Report (September 2010); no 59(rr09); 1-15. Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5909a1.htm?s_cid=rr5909a1_w. Accessed September 2010.

3. Barlow SE, Expert Committee. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary report. Pediatrics. 2007; 120; S164-S192.

4. Ogden CL, Flegal KM. Changes in Terminology for childhood overweight and obesity. National health statistics reports; no. 25. Hyattsville (MD): National Center for Health Statistics. 2010.

5. U.S. Department of Health and Human Services. The Surgeon General's vision for a healthy and fit nation. Rockville (MD): U.S. Department of Health and Human Services, Office of the Surgeon General. 2010.

6. Whitaker RC, Wright JA, Pepe MS, Seidel KD, Dietz WH. Predicting obesity in young adulthood from childhood and parental obesity. NEJM, Vol 337, No 13, September 25, 1997. pgs 869-873.

7. Anzman SL, Rolllins BY, Birch LL. Parental influence on children's early eating environments and obesity risk: implications for prevention. International Journal of Obesity 34, 1116-1124 (July 2010).

8. Krebs NF, Himes JH, Jacobson D, Nicklas TA, Guilday P, Styne D. Assessment of child and adolescent overweight and obesity. Pediatrics 2007; 120 Suppl 4:S103-S228.

Abbreviated Body Mass Index (BMI) Table

* This table may be used to determine paternal (male or female) obesity (BMI ≥ 30).

Height	Inches	Weight (lbs) equal to 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

Source: Evidence Report of Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults, 1998. National Institutes of Health/National Heart, Lung, and Blood Institute (NHLBI).

Note: A complete BMI table is available on the NHLBI website: www.nhlbi.gov/guidelines/obesity/ob_home/htm

References for High Risk

1. CDC 2011 b: Centers for Disease Control and Prevention. U.S. Obesity Trends. http://www.cdc.gov/obesity/data/trends.html#National. Accessed October 3, 2011.

2. Nader PR, O'Brien M, Houts R, Bradley R, Belsky J, Crosnoe R, Griedman S, Zuguo M, Susman E. Identifying Risk for Obesity in Early Childhood. *Pediatrics.* 2006;118:e594-e601. doi: 10.1542/peds.2005-2801

3. Ogden C, Carrol M. Prevalence of obesity among children and adolescents: United States, Trends 1963-1965 through 2007-2008. http://www.cdc.gov/nch/data/hestat/obesity_child_07_08/obesity_child_07_08.pdf Accessed September 9, 2011.

4. PANO: Physical Activity, Nutrition, and Obesity Program, Bureau of Health Promotion, Utah Department of Health. Childhood overweight in Utah 2010. http://health.utah.gov/obesity/documents/HW_Elem_Project_2010.pdf.

5. Barlow: Barlow SE. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary Report. *Pediatrics.* 2007;120:S164-S192. doi:10.1542/peds.2007-2329C

6. Messiah SE, Arheart KL, Natale RA, Hlaing WM, Lipshultz SE, Miller TL. BMI, waist circumference, and selected cardiovascular disease risk factors among preschool-age children. *Obesity*. 2011:1-8. doi: 10.1038/oby.2011.353

7. Centers for Disease Control and Prevention. Overweight and obesity. http://www.cdc.gov/obesity/childhood/data.html. Accessed September 9, 2011.

8. Connor: Connor, P., Bartlett, S., Mendelson, M., Condon, K., & Sutcliffe, J., et al. (2010). *WIC Participant and Program Characterictics 2008*. Published January 2010. http://www.fns.usda.gov/ora.

9. Ziol-Guest KM, Duncan G J, Kaili A. Early Childhood Poverty and Adult Body Mass Index.*American Journal of Public Health.*2009;99(3): 527-532. doi: 10.2105/AJPH.2007.130575

10. Centers for Disease Control and Prevention. Vital Signs: State-Specific Obesity Prevalence Among Adults — United States, 2009. *Morbidity and Mortality Weekly Report, 59*. http://www.cdc.gov/mmwr/pdf/wk/mm59e0803.pdf.

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

Definition/Cut-Off Value:

High weight-for-length for infants and children < 24 months of age is defined as follows:

Birth to < 24 months having ≥ 97.7th percentile weight-for-length as plotted on the Centers for Disease Control and Prevention (CDC), Birth to 24 months gender specific growth charts (1) (available at: www.cdc.gov/growthcharts).*****

*******Based on the 2006 World Health Organization (WHO) international growth standards (2). CDC labels the 97.7th percentile as the 98th percentile on the Birth to 24 months gender specific growth charts. For more information about the percentile cut-off, please see Clarification.*

Participant Category and Priority Level

Category	Priority	Risk
Infants	I	N
Children (< 24 months of age)	III	N

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 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 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/families.html

MyPryramid for Preschoolers: http://www.mypyramid.gov/preschoolers/index.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.

Justification for High Risk

Not applicable

References

1. Centers for Disease Control and Prevention. Use of World Health Organization and CDC growth charts for children aged 0-59 months in the United States. MMWR 2010; 59(No. RR-9). Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5909a1.htm?s_cid=rr5909a1_w. Accessed September 2010.

2. World Health Organization. WHO child growth standards: Length/height-for-age, weight-for-age, weight for height and body mass index-for-age: Methods and development. Geneva, Switzerland: World Health Organization; 2006. Available at http://www.who.int/childgrowth/publications/technical_report_pub/en/index.html. Accessed September 2010.

3. Kuczmarski RJ, Ogden CL, Grummer-Strawn LM, et al. CDC growth charts: United States. Advance data from vital and health statistics; no. 314. Hyattsville, Maryland: National Center for Health Statistics. 2000.

4. Ogden CL, Flegal KM. Changes in Terminology for childhood overweight and obesity. National health statistics reports; no. 25. Hyattsville (MD): National Center for Health Statistics. 2010.

5. Barlow SE, Expert Committee. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary report. Pediatrics. 2007; 120; S164-S192.

6. U.S. Department of Health and Human Services. The Surgeon General's vision for a healthy and fit nation. Rockville (MD): U.S. Department of Health and Human Services, Office of the Surgeon General. 2010.

7. Anzman SL, Rolllins BY, Birch LL. Parental influence on children's early eating environments and obesity risk: implications for prevention. International Journal of Obesity 34, 1116-1124 (July 2010).

8. Krebs NF, Himes JH, Jacobson D, Nicklas TA, Guilday P, Styne D. Assessment of child and adolescent overweight and obesity. Pediatrics 2007; 120 Suppl 4:S103-S228.

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

Definition/Cut-Off Value:

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 (1).*****
  2 – 5 years:

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

Short Stature (Birth to < 24 months)

- ≤ 2.3rd percentile length-for-age as plotted on the Centers for Disease Control and Prevention (CDC) Birth to 24 months gender specific growth charts (1).*****
  2 – 5 years:

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

*******Based on 2006 World Health Organization international growth standards (3). CDC labels the 2.3rd percentile as the 2nd percentile on the Birth to 24 months gender specific growth charts. For more information about the percentile cut-off, please see Clarification.*

Notes: 1.The Birth to 24 months and the 2000 CDC growth charts are available at: www.cdc.gov/growthcharts.

2. 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 for Growth Charts and Gestational Age Adjustment for Low Birth Weight and Very Low Birth Weight Infants.

Participant Category and Priority Level

Category	Priority	High Risk
Infants	I	N
Children	III	N

Parameters for Auto Assignment

At Risk of Short Stature

- Auto assigned for infants and children < 24 months of age if length-for-age is > 2.3rd percentile and ≤ 5th percentile (for premature infants and children < 24 months of age this is based on adjusted gestational age).

- Auto assigned for children 2-5 years if stature-for-age is > 5th percentile and ≤ 10th percentile.

Short Stature

- Auto assigned for infants and children < 24 months of age if length-for-age is ≤ 2.3rd percentile (for premature infants and children < 24 months of age this is based on adjusted gestational age).

- Auto assigned for children 2-5 years if stature-for-age is ≤ 5th percentile.

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.

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. <u>Electronic charts should use the 2.3rd percentile as the cut-off.</u>

Justification for High Risk

Not applicable

Additional Counseling Guidelines

- Discuss issues which may affect participant's growth:

  - caloric intake and quality of the diet
  - poverty and food insecurity
  - inadequate knowledge of appropriate diet
  - child neglect or abuse
  - illnesses or diseases which could affect growth
  - prematurity and birth weight
  - parental stature (mother's height may be best indicator)
  - cultural background (black and possibly Asian)
  - altitude
- Review current dietary intake and meal pattern
  - Look for deficiencies in calories, protein (particularly animal protein), zinc, vitamin A, iron, copper, iodine, calcium, and phosphorus

References

1. Centers for Disease Control and Prevention. Use of World Health Organization and CDC growth charts for children aged 0-59 months in the United States. MMWR 2010; 59(No. RR-9). Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5909a1.htm?s_cid=rr5909a1_w. Accessed September 2010.

2. Kuczmarski RJ, Ogden CL, Grummer-Strawn LM, et al. CDC growth charts: United States. Advance data from vital and health statistics; no. 314. Hyattsville, Maryland: National Center for Health Statistics. 2000.

3. World Health Organization. WHO child growth standards: Length/height-for-age, weight-for-age, weight for height and body mass index-for-age: Methods and development. Geneva, Switzerland: World Health Organization; 2006. Available at: http://www.who.int/childgrowth/publications/technical_report_pub/en/index.html. Accessed September 2010.

4. Institute of Medicine. WIC nutrition risk criteria a scientific assessment. Washington (DC): National Academy Press; 1996. p. 104-109.

5. Pipes PL, Trahms CM. Nutrition in infancy and childhood, 6th edition. Seattle (WA): WCB/McGraw-Hill; 1997. p. 2.

6. Berhane R, Dietz WH. Clinical assessment of growth. In: Kessler DB, Dawson P., editors. Failure to thrive and pediatric undernutrition: A transdisciplinary approach. Baltimore (MD): Paul H. Brooks Publishing Company, Inc.; 1999. p. 199.

7. Disbrow DD. The costs and benefits of nutrition services: a literature review. J Am Diet Assoc. 1989; 89:S3-66.

131 Low Maternal Weight Gain

Definition/Cut-Off Value:

Low 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 beneath the bottom line of the appropriate weight gain range for her respective pre-pregnancy weight category (1), as follows:

Pre-pregnancy Weight Groups	Definition (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 information.

Note: A BMI table is at the end of this section 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.

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	Y

Parameters for Manual Assignment

To manually assign risk 131, select the radio button 131 in the Anthropometrics panel or select 131 in the Risk panel.

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned

Justification

Maternal weight gain during the 2nd and 3rd trimesters is an important determinant of fetal growth. Low maternal weight gain is associated with an increased risk of small for gestational age (SGA) infants, especially in underweight and normal-weight women (1). In addition, low maternal weight gain is associated with failure to initiate breastfeeding and preterm birth among underweight and to a lesser extent normal weight women (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 (2). 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 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 (3). 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 (3). 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 (4).

Justification for High Risk

Low gestational weight gain is associated with an increased risk of giving birth to a growth-retarded infant. This has important adverse consequences for subsequent somatic growth and

neurobehavioral development. Low maternal weight gain during pregnancy is also associated with increased infant mortality, small for gestational age birth weight, and preterm birth. These adverse effects of low maternal weight gain are greater among underweight and normal weight women. As pre-pregnancy BMI increases, the adverse effects lessen (3). Some maternal characteristics associated with an increased risk of low gestational weight gain (< 6 lbs) occur in combination, e.g., low family income, black race, young age, unmarried status and low educational level, and are associated with short gestational duration and increased risk of premature delivery.

Maternal pre-pregnancy BMI and gestational weight are determinants of infant birth weight and are positively associated with infant birth weight, after adjustment for other maternal characteristics. These results are of great importance in public health, as pre-pregnancy BMI and weight gained during gestation are modifiable risk factors of adverse pregnancy outcomes. In comparing the relationship between maternal BMI, energy intake and pregnancy outcomes, pre-pregnancy weight consistently predicts the majority of neonatal measurements compared to other maternal factors (2). WIC supplemental foods, nutrition education counseling, and environment for frequent monitoring of weight gain status, may improve infant outcomes.

Additional Counseling Guidelines

- Discuss issues which may affect participant's weight gain:
  - perception of body weight gain
  - adequacy of food in the home
  - pattern of weight gain and birth outcomes in previous pregnancies
  - excessive exercise
  - environmental stressors
  - breastfeeding energy expenditure
- Counsel on ways to improve dietary intake:
  - eating more high calorie/nutrient dense foods
  - frequency of meals and snacks
  - improving pregnancy related symptoms (i.e. nausea, vomiting, discomfort)

Clarification

The Centers for Disease Control and Prevention (CDC) defines a trimester as a term of three months in the prenatal gestation period with 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"	<111 lbs	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.				

References

1. Institute of Medicine. Weight gain during pregnancy: reexamining the guidelines (Prepublication Copy). National Academy Press, Washington, D.C.; 2009. www.nap.edu. Accessed June 2009.

2. National Heart, Lung, and Blood Institute (NHLBI), National Institutes of Health (NIH). Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults. NIH Publication No.: 98-4083, 1998. www.nhlbi.nih.gov. Accessed June 2009.

3. Brown JE and Carlson M. "Nutrition and Multifetal Pregnancy". J Am Diet Assoc. 2000;100:343-348.

4. Institute of Medicine. WIC nutrition risk criteria: a scientific assessment. National Academy Press, Washington, D.C.; 1996.

Additional Related References

1. Brown JE, Schloesser PT. Pregnancy weight status, prenatal weight gain, and the outcome of term twin gestation. Am.J.Obstet.Gynecol. 1990;162:182-6.

2. Parker JD, Abrams B. Prenatal weight gain advice: an examination of the recent prenatal weight gain recommendations of the Institute of Medicine. Obstet Gynecol, 1992; 79:664-9.

3. Siega-Riz AM, Adair LS, Hobel CJ. Institute of Medicine maternal weight gain recommendations and pregnancy outcomes in a predominately Hispanic population. Obstet Gynecol, 1994; 84:565-73.

4. Suitor CW, editor. Maternal weight gain: a report of an expert work group. Arlington, Virginia: National Center for Education in Maternal and Child Health; 1997. Sponsored by Maternal and Child Health Bureau, Health Resources and Services Administration, Public Health Service, U.S. Department of Health and Human Services.

5. Williams RL, Creasy RK,Cunningham GC, Hawes WE, Norris FD, Tashiro M. Fetal growth and perinatal viability in California. Obstet.Gynecol. 1982;59:624-32.

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References for High Risk

1. Dietz PM, Callaghan WM, Smith R, Sharma AJ. Low pregnancy weight gain and small for gestational age: a comparison of the association using 3 different measures of small for gestational age. *American Journal of Obstetrics and Gynecology,* 2009; 201:53.e1-53.e7.

2. Frederick IO, Williams MA, Sales AE, Martin DP, Killien M. Pre-pregnancy body mass index, gestational weight gain, and other maternal characteristics in relation to infant birth weight. *Matern Child Health J*, 2008; 12:557-567.

3. Chen A, Feresu SA, Fernandez C, Rogan WJ. Maternal obesity and the risk of infant death in the United States. *Epidemiology*, 2009; 20:74-81.

4. Nohr EA, Vaeth M, Baker JL, Sorensen TIA, Olsen J, Rasmussen KM. Combined associations of pre-pregnancy body mass index and gestational weight gain with the outcome of pregnancy. *Am J Clin Nutr.* 2008; 87:1750-1759.

5. Margerison-Zilko CE, Shrimali BP, Eskenazi B, Lahiff M, Lindquist AR, Abrams BF. Trimester of maternal gestational weight gain and offspring body weight at birth and age five. *Matern Child Health J.* 2011; published online 07 July 2011.

6. Kiel DW, Dodson EA, Artal R, Boehmer TK, Leet TL. Gestational weight gain and pregnancy outcomes in obese women. *Obstetrics & Gynecology*, 2007; 110:752-758.

7. IOM (Institute of Medicine) and NRC (National Research Council). 2009. *Weight Gain During Pregnancy: Reexamining the Guidelines.* Chapters 5 and 6. Washington, DC: The National Academies Press.

8. Viswanathan M, Siega-Riz AM, Moos M-K, Deierlein A, Mumford S, Knaack J, Thieda P, Lux LJ, Lohr KN. Outcomes of Maternal Weight Gain, Evidence Report/Technology Assessment No. 168. (Prepared by RTI International–University of North Carolina Evidence-based Practice Center under Contract No. 290-02-0016.) AHRQ Publication No. 08-E009. Rockville, MD: Agency for Healthcare Research and Quality. May 2008. [See Structured Abstract.]

132 Maternal Weight Loss During Pregnancy

Definition/Cut-Off Value:

Any weight loss below pre-gravid weight during 1st trimester
OR
Weight loss of ≥ 2 pounds in the 2nd or 3rd trimesters (beginning the 14th week gestation)

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	Y

Parameters for Auto Assignment

Auto assigned for pregnant women if current weight < pre-pregnancy weight

Auto assigned if weight loss ≥ 2 lbs in 2nd or 3rd trimester

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned

Justification

Weight loss during pregnancy may indicate underlying dietary or health practices, or health or social conditions associated with poor pregnancy outcomes. These outcomes could be improved by the supplemental food, nutrition education, and referrals provided by the WIC Program.

Justification for High Risk

Current research investigating the outcomes of weight loss during pregnancy suggests that this loss could lead to both growth restriction and/or prematurity in the infant. This has important adverse consequences for subsequent somatic growth and neurobehavioral development. It also increases the risk of infant mortality. In addition, weight loss during pregnancy may indicate other health or nutrition related risk factors in the mother. Some maternal characteristics associated with an increased risk of low gestational weight gain (< 6 lbs) occur in combination, e.g., low family income, black race, young age, unmarried status and low educational level, and are associated with short gestational duration and increased risk of

premature delivery. WIC supplemental foods, nutrition education counseling, and environment for frequent monitoring of weight gain status may improve infant outcomes.

Additional Counseling Guidelines:

- Discuss issues which may affect participant's weight gain:
  - perception of body weight gain
  - adequacy of food in the home
  - pattern of weight gain and birth outcomes in previous pregnancies
  - excessive exercise
  - environmental stressors
  - breastfeeding energy expenditure
- Counsel on ways to improve dietary intake:
  - eating more high calorie/nutrient dense foods
  - frequency of meals and snacks
  - improving pregnancy related symptoms (i.e. nausea, vomiting, discomfort)

References

1. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 81-82.

2. Metropolitan Life Insurance Co.: New weight standards for men and women; 1959; 40:1-4.

3. Brown, Judith E., RD, MPH, PhD: Final Report on Prenatal Weight Gain Considerations for WIC; September 1998; commissioned by the Risk Identification and Selection Collaborative.

4. Centers for Disease Control and Prevention: Prenatal Nutrition Surveillance System User's Manual. Atlanta, GA: CDC; 1994; page 8-3.\

References for High Risk

1. Nohr EA, Vaeth M, Baker JL, Sorensen TIA, Olsen J, Rasmussen KM. Combined associations of pre-pregnancy body mass index and gestational weight gain with the outcome of pregnancy. *Am J Clin Nutr.* 2008; 87:1750-1759.

2. Fejzo MS, Poursharif B, Korst LM, Munch S, MacGibbon KW, Romero R, Goodwin M. Symptoms and pregnancy outcomes associated with extreme weight loss among women with hyperemesis gravidarum. *J Women's Health.* 2009; 18: 1981-1987.

3. Frederick IO, Williams MA, Sales AE, Martin DP, Killien M. Pre-pregnancy body mass index, gestation weight gain, and other maternal characteristics in relation to infant birth weight. *Matern Child Health J*. 2008; 12:557-567.

4. Bish CL, Chu SY, Shapiro-Mendoza CK, Sharma AJ, Blanck HM. Trying to lose or maintain weight during pregnancy – United States, 2003. *Matern Child Health J.* 2009; 13-286-292.

5. Beyerlein A, Schiessl B, Lack N, von Kries R. Assocations of gestational weight loss with birth-related outcome: a retrospective cohort study. *BJOG*. 2011; 18: 55-61.

6. Everette M. Gestational weight and dietary intake during pregnancy: Perspectives of African American women. *Matern Child Health J.* 2008;12:718-724.

133 High Maternal Weight Gain

Definition/Cut-Off Value:

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 line of the appropriate weight gain range for her respective pre-pregnancy 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 based on Body Mass Index (BMI) for singleton pregnancies, as follows:

Pre-pregnancy Weight Groups	Definition	Total Weight Gain
Underweight	BMI < 18.5	> 40 lbs
Normal Weight	BMI 18.5 to 24.9	> 35 lbs
Overweight	BMI 25.0 to 29.9	> 25 lbs
Obese	BMI ≥ 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	High Risk
Pregnant	I	Y
Breastfeeding	I	N
Non-Breastfeeding Women	VI	N

Parameters for Auto Assignment

Auto assigned for breastfeeding and non-breastfeeding women if Total Weight Gained (in pregnancy record) during the most recent pregnancy exceeds above amounts for their BMI category.

Parameters for Manual Assignment

To manually assign risk 133 for pregnant women, select the radio button 133 in the Anthropometrics panel or select 133 in the Risk Panel.

High Risk Flag

The high risk designation will automatically activate for the Pregnant category when this risk factor is assigned.

Justification

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 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 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.

Justification for High Risk

Very high gestational weight gain is associated with an increased rate of birth weight which is associated with an increased risk of fetopelvic disproportion, operative delivery, birth trauma, asphyxia and mortality. According to existing studies, a high weight gain during pregnancy has a nutritional component for the mother. Women who have an excessive increase in weight during pregnancy are at a higher risk for c-section, delivering a large for gestational age (LGA)

infant, and high postpartum weight retention. Large weight gain during pregnancy can also have long term effects on infants if they are born LGA. Previous research has shown association between LGA infants and an increased risk of becoming overweight at 3 to 6 years of life.

Maternal weight gain during specific trimesters is also suggested to have more of an impact on infant weight outcomes. However, overall weight gain during pregnancy is the biggest predictor of infant weight. This is a significant problem and a public health concern as it is a modifiable risk factor. WIC's role to counsel pregnant women to achieve recommended weight gain, emphasize high nutritional quality foods, and monitor weight gain through frequent weight checks and visits, can lead to better birth outcomes.

Additional Counseling Guidelines

- Discuss benefits of appropriate weight gain:
  - healthier birth weight baby
  - decreased risk of subsequent obesity
  - less body fat to lose after delivery
  - easier to do physical activities
  - feel better psychologically
- Discuss risks of excessive weight gain:
  - increased risk for delivering high birth weight babies which can lead to complications (see justification section)
    - infants weighing > 9 lbs are at higher risk; > 9.5 lbs at increased mortality risk
  - increased risk of pregnancy induced hypertension, preeclampsia, toxemia
- Discuss ways to improve nutritional intake, such as:
  - decreasing high calorie/low nutrient-dense foods
  - eating more high fiber fruits and vegetables
  - paying attention to portion sizes
  - decreasing frequency of eating, if appropriate
  - low-fat recipes and cooking
  - cultural cooking choices
  - drinking more water
- Address behavioral factors:
  - eating environment (eating in front of the TV)
  - psychological factors (eating when feeling stressed or emotionally upset)
  - cultural factors (body perceptions)
  - substitution behaviors (leave the kitchen area and go outside)
  - "triggers" that stimulate eating (know them and have a plan)
  - participant's readiness to change

Clarification

The Centers for Disease Control and Prevention (CDC) defines a trimester as a term of three months in the prenatal gestation period with 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"	<111 lbs	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.				

References

1. Institute of Medicine. WIC nutrition risk criteria: a scientific assessment. National Academy Press, Washington, D.C.; 1996.

2. Institute of Medicine. Weight gain during pregnancy: reexamining the guidelines (Prepublication Copy). National Academy Press, Washington, D.C.; 2009. www.nap.edu. Accessed June 2009.

3. National Heart, Lung, and Blood Institute (NHLBI), National Institutes of Health (NIH). Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults. NIH Publication No.: 98-4083, 1998. www.nhlbi.nih.gov. Accessed June 2009.

4. Brown JE and Carlson M. Nutrition and multifetal pregnancy. J Am Diet Assoc. 2000;100:343-348.

Additional Related References

1. Carmichael S, Abrams B, Selvin S. The pattern of maternal weight gain in women with good pregnancy outcomes. Am.J.Pub.Hlth. 1997;87;12:1984-1988.

2. Brown JE, Schloesser PT. Pregnancy weight status, prenatal weight gain, and the outcome of term twin gestation. Am.J.Obstet.Gynecol. 1990;162:182-6.

3. Parker JD, Abrams B. Prenatal weight gain advice: an examination of the recent prenatal weight gain recommendations of the Institute of Medicine. Obstet Gynecol,1992; 79:664-9.

4. Siega-Riz AM, Adair LS, Hobel CJ. Institute of Medicine maternal weight gain recommendations and pregnancy outcomes in a predominately Hispanic population. Obstet Gynecol, 1994; 84:565-73.

5. Suitor CW, editor. Maternal weight gain: a report of an expert work group. Arlington, Virginia: National Center for Education in Maternal and Child Health; 1997. Sponsored by Maternal and Child Health Bureau, Health Resources and Services Administration, Public Health Service, U.S. Department of Health and Human Services.

6. Waller K. Why neural tube defects are increased in obese women. Contemporary OB/GYN 1997; p. 25-32.

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References for High Risk

1. Frederick IO, Williams MA, Sales AE, Martin DP, Killien M. Pre-pregnancy body mass index, gestation weight gain, and other maternal characteristics in relation to infant birth weight. *Matern Child Health J*. 2008; 12:557-567.

2. Nohr EA, Vaeth M, Baker JL, Sorensen TIA, Olsen J, Rasmussen KM. Combined associations of pre-pregnancy body mass index and gestational weight gain with the outcome of pregnancy. *Am J Clin Nutr.* 2008; 87:1750-1759.

3. Dietz PM, Callaghan WM, Sharma AJ. High pregnancy weight gain and risk of excessive fetal growth. *Am J Obstet Gynecol.* 2009;201:51.31-6.

4. Kosa JL, Guendelman S, Pearl M, Graham S, Abrams B, Kharrazi M. The association between pre-pregnancy BMI and preterm delivery in a diverse southern California population of working women. *Matern Child Health J.* 2011; 15: 772-781.

5. Margerison-Zilko CE, Shrimali BP, Eskenazi B, Lahiff M, Lindquist AR, Abrams BF. Trimester of maternal gestational weight gain and offspring body weight at birth and age five. *Matern Child Health J.* July 2011; Available online.

6. Manun AA, Callaway LK, O'Callaghan MJ, Najman JM, Alati R, Clavarino A, Lawlor DA. Associations of maternal pre-pregnancy obesity and excess pregnancy weight gains with adverse pregnancy outcomes and length of hospital stay. *BMC Pregnancy and Childbirth*. 2011. Available at *http://www.biomedcentral.com/1471-2393/11/62.*

7. Fortner RT, Pekow P, Solomon CG, Markenson G, Chasan-Taber L. Pre-pregnancy body mass index, gestational weight gain, and risk of hypertensive pregnancy among Latina women. *Am J Obstet Gynecol.* 2009;200:167.e1-167.e7.

8. Sacks DA. Big babies in pregnancies complicated by Diabetes. *Perinatology.* 2010; 4:30-36.

134 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	High Risk
Infants	I	Y
Children	III	Y

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel.

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned

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).

Justification for High Risk

Failure to thrive (FTT) is a serious growth problem and, on occasion, can lead to severe forms of protein energy malnutrition (PEM) or micronutrient deficiency diseases. FTT can lead to developmental delays despite weight gain. This growth problem has multiple causation factors which are often unclear, leaving 80% of all cases without an identifiable medical condition. The single characteristic in FTT is under-nutrition or insufficient energy intake. Suitable nutrition counseling and intervention may help prevent some causes of FTT.

In infants younger than 8 weeks, problems with feeding (poor sucking and swallowing) and breastfeeding difficulties are prominent. For older infants, difficulty transitioning to solid foods, insufficient breast milk or formula consumption, excessive juice consumption, and parental avoidance of high calorie foods often lead to FTT. Long-term effects of FTT include delays of physical growth, psychosocial and motor maturation, subsequent cognitive performance, and decreased immune function.

WIC services of supplemental foods and nutrition counseling can directly impact participants with diagnosed FTT. WIC participation can help restore nutrition status, improve weight gain, and promote rehabilitation and growth/catch-up growth by providing key nutrients and nutrition counseling. Additionally, nutritional counseling, as part of a multidisciplinary approach to treatment, has been shown to improve parent-child relationships and cognitive development. The WIC setting can also provide immediate referral for nutrition and health intervention.

Additional Counseling Guidelines

- Discuss caregiver's understanding of FTT diagnosis
- Discuss factors that may be involved in growth failure, such as:
    - inadequate caloric intake
    - mother-infant interaction
        - Tactfully discuss parent/child interaction
        - Does caregiver respond to child's nutritional and emotional needs (educate on cues)
        - Remember, in many FTT cases, caregiver(s) are very tentative and not neglectful
    - Swallowing problems - organic (CNS, cleft palate, etc.)
    - Too sick or too tired to eat (e.g. cardiac conditions, cancer, etc.)
    - Anorexia
    - Spitting-up/vomiting
    - Gastro esophageal reflux (GER)

    - Diarrhea
        - May need to use lactose-free products after GI episodes
    - Mal-absorption
    - Illness or disease (gastrointestinal, endocrine, or other chronic disease)
    - Genetic factors
    - Formula intolerances, food preferences
    - Secondary issues (e.g. medications)
    - Unclear origin
- If appropriate, use disease specific growth charts for counseling (e.g. Down's Syndrome)
    - Explain expected and realistic growth pattern - maintaining or gradually increasing channels
    - Explain that frequent weight, height, OFC checks, are important in following growth
- Recommend rate of weight gain per week/month
- Provide basic dietary recommendations for optimal growth
    - Recommend appropriate calorie level

      < 3 mo 120 kcal/kg
      3-5 mos 115 kcal/kg
      6-8 mos 110 kcal/kg
      9-11 mos 105 kcal/kg
      (possibly based on IBW for catch-up growth)
- If appropriate, explain standard mixing instructions for formula/medical nutritional products prescribed by health care provider (see Product Guide)
    - Refer participant to MD for any special written instructions for mixing
    - Identify if nutritional products are being tolerated or accepted
        - Refer to MD if not
- If appropriate, discuss meal plan to balance use of nutritional product with solid foods
- Discuss meal scheduling
    - May need to add more snacks and meals OR
    - Offer foods only at mealtimes (Eliminate "grazing" to stimulate appetite.)
- Educate on increasing calorie concentration:
    - Give "calorie booster" or "power packing" idea
- Discuss modification of foods
    - May need to change textures, temperature, presentations
- Encourage physical activity if child is medically able
- For breastfeeding infants, discuss:
    - availability of adequate volume of breast milk
    - fatigue at feeds, good latch/suck
    - pumping, SNS use, bottle supplementation
    - number of feeds, length of time between feeds
    - (could use baby weight scales to measure volume intake)
- For premature infants use adjusted gestational age for solid food introduction

References

1. Berkow R, Fletcher AJ. The Merck manual of diagnosis and therapy. Rahway (NJ): Merck Sharp & Dohme Research Laboratories; 1992.

2. Institute of Medicine. WIC nutrition risk criteria a scientific assessment. Washington (DC): National Academy Press; 1996. p. 100.

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References for High Risk

1. Cole SZ, Lanham JS. Failure to thrive: an update. *Am Fam Physician*. 2011;83(7):829-834.

2. McDougall P, et al. The detection of early weight faltering at the 6-8 week check and its association with family factors, feeding, and behavioral development. *Arch Dis Child*. 2009; 94(7):549-552.

3. Jeong SJ. Nutritional approach to failure to thrive. *Korean J Pediatr*. 2011; 54(7):277-281.

4. Nutzenadel W. Failure to thrive in childhood. *Dtsch Arztebl Int.* 2011; 108(38):642-649.

5. Olsen EM, et al. Failure to thrive: the prevalence and concurrence of anthropometric criteria in a general infant population. *Arch Dis Child.* 2007; 92:109-114.

6. Gahagen S. Failure to thrive: a consequence of undernutrition. *Pediatr Rev*. 2006; 27(1):e1-e11.

135 Inadequate Growth

Definition/Cut-Off Value:

An inadequate rate of weight gain as defined below:

Infants from birth to 1 month of age:

- Excessive weight loss after birth (> 8% lost from birth)
- Not back to birth weight by 2 weeks of age
- Older infants up to 12 months of age according to minimum expected weight gain

Children not gaining minimum expected weight gain based on table below.

Participant Category and Priority Level

Category	Priority	High Risk
Infants	I	Y
Children	III	Y

This risk factor is **not auto assigned in all cases** and must be assessed at every certification visit by reviewing the growth charts at the Anthropometrics panel or screen under “Assessment" in the VISION navigational tree. Determine the amount of weight gained. For infants from 1 month to 6 months of age and based on 2 weights taken at least 1 month apart, the infant’s actual weight gain is less than the calculated expected minimal weight gain based on the table below. For infants and children from 6 months to 59 months of age and based on 2 weights taken at least 3 months apart, the infant’s or child’s actual weight gain is less than the calculated expected minimal weight gain based on the table below. When the expected minimal weight gain is less than the amount listed in the table below, select or check the 135 check box in the Anthropometrics panel.

Age	Minimum Expected Weight Gain			
	Grams/Day	Ounces/Week	Ounces/Month	Pounds/Month
Birth – 1 mo	18	4 ½	19	1 lb 3 oz
1 - 2 mos	25	6 ¼	27	1 lb 11 oz
2 - 3 mos	18	4 ½	19	1 lb 3 oz

3 - 4 mos	16	4	17	1 lb 1 oz
4 - 5 mos	14	3 ½	15	-------
5 - 6 mos	12	3	13	-------
Age	**Grams/Day**	**Ounces/Week**	**Ounces/Month**	**Pounds/ 6 Months**
6 - 12 mos	9	2 ¼	9 ½	3 lb 10 oz
12 – 59 mos	2 ½	.6	2.7	1 lb

a. Determine that minimal weight gain has not been achieved.
b. Assess if any medications have been prescribed, and determine if there is a negative effect on appetite and caloric intake.
c. Write a HRCP, and include a referral to a physician for medical assessment.
d. Consult with the RD concerning dietary instruction and the follow up schedule in the WIC clinic.

Parameters for Auto Assignment

Auto assigned for an infant that is currently < one month of age if any weight recorded for the infant is ≤ 92% of the birth weight

Auto assigned for an infant that is currently < one month of age if any weight recorded after 2 weeks of age is less than the birth weight.

Parameters for Manual Assignment

For children and infants not gaining minimum expected weight gain select the check box in the Anthropometrics panel or select this risk factor in the Risk Panel

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned

Justification

Weight for age is a sensitive indicator of acute nutritional inadequacy. The rate of gain during infancy, especially early infancy is rapid, and abnormalities in rate of weight may often be detected in just a few months. There is little question that decrease in the rate of weight gain during infancy is the earliest indication of nutritional failure. In contrast, children beyond infancy grow rather slowly, and many months of observation may be required to demonstrate that the rate of weight gain is unusually slow. During the first eighteen months of life, to change in weight fluctuates and then declines rapidly. Because of this deceleration it may be difficult to differentiate normal growth slowing from an abnormal rate. After 18 months weight gain becomes more linear so assessment becomes easier.

Infants and children with abnormally slow growth can benefit from nutrition and health interventions to improve weight and height gain. The diagnosis of slow growth must consider possible causes of growth changes including under eating and disease conditions. Under eating, for any number of reasons, and disease conditions are the main causes of abnormally slow growth. Factors associated with under eating by an infant or child include inadequate sources of nutrient dense foods; lack of social support for the caregiver; an adverse social and psychological environment; a disorganized family; depressed parents or caregivers; and the caregiver's lack of education, health and nutrition knowledge, mental and physical abilities, and responsibility for child care. There is good evidence that through nutrition education, supplemental foods, and referrals to other health and social services, participation in the WIC Program will benefit infants and children with slow growth. In keeping with the preventive nature, a cut-off point approximating the 10th percentile rate of change in weight for age was chosen.

Justification for High Risk

Inappropriately low weight for stature provides a clear indication of recent malnutrition. The WIC environment provides for an excellent opportunity to identify a decline in growth through anthropometric monitoring and prevent deterioration through ongoing nutrition education and supplemental foods. Such intervention promotes catch-up growth in weight and other dimensions of growth. The participant can also benefit from additional nutritional and medical referrals.

Additional Counseling Guidelines

- Explain that height, weight, and OFC are indicators of growth and nutritional adequacy
    - Discuss factors affecting growth, such as:
        - Family history of growth (e.g. height, weight, build of parents/siblings
        - Illness or sickness
        - Possible decreased appetite or intake
        - Increased caloric expenditure, e.g. fevers

- Explain that under-eating, for a variety of reasons (and disease conditions) are the main causes of abnormally slow growth
- Keep in mind that factors associated with under-eating may include:
  - Lack of social support for the caregiver
  - Adverse social and psychological environment
  - Caregiver's lack of education, health and nutrition knowledge, mental and physical abilities
- For children, assess intake of non-nutritive foods/inappropriate choices
  - If appropriate, discuss ideas for "calorie boosting"

References

1. Baumgartner RN, Roche AF, Himes, JH: Incremental Growth Tables: Supplementary to Previously Published Charts; American Journal of Clinical Nutrition; 1986; 43: 711-722.

2. Guo, S, Rouche, AF, Fomon, SF, Nelson, SE, Chumlea, WC, Rogers, RR, Baumgartner, RN, Zeigler, EE and Siervogel, RM: Reference data on gains in weight and length during the first two years of life; J Pediatr; 1991; 119:355-362

3. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 123-124.

4. Fomon , Samuel, J.: Nutrition of Normal Infants; Mosby; 1993; pp. 47-51.

141 Low Birth Weight

Definition/ Cut-Off Value

Low Birth Weight (LBW)

- Birth weight defined as ≤ 5 pounds 8 ounces (≤ 2500 g), for infants and children less than 24 months old

Very Low Birth Weight (VLBW)

- Birth weight defined as ≤ 3 pounds 5 ounces (≤ 1500 g), for infants and children less than 24 months old

Note: See "Guidelines for Growth Charts and Gestational Age Adjustments 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	High Risk
Infants	I	Y
Children (< 24 months old)	III	N

Parameters for Auto Assignment

Low Birth Weight (LBW)

- Auto assigned for infants and children < 24 months if birth weight was ≤ 5.5 lbs and > 3.3 pounds

Very Low Birth Weight (VLBW)

- Auto assigned for infants and children < 24 months if birth weight was ≤ 3.3 pounds

High Risk Flag

High risk designation will automatically activate when this risk factor is assigned for infants

Justification

Low birth weight (LBW) 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).

Justification for High Risk

Low birth weight is associated with poor health, growth and development. It is the most important biological predictor of infant death and deficiencies in physical and mental development. The consequences of low birth weight caused by intrauterine growth restriction (IUGR) and those caused by prematurity differ, however when combined with low birth weight they pose an increased risk. Infants with extreme low birth weight are at a very high risk for long term neurobehavioral dysfunction and poor school performance. Infants must receive an optimal nutrient intake to survive, meet the needs for an extended period of rapid postnatal growth, and complete their growth and development.

Low birth weight increases the probability of mortality and morbidity in infants and can lead to both short and long-term health risks. The chance of health problems increases with lower birth weights. Potential gastrointestinal and/or nutritional risks of low birth weight infants include hyperbilirubinemia, feeding intolerance, growth failure, failure to thrive, short-bowel syndrome, and cholestasis.

One of the major complications in low birth weight infants is necrotizing entercolitis (NEC). Providing low birth weight infants with breast milk reduces the risk of NEC as well as many other diseases and complications. However, the barriers and obstacles mothers face in initiating and establishing a good milk supply for their hospitalized low birth infants often leads to a decreased breast milk production. Consequently, the infant may not receive an adequate amount of breast milk.
There is also controversy whether catch up growth is beneficial or harmful to infants. More and more research states that catch up growth may play a significant role in developing type 2 diabetes, cardiovascular disease, or metabolic syndrome later in life. However, inadequate growth in the early years can also lead to lower cognitive development overtime. Thus it is important to track growth and adjust nutrition care to help low birth weight infants achieve optimal growth while avoiding excessive weight gain. WIC can help monitor growth and educate on proper nutrition care, the importance of breastfeeding, and provide support to breastfeeding mothers.

Additional Counseling Guidelines

- Explain low birth weight: LBW: <2500g, VLBW: <1500g, ELBW: <1000g
    - ELBW infants are at very high risk for long-term neurobehavioral dysfunction
    - LBW infants are at increased risk for poor health and growth and development, but risk lessens as child gets older
- Discuss importance of optimal nutrient intake to meet growth needs since infant is at higher risk
- Encourage breastfeeding, unless medically contraindicated
    - If necessary, provide breastfeeding assistance and support

- Medical monitoring by physician is necessary if infant is receiving formula with caloric content which is greater than 22 calories per ounce or if infant is receiving human milk fortifier (HMF)
    - If HMF is prescribed, stress importance of physician monitoring blood levels for certain nutrients including calcium, phosphorus, magnesium, sodium, vitamins A & D and possibly others
    - Medical monitoring is critical for ruling out potential toxicity/adverse effects associated with abnormal blood levels of these nutrients

References

1. Institute of Medicine: WIC nutrition risk criteria a scientific assessment. Washington (DC): National Academy Press; 1996. p. 97.

2. Anderson DM. Nutritional implications of premature birth, birth weight, and gestational age classification. In: Groh-Wargo S, Thompson M, Cox J, editors. Nutritional care for high risk newborns. Rev. 3rd ed. Chicago: Precept Press, Inc; 2000.

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References for High Risk

1. Eichenwald EC, Stark AR. Management and Outcomes of Very Low Birth Weight. *New Engl J Med.* 2008;358(16):1700-1711.

2. Casey PH. Growth of Low Birth Weight Preterm Children. *Seminars in Perinatology.* 2008; 32(11):20-27.

3. Meinzen-Derr J, Poindexter B, Wrage L, Morrow AL, Stoll B, Donovan EF. Role of human milk in extremely low birth weight infants' risk of necrotizing entercolitis or death. *J Perinatol.* 2009; 29(1):57-62.

4. Sisk P, Quandt S, Parson N, Tucker J. Breast Milk Expression and Maintenance in Mothers of Very Low Birth Weight Infants: Supports and Barriers. *J Hum Lact.* 2010; 26(4):368-375.

5. Vaag A. Low birth weight and early weight gain in the metabolic syndrome: Consequence for infant nutrition. *International Journal of Gynecology & Obstetrics.* 2009; 104:s32-s34.

6. Thakur SK, Paul K, Khanam M, Khatun W, Sarker D. Effect of nutrition education on exclusive breastfeeding for nutritional outcome of low birth weight babies. *European Journal of Clinical Nutrition.* 2011; 1-6.

142 Prematurity

Definition/Cut-Off Value

Prematurity

- Birth at ≤ 37 weeks gestation for infants less than 12 months
- Birth at ≤ 37 weeks gestation for a child at 12 months of age and up to, but not including 24 months of age.

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 on the anthropometric assessment and nutritional care of premature infants.

Participant Category and Priority Level

Category	Priority	High Risk
Infants	I	Y
Children (< 24 months old)	III	N

Parameters for Auto Assignment

Auto assigned for infants and children < 24 months if premature is designated on the birth measurement Anthropometrics record

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned for infants

Justification

Premature infants may have physical problems that have nutritional implications, including immature sucking, swallowing and immature digestion and absorption of carbohydrates and lipids. Premature infants have increased nutrient and caloric needs for rapid growth. Premature infants grow well on breast milk. WIC promotes breastfeeding and provides nutrition education about infant feeding (1).

Justification for High Risk

Pre-term infants have increased nutritional needs for the following:

- Protein
- Calories
- Calcium, phosphorus and magnesium
- Sodium
- Zinc, copper and iodine
- Vitamin A
- Iron
- Water soluble vitamins because of higher protein requirements and reduced vitamin reserves associated with shortened gestation.

Preterm infants also need more frequent assessment of nutritional health and ongoing adjustment of nutritional intake throughout the neonatal period to ensure appropriate growth and development. Scientific research supports the fact that aggressive early nutrition intervention can improve growth and metabolic outcomes in preterm infants. Preterm infants have many physical problems which can affect nutrition status including immature swallowing, sucking, and GI tracts.

WIC plays an important role in providing nutrition and follow up care for premature infants following hospital discharge. Receiving suboptimal or even excessive nutrition during critical growth periods will likely cause adverse effects in these premature babies. Most preterm infants, especially those with extremely low birth weight, are not fed sufficient amounts of nutrients for normal fetal growth. This can result in growth restriction during the hospital stay. Conversely, many studies are now showing that excessive growth, including catch up growth, can also lead to complications later in life such as obesity, diabetes, and insulin resistance. It is important for the CPA to assess the nutritional status and growth of these infants to ensure adequate, but not excessive, weight is being gained.

Additional Counseling Guidelines

- Encourage compliance with:
  - Recommended feeding method (breast, bottle, gavage, parenteral, enteral)
  - Supplementation of breast milk or formula (HMF, high caloric density formula, vitamin/mineral supplementation)
  - Pumping and/or mixing instructions
  - Continued follow-up with health care provider(s)
- Calculate rate of weight gain if two weights are available:

    - Appropriate growth is 20-25 gms (.75 to 1 oz) per day
- Assess current caloric and dietary intake
    - Goal range is 110-150 kcal/kg/day
    - Average intake is usually around 120 kcal/kg/day
- Contact MD for prescription if higher calorie formula or change in formula is warranted
    - Remember premature formulas must be vouchered monthly
- If mom is breastfeeding:
    - Refer to a Lactation Educator and peer counselor
    - Offer lots of support and encouragement
    - Provide an electric pump if needed
- Remember that soy-based formulas are not recommended for premature infants (AAP).
- Refer to occupational therapist if needed (Oral aversion is very common due to prolonged use of TPN and/or tube feedings.)
- Assist parents in determining if their infant is ready for solid foods

References

1. Institute of Medicine: WIC nutrition risk criteria a scientific assessment. Washington (DC): National Academy Press; 1996. p. 215.

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References for High Risk

1. Goldenberg RL, Gulthan JF, Iams JD, Romero R. Epidemiology and causes of preterm birth. *The Lancet.* 2008; 371:75-84.

2. Bocca-Tjeertes IFA, Kerstjens JM, Reijneveld SA, deWinter AF, Bos AF. Growth and Predictors of Growth Restraint in Moderately Preterm Children Aged 0 to 4 Years. *Pediatrics.* 2011; 128(5):1187-1194.

3. Merewood A, Brooks D, Bauchner H, MacAuley L, Mehta SD. Maternal Birthplace and Breastfeeding Initiation Among Term and Preterm Infants: A Statewide Assessment for Massachusetts. *Pediatrics.* 2006; 118(4):1048-1054.

4. Velaphi S. Nutritional requirements and parenteral nutrition in preterm infants. *S Afr J Clin Nutr.* 2011; 24(3):S27-S31.

5. Jadcheria SR, Wang M, Vijayapal AS, Leuthner SR. Impact of prematurity and co-morbidities on feeding milestones in neonates: a retrospective study. *Journal of Perinatology.* 2010; 30:201-208.

6. Hay WW Jr. Strategies for Feeding the Preterm Infant. *Neonatology.* 2008; 94(4):245-254.

7. Thureen PJ. The Neonatologist's Dilemma: Catch-up Growth or Beneficial Undernutrition in Very Low Birth Weight Infants-What Are Optimal Growth Rates? *Journal of Pediatric Gastroenterology and Nutrition.* 2007; 45:S152-154.

8. Martin CR, Brown YF, Ehrenkranz RA, O'Shea M, Allred EN, Belfort MB, McCormick MC, Leviton A. Nutritional Practices and Growth Velocity in the First Month of Life in Extremely Premature Infants. *Pediatrics.* 2009; 124(2):649-655.

151 Small for Gestational Age

Definition/ Cut-Off Value

For infants and children < 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	High Risk
Infants	I	Y
Children (< 24 months old)	III	N

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel.

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned for infants.

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.

Justification for High Risk

Infants born small for gestational age (SGA) have a greater risk for developing health problems later in life such as cardiovascular disease and metabolic syndrome. While the association's cause is unknown, there are two strong hypotheses. The thrifty gene hypothesis explains that a nutritionally deprived fetus will divert nutrients to the brain at the expense of body growth and pancreas, liver and muscle development. Research investigating the relationship between insulin sensitivity and premature or term SGA infants shows that by age one-year, insulin sensitivity is reduced and they may become insulin resistant. This association was more evident in those who had a rapid weight gain after birth.

The second hypothesis explaining disease occurrence later in life for infants born SGA is the catch-up growth hypothesis. Catch-up growth is a common method of treatment for SGA infants aimed at achieving adequate growth in height and weight as well as fat mass. However, research has found that quickly increasing weight gain early in life for a low birth weight infant is associated with increased risk of obesity, insulin resistance, type-2 diabetes and CVD. In relation to this finding, consumption of a nutrient-enriched formula was associated with increased blood pressure in SGA infants, affecting them up to 8 years later. As adults, SGA infants have a greater percentage of body fat than infants born appropriate for gestational age and are more likely to have a higher abdominal fat distribution, which are risk factors for CVD, type-2 diabetes and metabolic syndrome. The exact timing of rapid weight gain which

contributes to the poor health outcomes is still being debated. WIC provides growth assessment as well as breastfeeding and nutrition counseling that can benefit children who were born SGA.

Additional Counseling Guidelines

- Explain potential risks of SGA:
  - Higher mortality and morbidity rates
  - Slower physical growth
  - Possibly slower mental development
  - Congenital abnormalities
  - Long term deficit growth and neurocognitive development
- If also premature, HMF, or supplements of premature formula are recommended with the continuation of long term breastfeeding
- If breastfeeding is not possible or feasible, work with medical provider to provide formula tailored to meet infant's needs
- Explain appropriate calorie level and nutrient intake to encourage appropriate growth
- Delay solids until the infant is developmentally ready

References

1. Institute of Medicine. WIC nutrition risk criteria a scientific assessment. Washington (DC): National Academy Press; 1996; p. 100.

2. Behrman RE, Kliegman R, Jenson HB. Nelson textbook of pediatrics. Philadelphia (PA): Saunders; 2000.

3. Groh-Wargo S, Thompson M, Cox J, editors. Nutritional care for high-risk newborns. Rev. 3rd edition. Chicago (IL): Precept Press, Inc.; 2000.

4. Kessler DB, Dawson, P, editors. Failure to thrive and pediatric undernutrition, a transdisciplinary approach. Baltimore (MD): Paul H. Brooks Publishing Company, Inc.; 1999.

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References for High Risk

1. Meas T, Deghmoun S, Armoogum P, Alberti C, Levy-Marchal C. Consequences of being born small for gestational age on body composition: An 8-year follow-up study. *J Clin Endocrinol Metab.* 2008; 93(10):3804-3809.

2. Ibanez L, Ong K, Dunger DB, Zegher F. Early development of adiposity and insulin resistance after catch-up weight gain in small-for-gestational-age children. *J Clin Endocrinol Metab.* 2006; 91(6):2153-2158.

3. Wang X, Cui Y, Tong X, Ye H, Li S. Glucose and lipid metabolism in small-for-gestational age infants at 72 hours of age. *J Clin Endocrinol Metab.* 2007;92(2):681-684.

4. Clayton PE, Cianfarani S, Czernichow P, Johannsson G, Rapaport R, Rogol A. Management of the child born small for gestational age through to adulthood: A consensus statement of the international societies of pediatric endocrinology and the growth hormone research society. *J Clin Endocrinol Metab.* 2007; 92(3):804-810.

5. Singhal A, Cole TJ, Fewtrell M, Kennedy K, Stephenson T, Elias-Jones A, Lucas A. Promotion of faster weight gain in infants born small for gestational age: Is there an adverse effect on later blood pressure? *Circulation.* 2007;115:213-220.

152 Low Head Circumference (Infants and Children < 24 Months of Age)

Definition/ Cut-Off Value

Low head circumference for infants and children < 24 months of age is defined as follows:

Birth to < 24 months having ≤ 2.3rd percentile head circumference-for-age as plotted on the Centers for Disease Control and Prevention (CDC) Birth to 24 months gender specific growth charts (1) (available at: www.cdc.gov/growthcharts).*****

****** *Based on 2006 World Health Organization international growth standards (2). CDC labels the 2.3rd percentile as the 2nd percentile on the Birth to 24 months gender specific growth charts. For more information about the percentile cut-off, please see Clarification.*

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 for Growth Charts and Gestational Age Adjustment for Low Birth Weight and Very Low Birth Weight Infants.

Participant Category and Priority Level

Category	Priority	High Risk
Infants	I	N
Children	III	N

Parameters for Auto Assignment

Auto assigned for infants if head circumference is ≤ 2.3rd percentile (assignment based on adjusted gestational age if applicable).

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel for children.

Justification

The American Academy of Pediatrics recommends that all children have a head-circumference measurement at each well-child visit until 2 years of age (3). It is recommended that the measurements be plotted on gender specific growth charts to identify children with a head size or growth pattern that warrants further evaluation (3). Low head circumference (LHC) is associated with pre-term birth and very low birth weight (VLBW) as well as a variety of genetic, nutrition, and health factors (4). Head size is also related to socioeconomic status and the relationship is mediated in part by nutrition factors (4). LHC is indicative of future nutrition and health risk, particularly poor neurocognitive abilities (4). LHC among VLBW children is associated with lower IQ and poorer academic achievement (5). Some studies suggest that interventions to improve antenatal and postnatal head circumference growth may contribute to better scholastic outcomes (5).

Implications for WIC Nutrition Services

LHC alone does not necessarily indicate an abnormal head size. The diagnosis of LHC must also be based on the presence of other evidence and knowledge of the causes of LHC (5). Although WIC agencies may choose not to take head circumference measurements, referral

data that indicates LHC may be used to assign this risk.

Through client-centered counseling, WIC staff can assist families in making nutritionally balanced food choices to promote adequate growth. 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, 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 LHC 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.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Explore potential causes of low head circumference, such as:
  - Malnutrition during critical stages of brain development (from early fetal life through approximately 3 months past delivery). Mother's pre-pregnancy weight, fat stores, and weight gain during pregnancy are correlated with head size.
  - Genetic disorders such as autosomal and sex chromosome abnormalities
  - Health factors including: PKU, exposure to neurotoxic substances, cocaine and alcohol use during pregnancy, intracranial hemorrhages, perinatal asphyxia, ischemic brain injury, and other major congenital CNS abnormalities
- Explain risks associated with low OFC:
  - Poor neurocognitive abilities
  - Lower IQ
  - Growth or developmental retardation
  - Increased morbidity
- Poor nutrition affects weight first, then height, then head circumference; thus a small head circumference may indicate advanced malnutrition
- Preterm, black, and Asian children may be smaller, but should not fall

< 10th percentile

References

1. Centers for Disease Control and Prevention. Use of World Health Organization and CDC growth charts for children aged 0-59 months in the United States. MMWR 2010; 59(No. RR-9). Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5909a1.htm?s_cid=rr5909a1_w. Accessed September 2010.
2. World Health Organization. WHO child growth standards: Length/height-for-age, weight-for-age, weight for height and body mass index-for-age: Methods and development. Geneva, Switzerland: World Health Organization; 2006. Available at: http://www.who.int/childgrowth/publications/technical_report_pub/en/index.html. Accessed September 2010.
3. Hagan JF, Shaw JS, Duncan PM, editors. Bright futures: Guidelines for health supervision of infants, children and adolescents. 3rd ed. Elk Grove, IL: American Academy of Pediatrics; 2008.
4. Institute of Medicine. WIC nutrition risk criteria a scientific assessment. Washington (DC): National Academy Press; 1996.
5. Peterson J, Taylor HG, Minich N, Hack M. Subnormal head circumference in very low birth weight children: neonatal correlates and school-age consequences. Early Hum Dev. 2006 May; 82(5):325-34.

153 Large for Gestational Age

Definition/ Cut-Off Value

Birth weight ≥ 9 pounds (≥ 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	High Risk
Infants	I	N

Parameters for Manual Assignment

Must be manually selected by designating LGA on the birth measurement Anthropometric record.

Justification

Infant mortality rates are higher among full-term infants who weigh > 4,000 g (> 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 age 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).

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Explain potential risks of LGA, such as:
  - Childhood/adult obesity
  - Developmental or intellectual retardation
  - If also premature, higher mortality and morbidity rates

References

1. Institute of Medicine. WIC nutrition risk criteria a scientific assessment. Washington (DC): National Academy Press; 1996. p. 117.

2. Behrman RE, Kliegman R, Jenson HB. Nelson textbook of pediatrics. Philadelphia (PA): Saunders; 2000. p. 384.

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201 Low Hematocrit/Low Hemoglobin

Definition/ Cut-Off Value

Hematocrit or hemoglobin 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 provided in the attached Tables 201-A and 201-B, based on the levels established by the Centers for Disease Control and Prevention (CDC). Adjustments for smoking and/or altitude are optional for State agencies as long as the cut-off values used are those indicated on the CDC tables. Table 201-C includes a table of rounded hematocrit values adapted from CDC for those WIC agencies that obtain hematocrits only in whole numeric values.

High risk = hematocrit > 3 percent below anemia cutoff or hemoglobin > 1 gm/dL below anemia cutoff. Example: If anemia is < 34.5% then high risk will be flagged when the hematocrit is < 31.5%.

Altitude Levels

Use the altitude level for the clinic area where the applicant lives. Altitude levels of Utah's WIC clinics are summarized in the table below.

District	County/Clinic	Altitude
Bear River	Logan	4000-4999
Bear River	Brigham City	4000-4999
Bear River	Tremonton	4000-4999
Bear River	Randolph	6000-6999
Bear River	Garden City	5000-5999
Central	Nephi	5119
Central	Eureka	6442
Central	*West Desert	7000
Central	Delta	4650
Central	Fillmore	5061
Central	Junction	5000-5999
Central	Loa	7020
Central	*Bullfrog	5200
Central	Hanksville	4666
Central	Manti	5800
Central	Mt. Pleasant	5700
Central	Richfield	5303
Davis	all clinics	4000-4999
Salt Lake	all clinics	4000-4999
Southeast	Moab	4000-4999
Southeast	Price	5000-5999
Southeast	Green River	4000-4999
Southeast	East Carbon	6000-6999
Southeast	Castle Dale	5000-5999
Southeast	Blanding	6000-6999
Southeast	Monticello	7000-7999
Southwest	St. George	2880
Southwest	Beaver	5895
Southwest	Panguitch	6670
Southwest	Cedar City	5800
Southwest	Parawon	5800
Southwest	Kanab	4925
Summit	*Coalville	5000-5999
Summit	Park City	7000-7999
Summit	Kamas	5000-5999

Tooele	Wendover	4000-4999
Tooele	Tooele	5000-5999
Tri-County	Vernal	5000-5999
Tri-County	Roosevelt	5000-5999
Utah County	all clinics	4000-4999
Wasatch	Wasatch	5000-5999
Weber/Morgan	Ogden	4000-4999
Weber/Morgan	Morgan	4000-4999

Note: The community is at a different altitude level than the WIC clinic. Assign nutrition risk based on the participant's community of residence.

Hematocrit/hemoglobin Cut-Off Values

Use the hematocrit/hemoglobin value listed in the table below for the clinic area where the applicant lives (adjusted for trimester of pregnancy (for pregnant women), smoking (for women), and age (for children)). Each value in the table is the cutoff below which is considered low iron. The high risk low iron value is described on page 85.

201- A Hematocrit Values

Altitude	Smoking	1st trimester Hct <	2nd trimester Hct <	3rd trimester Hct <	Postpartum 12 - <15 years Hct <	Postpartum 15 - <18 years Hct <	Postpartum ≥ 18 years Hct <	Infant 7- < 12 mo Hct <	Child 1-2 yrs Hct <	Child 2-< 5 yrs Hct <
0-2999 ft	Non smoker	33.0	32.0	33.0	35.7	35.9	35.7	32.9	32.9	33.0
	< 1 pack/day	34.0	33.0	34.0	36.7	36.9	36.7			
	1-2 pks/day	34.5	33.5	34.5	37.2	37.4	37.2			
	> 2 pks/day	35.0	34.0	35.0	37.7	37.9	37.7			
3000-3999 ft	Non smoker	33.5	32.5	33.5	36.2	36.4	36.2	33.4	33.4	33.5
	< 1 pack/day	34.5	33.5	34.5	37.2	37.4	37.2			
	1-2 pks/day	35.0	34.0	35.0	37.7	39.7	37.7			
	> 2 pks/day	35.5	34.5	35.5	38.2	38.4	38.2			
4000-4999 ft	Non smoker	34.0	33.0	34.0	36.7	36.9	36.7	33.9	33.9	34.0
	< 1 pack/day	35.0	34.0	35.0	37.7	37.9	37.7			

	1-2 pks/day	35.5	34.5	35.5	38.2	38.4	38.2			
	> 2 pks/day	36.0	35.0	36.0	38.7	38.9	38.7			
5000-5999 ft	Non smoker	34.5	33.5	34.5	37.2	37.4	37.2	34.4	34.4	34.5
	< 1 pack/day	35.5	34.5	35.5	38.2	38.4	38.2			
	1-2 pks/day	36.0	35.0	36.0	38.7	38.9	38.7			
	> 2 pks/day	36.5	35.5	36.5	39.2	39.4	39.2			
6000-6999 ft	Non smoker	35.0	34.0	35.0	37.7	37.9	37.7	34.9	34.9	35.0
	< 1 pack/day	36.0	35.0	36.0	38.7	38.9	38.7			
	1-2 pks/day	36.5	35.5	36.5	39.2	39.4	39.2			
	> 2 pks/day	37.0	36.0	37.0	39.7	39.9	39.7			
7000-7999 ft	Non smoker	36.0	35.0	36.0	38.7	38.9	38.7	35.9	35.9	36.0
	< 1 pack/day	37.0	36.0	37.0	39.7	39.9	39.7			
	1-2 pks/day	37.5	36.5	37.5	40.2	40.4	40.2			
	> 2 pks/day	38.0	37.0	38.0	40.7	40.9	40.7			

201-B Hemoglobin Values

Altitude	Smoking	1st trimester Hgb <	2nd trimester Hgb <	3rd trimester Hgb <	Postpartum 12 - <15 years Hgb <	Postpartum 15 - <18 years Hgb <	Postpartum ≥ 18 years Hgb <	Infant 7- < 12 mo Hgb <	Child 1-2 yrs Hgb <	Child 2-< 5 yrs Hgb <
0-2999 ft	Non smoker	11.0	10.5	11.0	11.8	12.0	12.0	11.0	11.0	11.1
	< 1 pack/day	11.3	10.8	11.3	12.1	12.3	12.3			
	1-2 pks/day	11.5	11.0	11.5	12.3	12.5	12.5			
	> 2 pks/day	11.7	11.2	11.7	12.5	12.7	12.7			
3000-3999 ft	Non smoker	11.2	10.7	11.2	12.0	12.2	12.2	11.2	11.2	11.3
	< 1 pack/day	11.5	11.0	11.5	12.3	12.5	12.5			
	1-2 pks/day	11.7	11.2	11.7	12.5	12.7	12.7			
	> 2 pks/day	11.9	11.4	11.9	12.7	12.9	12.9			
4000-4999 ft	Non smoker	11.3	10.8	11.3	12.1	12.3	12.3	11.3	11.3	11.4
	< 1 pack/day	11.6	11.1	11.6	12.4	12.6	12.6			
	1-2 pks/day	11.8	11.3	11.8	12.6	12.8	12.8			
	> 2 pks/day	12.0	11.5	12.0	12.8	13.0	13.0			

5000-5999 ft	Non smoker	11.5	11.0	11.5	12.3	12.5	12.5	11.5	11.5	11.6
	< 1 pack/day	11.8	11.3	11.8	12.6	12.8	12.8			
	1-2 pks/day	12.0	11.5	12.0	12.8	13.0	13.0			
	> 2 pks/day	12.2	11.7	12.2	13.0	13.2	13.2			
6000-6999 ft	Non smoker	11.7	11.2	11.7	12.5	12.7	12.7	11.7	11.7	11.8
	< 1 pack/day	12.0	11.5	12.0	12.8	13.0	13.0			
	1-2 pks/day	12.2	11.7	12.2	13.0	13.2	13.2			
	> 2 pks/day	12.4	11.9	12.4	13.2	13.4	13.4			
7000-7999 ft	Non smoker	12.0	11.5	12.0	12.8	13.0	13.0	12.0	12.0	12.1
	< 1 pack/day	12.3	11.8	12.3	13.1	13.3	13.3			
	1-2 pks/day	12.5	12.0	12.5	13.3	13.5	13.5			
	> 2 pks/day	12.5	12.2	12.7	13.5	13.7	13.7			

201-C Rounded Hematocrit Values

Altitude	Smoking	1st trimester Hct <	2nd trimester Hct <	3rd trimester Hct <	Postpartum 12 - <15 years Hct <	Postpartum 15 - <18 years Hct <	Postpartum ≥ 18 years Hct <	Infant 7- < 12 mo Hct <	Child 1-2 yrs Hct <	Child 2-< 5 yrs Hct <
0-2999 ft	Non smoker	33	32	33	36	36	36	33	33	33
	< 1 pack/day	34	33	34	37	37	37			
	1-2 pks/day	35	34	35	38	38	38			
	> 2 pks/day	35	34	35	38	38	38			
3000-3999 ft	Non smoker	34	33	34	37	37	37	34	34	34
	< 1 pack/day	35	34	35	38	38	38			
	1-2 pks/day	35.0	34	35	38	38	38			
	> 2 pks/day	36	38	36	39	39	39			
4000-4999 ft	Non smoker	34	33	34	37	37	37	34	34	34
	< 1 pack/day	35	34	35	38	38	38			
	1-2 pks/day	36	38	36	39	39	39			
	> 2 pks/day	36	35	36	39	39	39			
5000-5999 ft	Non smoker	35	34	35	38	38	38	35	35	35
	1-2 pks/day	36	35	36	39	39	39			

	> 2 pks/day	37	36	37	40	40	40			
	≥ 2 pks/day	37	36	37	40	40	40			
6000-6999 ft	Non smoker	35	34	35	38	38	38	35	35	35
	< 1 pack/day	36	35	36	39	39	39			
	1-2 pks/day	37	36	37	40	40	40			
	> 2 pks/day	37	36	37	40	40	40			
7000-7999 ft	Non smoker	36	35	36	39	39	39	36	36	36
	< 1 pack/day	37	36	37	40	40	40			
	1-2 pks/day	38	37	38	41	41	41			
	> 2 pks/day	38	37	38	41	41	41			

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	Hematocrit >3%ile OR Hemoglobin > 1 g/dl below cut-off
Breastfeeding	I	Hematocrit >3%ile OR Hemoglobin > 1 g/dl below cut-off
Postpartum	VI	Hematocrit >3%ile OR Hemoglobin > 1 g/dl below cut-off
Infant	I	Hematocrit >3%ile OR Hemoglobin > 1 g/dl below cut-off
Children	III	Hematocrit >3%ile OR Hemoglobin > 1 g/dl below cut-off

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.

Parameters for Auto Assignment

Auto assigned for all categories if hemoglobin is below specified value on table “Hemoglobin Levels Indicating Risk.”

High Risk Flag

Must be manually selected

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 iron 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 mild 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.

Justification for High Risk

Anemia is one of the most preventable and treatable nutritional deficiencies and is also one of the most common. Anemia during the first trimester is a risk factor for LBW and preterm birth. The greater the severity is of anemia in the pregnant woman, the higher the risk of preeclampsia, preterm delivery, LBW, or miscarriage. Maternal morbidities and LBW are also negatively associated with high hemoglobin levels >13.9 g/dL, which thicken the blood and slow oxygen delivery to tissues, causing cerebrovascular complications.

Iron deficiency and iron deficiency anemia (IDA) both have adverse effects on childhood cognitive and behavioral development. IDA in children occurs mostly between 6 months to 3 yrs of age when most repeated infections occur. Low hemoglobin levels are also a result from IDA and are a risk factor for lower respiratory tract infections (LRTI). Children younger than 5 years

of age suffer about an average of 5-6 episodes of LRTI every year. Anemia has been found to cause more episodes of pneumonia than bronchiolitis symptoms.

It is especially important to prevent an iron deficiency in infants and toddlers as this is a crucial time for growth and development. Anemia is known to have adverse effects on cognitive and behavioral development, which may be irreversible. Preventing anemia is a modifiable risk factor that can be treated with appropriate nutritional intervention. The WIC nutritionist can play an important role in decreasing the prevalence of this condition in women and children by:

- Providing a high iron food package
- Counseling
- Follow-up hematocrit/hemoglobin testing

References

1. Centers for Disease Control and Prevention. Criteria for anemia in children and childbearing-aged women. MMWR 1998:47: RR-3.

2. Centers for Disease Control and Prevention. Prenatal Nutrition Surveillance System User's Manual. Atlanta: CDC, 1994.

3. Institute of Medicine. Iron deficiency anemia: recommended guidelines for the prevention, detection, and management among U.S. children and women of childbearing age. National Academy Press, Washington, D.C.; 1993.

4. Institute of Medicine. Nutrition during pregnancy. National Academy Press, Washington, D.C.; 1990.

5. Institute of Medicine. WIC nutrition risk criteria a scientific assessment. National Academy Press, Washington, D.C.; 1996.

References for High Risk

1. Baker RD, Greer FR. Clinical Report—Diagnosis and Prevention of Iron Deficiency and Iron-Deficiency Anemia in Infants and Young Children (0-3 Year of Age). *American Academy of Pediatrics.* 2010.

2. Arapcic S. Impact of hemoglobin level on the development of ischemic heart disease. *HealthMed*. 2011;5:865-867.

3. Abeysena C, Jayawardana P, Seneviratne R. Maternal haemoglobin level at booking visit and its effects on adverse pregnancy outcome. *Australian and New Zealand Journal of Obstetrics and Gynaecology*. 2010; 50: 423-427.

4. Ali AA, Rayis DA, Abdallah TM, Elbashir MI, Adam I. Severe anaemia is associated with a higher risk for preeclampsia and poor perinatal outcomes in Kassala hospital, eastern Sudan. *BMI Research Notes*. 2011; 4:311

5. Malla T, Pathak OK, Malla KK. Is low hemoglobin level a risk factor for acute lower respiratory tract infections? *Journal of Nepal Paediatric Society*. 2010; 30:1.

6. Barton JC, Barton JC, Bertoli LF. Pica associated with iron deficiency or depletion: clinical and laboratory correlates in 262 non-pregnant adult outpatients. *BMC Blood Disorders*. 2010; 10:9.

211 Elevated Blood Lead Levels

(Effective as a manual selection when approved by USDA or as an automatic selection when implemented in VISION system)

Definition/Cut-Off Value

Blood lead level of ≥ 5 ~~10~~ µg/deciliter within the past 12 months

The lead level must be tested and documented by a qualified person in a local health department, physician's office, hospital, or lead treatment program.

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N
Infant	I	N
Children	III	N

Parameters for Auto Assignment

Auto assigned for all categories if blood lead level was tested in the last year and was ≥ 5 µg/dl as designated in the Blood panel. Auto assignment with the updated level of 5 µg/dl will be effective with computer change. Risk may be manually assigned in the meantime.

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.

•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)

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Explain potential risks of lead intake:
  Women:
  - Lead crosses the placenta and can be detrimental to a developing fetus
  - Lead stored in bone is mobilized during lactation, however effect is unknown
  - Increased blood pressure

  Infants, Children and Women:
  - Neurobehavioral and cognitive impacts including lower IQ
  - Damage to the central nervous system, kidneys, and hematopoietic (formation of red blood cells) systems
  - Increased risk of coma, convulsions, and death (at extremely high levels)
- Screen for PICA (may consume lead paint chips)
- Inform participant of potential sources of lead, such as:
  - Residual deposits (soil dust, old paint and plaster)
  - All homes built before 1978 have some lead based paint
  - Homes build before 1960 have the highest levels of lead based paint (The more intact the paint is, the less the risk of exposure.)
    - Corners and doorways and windows tend to deteriorate from friction even if painted over
  - Occupational exposure
  - Lead-containing imported containers used for serving or storing food or beverages
  - Lead-containing jewelry (particularly inexpensive imported necklaces that infants or children may put in their mouths)
  - *Note - gasoline, paint, and soldered cans no longer contain elevated levels of lead in the US
- Help participant find ways to eliminate lead exposure
- Review dietary intake and make the following recommendations:
  - Encourage low-fat diet because fat increases absorption of lead
  - Encourage regular meals because lead absorption is reduced on a full stomach

- Encourage consumption of WIC foods high in iron (cereal, beans, peanut butter), vitamin C (juice) and calcium (milk, cheese, beans) to help reduce absorption of lead
- Encourage adequate intake of calories, magnesium, zinc, thiamin, and vitamin E as they may also help reduce the absorption of lead (A vitamin supplement may be warranted.)

- Recommend blood lead level be retested within 12 months

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
  - http://ods.od.nih.gov/factsheets/Calcium-HealthProfessional/
  - Iron: Lentils and beans, fortified cereals, red meats, fish, and poultry 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.

References

1. Advisory Committee on Childhood Lead Poisoning Prevention. Low level lead exposure harms children: a renewed call for primary prevention. Atlanta, GA: US Department of Health and Human Services, CDC, Advisory Committee on Childhood Lead Poisoning Prevention; 2012.
2. National Center for Envrionmental Health. Guidelines for the identification and management of lead exposure in pregnant and lactation women. Atlanta, GA: Centers for Disease Control and Prevention, National Center for Environmental Health, U.S. Dept. of Health and Human Services, 2010.
3. Cleveland LM, Minter ML, Cobb KA, Scott AA, German VF. Lead Hazards for Pregnant Women and Children: Part 1. American Journal of Nursing. 2008;108(10):40-49.
4. Centers for Disease Control and Prevention. Managing Elevated Blood Lead Levels Among Young Children: Recommendations from the Advisory Committee on Childhood Lead Poisoning Prevention. Atlanta, GA: US Department of Health and Human Services, CDC, Advisory Committee on Childhood Lead Poisoning Prevention; 2002. P. 59-76

301 Hyperemesis Gravidarum

Definition/Cut-Off Value

Severe nausea and vomiting to the extent that the pregnant woman becomes dehydrated and acidotic.

Presence of Hyperemesis Gravidarum diagnosed by 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	High Risk
Pregnant	I	Y

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel.

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned.

Justification

Nausea and vomiting are common early in gestation; 50% or more of normal pregnant women experience some vomiting. However, pregnant women with severe vomiting during pregnancy are at risk of weight loss, dehydration, and metabolic imbalances. Nutrition risk is based on chronic conditions, not single episodes.

Justification for High Risk

Women who are experiencing hyperemesis gravidarum are at risk for weight loss, dehydration, and metabolic imbalances. Women with this condition may also be plagued with insomnia, extreme fatigue and nausea for most or all of the pregnancy.

Extreme weight loss (> 15% of pre-pregnancy weight) can be common among women with this condition and is labeled as a form of “prolonged starvation”. This state can have dire long-term effects that can be avoided with initial management of symptoms through diet and supportive counseling.

Women who are diagnosed with hyperemesis gravidarum are more likely to give premature birth and have LBW and SGA children. There is also a higher incidence of spontaneous preterm birth. Aside from physical symptoms, women may also experience cognitive, behavioral and emotional dysfunction associated with hypermesis gravidarum.

The WIC nutritionist can play a vital role in helping pregnant women identify triggers for nausea and develop their own techniques and diet for relief and ultimately help them experience the joys of pregnancy. WIC services can also help prevent further weight loss and provide education on how to avoid dehydration.

Additional Counseling Guidelines

- Encourage participant to keep a diary to identify triggers for nausea - include time of day, foods eaten, smells, activities, and stimuli like lights and noise.
- Recommend appropriate calorie and fluid intake.
- Recommend small, frequent meals.
- Encourage eating foods that are craved.
- Experiment with different types of foods such as salty, bitter or sour.
- Encourage foods that are rich in carbohydrates and low in fat and acid.
- Electrolyte-replacement drinks and oral nutritional supplements may be advisable to maintain electrolyte balance.
- Protein-predominant meals may help to reduce nausea.
- Counsel women to discuss possibility of calcium supplementation with their health care provider.

References

1. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 166-168.

2. Erick M. *No More Morning Sickness - A Survival Guide for Pregnant Women*. New York, NY: Plume; 1993.

References for High Risk

1. Fejzo MS, Poursharif B, Korst LM, Munch S. MacGibbon KW, Romero R, Goodwin TM. Symptoms and pregnancy outcomes associated with extreme weight loss among women with hyperemesis gravidarum. *J Womens Health*.2009;18(12):1981-1987. Doi: 10.1089/jwh.2009.1431.

2. Jueckstock JK, Kaestner R, Mylonas I. Managing hyperemesis gravidarum: a multimodal challenge. *BMC Medicine*. 2010;8:46. www.biomedcentral.com/1741-7015/8/46.

3. Veenendaal MVE, van Abeelen AFM, Painter RC, van der Post JAM, Rosenboom TJ. Consequences of hyperemesis gravidarum for offspring: a systematic review and meta-analysis. *BJOG*. 2011;118:1301-1313.

4. McCarthy RP, Khashan AS, North RA, Moss-Morris R, Baker PN, Dekker G, Poston L, Kenny LC. A prospective cohort study investigating associations between hyperemesis gravidarum and cognitive behavioural and emotional well-being in pregnancy. PLoS One. 6(11):e27678. Doi 10.1371/journal.pone.0027678.

5. Power Z. Thomson AM, Waterman H. Understanding the stigma of hyperemesis gravidarum: qualitative findings from an action research study. *BIRTH*. 2010; 37(3)237-244.

302 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 pregnancy (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	High Risk
Pregnant	I	Y

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel.

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned.

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, impaired 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.

Justification for High Risk

Data suggests that even minor abnormalities in maternal glucose metabolism will cause increases in infant birth weight and put mother and infant at risk for complications. These

complications include birth weight above 90th percentile, cesarean delivery, hypoglycemia, premature delivery, preeclampsia, birth injury, NICU admission and hyperbilirubinemia. Increased maternal blood glucose levels at 24-28 weeks increases these risks associated with GDM and adiposity. Even if levels are below the threshold of diabetes; it is important to monitor blood glucose during pregnancy. Mothers with GDM are also at an increased risk of developing type-2 diabetes later in life when compared to women who did not have gestational diabetes (4).

Women who had mild gestational diabetes reduced the risk of fetal overgrowth, caesarean delivery and hypertensive disorders, when treated with nutritional counseling, diet therapy and insulin injections (if required). The WIC nutritionist can play a vital role in assuring the participant receives comprehensive counseling and follow-up by appropriate health care providers outside of WIC.

Additional Counseling Guidelines

- Remember, women with gestational diabetes often feel well and are in their last trimester of pregnancy; therefore they may be casual about their treatment
- Emphasize the positive outcomes for treatment with gestational diabetes
- Explain potential risks to mother, such as:
    - Fatigue
    - Difficult labor and cesarean delivery
    - Increased risk of infection
    - Toxemia and preeclampsia
    - Diabetes after the pregnancy ends
- Inform participant of potential risks to infant, such as:
    - Large birth size (macrosomia)
    - Low blood sugar after birth
    - Jaundice
    - Respiratory distress syndrome
    - Cardiovascular problems
    - Kidney dysfunction
    - Hypocalcemia
    - Fetal death in extreme cases
- Explain relationship between diet, insulin and exercise
- Provide basic counseling on diet which provides nutrient needs for pregnancy and facilitates normal blood glucose levels:
    - Encourage participant to consume calories adequate for recommended weight gain but not excessive weight gain
    - Recommend diet which contains approximately 40-50% carbohydrate, 20-25% protein and 30-35% fat
    - Activity Factor - Add 40-60% of basal needs for light activity

- Keep timing of meals consistent from day to day with calorie and carbohydrate content fairly evenly divided from meal to meal
- Recommend increased intake of high fiber foods and complex carbohydrates
- Counsel on importance of not consuming foods high in refined sugar and juice
- Plan for food to be taken to correct hypoglycemic episodes
- Plan for food and fluids to be taken for periods of increased physical activity and illness
- Plan for a bedtime snack to prevent nocturnal hypoglycemia
- Eat mid-morning and mid-afternoon snacks, if needed
- Encourage moderate regular exercise
    - Best to exercise after snack or meal
    - Don't exercise if blood glucose is < 80 mg/dL or higher than 250 mg/dL
    - Take carbohydrate in case of hypoglycemia
    - Always exercise with a partner in case blood sugar drops
- Stress importance of maternal follow-up during prenatal period, postpartum period and annually
- Stress importance of maintaining healthy body weight

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:

- 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).

- 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 to 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).

References

1. American Diabetes Association: Diagnosis and classification of diabetes mellitus. Diabetes Care. Jan 2008; 31 Suppl 1:S55-60.

2. Franz MJ, Biastre SA, Slocum J. Diabetes in the life cycle and research. In: Gestational Diabetes – A core curriculum for diabetes education, American Association of Diabetes Educators. 5th ed. 2003.

3. American Diabetes Association. Gestational diabetes mellitus (position statement). Diabetes Care. 2003; 26 Suppl 1:S103-105.

4. Ferrara, A. Increasing prevalence of gestational diabetes mellitus: a public health perspective. Proceedings of the fifth international workshop – conference on Gestational Diabetes Mellitus. Diabetes Care. Jul 2007; 30 Suppl 2:S141-46.

5. American Diabetes Association. Standards of medical care in diabetes (position statement). Diabetes Care. Jan 2007; 30 Suppl 2:S4-41.

6. Thomas AM, Gutierrez YM. American Dietetic Association guide to gestational diabetes mellitus in postpartum considerations. Eds. American Dietetic Association; 2005:101-113.

7. Brian SR, Nickless N, Thung SF, Inzucchio SE. Gestational diabetes update.: screening, medical management and follow-up. Practical Diabetology. Mar 2007;10-18.

8. American Diabetes Association. Diagnosis and classification of diabetes mellitus. Diabetes Care. 2008 Jan; 31 Suppl 1:S55-60.

9. Ratner, RE. Prevention of type 2 diabetes in women with previous gestational diabetes. Proceedings of the fifth international workshop – conference on gestational diabetes mellitus. Diabetes Care. Jul 2007; 30 Suppl 2 :S242-245.

10. Evert AG, Vande Hei K. Gestational diabetes education and diabetes prevention strategies. Diabetes Spectrum. 2006; 19(3):135-139.

References for High Risk

1. The HAPO Study Cooperative Research Group. Hyperglycemia and adverse pregnancy outcomes. *N Engl J Med.* 2008;358:1991-2002.

2. The HAPO Study Cooperative Research Group. Hyperglycemia and adverse pregnancy outcome (HAPO) study: associations with neonatal anthropometrics. *Diabetes* 2009;58:453-459.

3. Landon MB, Spong CY, Thom E, et. al. A multicenter, randomized trial of treatment for mild gestational diabetes. *N Eng J Med.* 2009;361:1339-1348.

4. Bellamy L, Casas JP, Hingorani AD, Williams D. Type 2 diabetes mellitus after gestational diabetes: a systematic review and meta-analysis. *Lancet* 2009; 373:1773-1779.

5. International Association of Diabetes and Pregnancy Study Groups Consensus Panel. International association of diabetes and pregnancy study groups recommendations on the diagnosis and classification of hyperglycemia in pregnancy. *Diabetes Care* 2010;33:676-682.

6. American Diabetes Association. Diagnosis and classification of diabetes mellitus. *Diabetes Care* 2012; 35(Suppl 1):S64-S71.

7. American Diabetes Association. Standards of medical care in diabetes—2012. *Diabetes Care* 2012;35(Suppl 1):S11-S63.

8. Committee on Obstetric Practice. Screening and diagnosis of gestational diabetes mellitus. Obstet Gynecol 2011;118:751-753.

303 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 physician's orders.

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel

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.

Women with a history of GDM but without immediate subsequent postpartum diagnosis of diabetes should be advised to discuss with their medical provider the importance of having a Glucose Tolerance Testing (GTT) at 6 to 12 weeks postpartum (see Clarification, Table 1); to have a pre-pregnancy consultation before the next 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) 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 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 prepregnancy weight 6 to 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.

Justification for High Risk

Not applicable

References

1. Evert AG, Vande Hei K. Gestational diabetes education and diabetes prevention strategies. Diabetes Spectrum. 2006; 19 (3):135-139.

2. Franz MJ, Biastre SA, Slocum J. Diabetes in the life cycle and research. In: Gestational diabetes - A core curriculum for diabetes education, American Association of Diabetes Educators. 5th ed. 2003; 145-163.

3. Thomas AM, Gutierrez YM. American Dietetic Association guide to gestational diabetes mellitus in postpartum considerations. Eds. American Dietetic Association. 2005; 101-113.

4. Kitzmiller JL, Dang-Kilduff L, Taslimi MM. Gestational diabetes after delivery: short-term management and long-term risks. Proceedings of the fifth international workshop — conference on Gestational Diabetes Mellitus. Diabetes Care. Jul 2007; 30 Suppl 2:S225-231.

5. Ratner RE. Prevention of type 2 diabetes in women with previous gestational diabetes. Proceedings of the fifth international workshop — conference on Gestational Diabetes Mellitus. Diabetes Care. Jul 2007; 30 Suppl 2:S242-245.

6. Reader DM. Medical nutrition therapy and lifestyle interventions. Proceedings of the fifth international workshop — conference on Gestational Diabetes Mellitus. Diabetes Care. Jul 2007; 30 Suppl 2:S188-193.

304 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 order.

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel

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 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.

Justification for High Risk

Not Applicable

References

1. American Dietetic Association. Nutrition Care Manual. Hypertension; 2006. http://www.nutritioncaremanual.org. Accessed May 2009.

2. National Heart, Lung, and Blood Institute, 2000, Working group report on high blood pressure in pregnancy; 2000 Jul. NIH Publication No. 00-3029

3. Irani RA, Xia Y. The functional role of the rennin-antiotensin system in pregnancy and preeclampsia. Placenta. 2008; 763-771.

4. Roberts JM, Bodnar LM. Report on the WIC nutrition risk criteria for hypertension in pregnancy. July 2007. Unpublished.

5. National Heart Lung and Blood Institute: www.nhlbi.gov Accessed May 2009.

6. U.S. Department of Health and Human Services. 2008 Physical activity guidelines for Americans. www.health.gov/paguidelines. p. 41-42. Accessed May 2009.

7. Gaugler-Senden, I, Berends A, deGroot C, Steegers E.: Severe, very early onset preeclampsia: subsequent pregnancies and future cardiovascular health. European Journal of Obstetrics and Gynecology and Reproductive Biology. 2008:171-177.

8. Institute of Medicine. Weight gain during pregnancy: reexamining the guidelines (Prepublication Copy). National Academy Press, Washington, D.C.; 2009

311 History of Preterm Delivery

Definition/Cut-Off Value

Birth of an infant at ≤ 37 weeks gestation

Pregnant Women:

Any history of preterm delivery

Breastfeeding/Non-Breastfeeding:

Most recent pregnancy

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel

Justification

Preterm birth causes at least 75% of neonatal deaths not due to congenital malformations (1). In most cases of preterm labor, the cause is unknown. 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. A history of one previous preterm birth is associated with a recurrent risk of 17-37% (2, 3); the risk increases with the number of prior preterm births and decreases with the number of term deliveries.

Justification for High Risk

Not Applicable

References

1. Preterm Labor; ACOG Technical Bulletin; No. 206; June 1995.

2. Hoffman HJ, Bakketeig LS.: Risk factors associated with the occurrence of preterm birth; Clin Obstet Gynecol; 1984; 27:539-522.

3. Keiirse MJNC, Rush RW, Anderson AB, Turnbull AC: Risk of preterm delivery in patients with a previous preterm delivery and/or abortion; Br J Obstet Gynecol; 1978; 85:81.85.

312 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/Non-Breastfeeding:

Most recent pregnancy

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N

Parameters for Auto Assignment

Auto assigned for breastfeeding and non-breastfeeding women if infant birth weight from the most recent pregnancy was ≤ 5.5 pounds.

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel for Pregnant category

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).

Justification for High Risk

Not Applicable

References

1. Institute of Medicine: Committee to Study the Prevention of Low Birth Weight: Preventing Low Birth Weight; 1985; p. 51.

2. Institute of Medicine: Nutrition During Pregnancy; National Academy Press; 1990, pp. 176 211

3. Kramer: Intrauterine Growth and Gestational Duration Determents. Pediatrics; October 1987; 80(4):502-511.

321 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 loss or two 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 Women:

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	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel

Justification

Pregnancy:

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.

Spinnillo et al found that the risk for future small for gestational age outcomes increased two fold if a woman had 2 or more spontaneous abortions. Adverse outcomes related to history of spontaneous abortion include recurrent spontaneous abortions, 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 spontaneous abortion has been implicated as an indicator of a possible neural tube defect in a subsequent pregnancy. Women who have just had a spontaneous abortion 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.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Acknowledge participant's loss, and provide sensitive, compassionate counseling
- Explain importance of maintaining health and nutritional status

References

1. Spinnillo, A, et al: Maternal high risk factors and severity of growth deficit in small gestational age infants; Ear Human Dev; 1994; 38:35-43.

2. Thorn, D.H.: Spontaneous abortion and subsequent adverse birth outcomes; Am J Obstet Gyn; 1992; 111-6.

3. Carmi, R. et al: Spontaneous abortion-high risk factor for neural tube defects in subsequent pregnancy; Am J of Med Gen: 1994; 51:93-97.

4. Paz, J. et al: Previous miscarriage and stillbirth as risk factors for other unfavorable outcomes in the next pregnancy; Bri J of Obstet Gyn: October 1999; 808-812.

5. Institute of Medicine: Committee to Study the Prevention of Low Birth Weight: Preventing Low Birth Weight; 1985; p. 51.

6. Shapiro, S, LF Ross, and HS Levine: Relationship of Selected Prenatal Factors to Pregnancy Outcome and Congenital Anomolies. Am.J.Public Health;

February 1965; Vol. 55, No. 2; pp. 268-282.

7. Preterm Labor; AGOG Technical Bulletin, No. 206; June 1995. Institute of Medicine: Nutrition During Pregnancy; National Academy Press; 1990; pp. 176-211.

8. Kramer: Intrauterine Growth and Gestational Duration Determents. Pediatrics; October 1987; 80(4):502-511.

331 Pregnant < 18 Years at Conception

Definition/Cut-Off Value

Conception < 18 years of age

Pregnant Women:

Current pregnancy

Breastfeeding/ Non-Breastfeeding:

Most recent pregnancy

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	Y
Breastfeeding	I	N
Non-Breastfeeding	VI	N

Parameters for Auto Assignment

Pregnant Women:

Auto assigned if LMP minus birth date is < 16 years

Breastfeeding/ Non-Breastfeeding:

Auto assigned if LMP minus birth date is ≥ 16 and < 18 years

High Risk Flag

The high risk designation will automatically activate when both risk factors are assigned.

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.

Justification for High Risk

Pregnant teens are at risk for poor birth outcomes and can benefit from individualized follow-up, support, and encouragement to meet dietary and weight gain goals.

Infants of teen pregnancies are at a higher risk for abnormalities of the central nervous system, the gastrointestinal system and musculoskeletal anomalies, including cleft lip and missing or extra fingers and toes. A shorter interval between menarche and the first pregnancy leads to an increased risk, leading researchers to suggest that these congenital defects may be from young

mothers being biologically immature. Poor outcomes are more prevalent in teen pregnancies when they engage in high risk behaviors such as smoking, illegal drug use, and poor diet. Another possible explanation is the fact that this population has low vitamin supplementation and is more likely to receive late prenatal care (4).

Postnatal adolescent girls have higher weight retention when compared to older postnatal women, even if lean body mass is similar. The extra weight consists mostly of fat mass which increases the teen's risk for obesity later in life (5). Pregnant teens are also twice as likely to develop hypertensive problems and to deliver preterm and LBW babies.

Although there are existing studies that suggest teenage pregnancies are not high risk, an extremely large study comprised of 3.8 million women found that teenage pregnancy does in fact increase the risk of adverse birth outcomes. These risks include pre-term delivery, SGA, LBW, and infant mortality independent of inadequate prenatal care, low socioeconomic status (SES) and poor weight gain during pregnancy. This study specifically found that poor pregnancy outcomes increased as maternal age decreased, where these outcomes were less likely to be attributed to low SES and poor prenatal care.

Additional Counseling Guidelines

- Support weight gain as normal part of pregnancy process
- Explain need for the body to change to support pregnancy
- Explain potential risk of low weight gain:
    - Low birth weight infant
    - Premature infant
- Encourage adequate prenatal care
- Encourage prenatal vitamin supplementation
- Promote overall healthy eating
- Counsel on avoidance of alcohol, drugs, and smoke exposure

References

1. Institute of Medicine: Nutrition During Pregnancy; National Academy Press; 1990; pp. 74, 269, 279.

2. Storey, M.: Nutrition Management of the Pregnant Adolescent; A Practical Reference Guide; USDA and March of Dimes; DHHS; 1990; pp. 21-26.

3. Endres: Older pregnant women and adolescents: Nutrition data after enrollment in WIC; J. of Am. Diet. Assn.; August 1987; 87(8):1011-1019.

4. Kennedy and Kotlechuck: The effect of WIC supplemental feeding on birth weight: A case control analysis; Am. J. of Clin. Nutr.; September 1984; 40:579-585.

References for High Risk

1. Chen X, Wen SW, Fleming N, Yang Q, Walker MC. Teenage pregnancy and congenital anomalies: which system is vulnerable? *Human Reproduction.* 2007;22(6):1730-1735.

2. Thame MM, Jackson MD, Manswell IP, Osmond C, Antoine MG. Weight retention within the puerperium in adolescents: a risk factor for obesity? *Public Health Nutrition.* 2009;13(2):283-288.

3. Chen W, Wen SW, Fleming N, Demissie K, Rhoads GG, Walker M. Teenage pregnancy and adverse birth outcomes: a large population based retrospective cohort study. *International Journal of Epidemiology.* 2007;36:368-373.

4. Mahavarkar SH, Madhu CK, Mule VD. A comparative study of teenage pregnancy. *Journal of Obstetrics and Gynaecology.* 2008;28(6):604-607.

5. Moran VH. Nutritional status in pregnant adolescents: a systematic review of biochemical markers. *Maternal and Child Nutrition.* 2007;3:74-93.

332 Short Interpregnancy Interval ~~Closely Spaced Pregnancies~~

(Effective as a manual selection when approved by USDA or as an automatic selection when implemented in VISION system)

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

Note: The evidence-based information supporting this criterion is specific to live births and did not include women who had miscarriages or stillbirths. Thus, the definition for this criterion is specific only to women who experienced live births. Women whose pregnancies did not result in a live birth may be assigned, as appropriate, Risk #321 *History of Spontaneous Abortions, Fetal or Neonatal Loss*.

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	IPI* < 6 months
Breastfeeding	I	N
Non-Breastfeeding	VI	N

*IPI refers to interpregnancy interval

Parameters for Auto Assignment

Auto assigned if last pregnancy ended < ~~16~~ 18 months before LMP.
(~~24~~ 26 months - 9 month pregnancy = ~~16~~ 18 month interpregnancy interval)

Note: The 332 risk is based on the presence of two pregnancy records. This risk is assigned when there is less than ~~16~~ 18 months between the current pregnancy Last Menstrual Period and the previous pregnancy Actual Delivery Date.

High Risk Flag

Must be manually selected for pregnant women with an IPI < 6 months

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 cut- off 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).

Justification for High Risk

Women with interpregnancy intervals (IPI) of less than 6 months are at greater risk for early spontaneous preterm birth (<34 weeks) (1). It has also been shown that these women are at much greater risk for delivering a low birth weight or small for gestational age infant when compared to women with an IPI greater than 6 months. While the causality has not yet been determined, it has been suggested that the mother has had inadequate time to replete nutrient stores. The lack of nutritional reserves may not be adequate to support proper fetal growth and development. Lack of folate in particular has been shown to increase risk of growth restriction (2).

Additional Counseling Guidelines

- Explain that closely spaced pregnancies leave less time to replenish nutrient stores; therefore good nutrition is very important during this pregnancy
- Explain benefits of spacing pregnancies
    - Less risk for preterm birth, low birth weight, and infant mortality
    - More time for mother's body to replenish nutrient stores
    - More time for mom and baby to strengthen their nurturing relationship
    - More time to enjoy breastfeeding
- Encourage early initiation of prenatal vitamin
- Encourage talking to doctor about additional folate supplementation

Implications for WIC Nutrition Service

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

Clarification

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)

References

1.Conde-Agudeloa A, Rosas-Bermúdez A, Kafury-Goeta AC. Birth spacing and risk of adverse perinatal outcomes: a meta-analysis. JAMA. 2006;295(15):1809-1823.

2.Shachar BZ and Deirdre JL. Interpregnancy Interval and Obstetrical Complications. Obstet Gynecol Surv. 2012;67(9):584-596.

3.World Health Organization. Report of a WHO technical consultation on birth spacing. Geneva, Switzerland, 13–15 June 2005. 2006;1-44.

4.Conde-Agudelo A, Rosas-Bermudez A, Castaño F, Norton MH. Effects of birth spacing on maternal, perinatal, infant, and child health: a systematic review of causal mechanisms. Stud Fam Plann. 2012;43(2):93-114.

5.Conde-Agudelo A, Belizán JM. Maternal morbidity and mortality associated with interpregnancy interval: cross sectional study. BMJ. 2000;321(7271):1255-9.

6.Conde-Agudelo A, Rosas-Bermúdez A, Kafury-Goeta AC. Effects of birth spacing on maternal health: a systematic review. Am J Obstet Gynecol. 2007;196(4):297-308.

7.U.S. Department of Health and Human Services. Office of Disease Prevention and Health Promotion. Healthy People 2020. [cited 2015 Feb 1]. Available from: http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=13.

8.Shipp TD, Zelop CM, Repke JT, Cohen A, Lieberman E. Interdelivery Interval and Risk of Symptomatic Uterine Rupture. Obstet Gynecol. 2001;97:175–7.

9.Stamilio DM, DeFranco E, Pare´ E, Odibo AO, Peipert JF, Allsworth JE, et al. Short Interpregnancy Interval: Risk of Uterine Rupture and Complications of Vaginal Birth After Cesarean Delivery. Obstet Gynecol. 2007;110:1075–82.

10. Shachar BZ, Mayo J, Lyell D, Stevenson D, Shaw G. Interpregnancy interval length and risk of preterm birth, a large US study. American Journal of Obstetrics & Gynecology. 2014; 210(1)Suppl:S373. Abstract. Poster Session V, Number 760.

11. Chen I, Jhangri GS, Chandra S. Relationship between interpregnancy interval and congenital anomalies. Am J Obstet Gynecol. 2014;210(6):564.e1–564.e8.

12. Cheslack-Postava K, Liu K, Bearman PS. Closely Spaced Pregnancies Are Associated With Increased Odds of Autism in California Sibling Births. Pediatrics. 2011;127(2):246-53.

13. Gunnes N, Surén P, Bresnahan M, Hornig M, Lie KK, Lipkin WI, et al. Interpregnancy Interval and Risk of Autistic Disorder. Epidemiology. 2013;24:906–912.

14. Bujold E, and Gauthier R J. Risk of Uterine Rupture Associated With an Interdelivery Interval Between 18 and 24 Months. Obstet Gynecol. 2010;115(5):1003–6.

15. Huang WH, Nakashima DK, Rumney PJ, Keegan KA Jr, Chan K. Interdelivery interval and the success of vaginal birth after cesarean delivery. Obstet Gynecol. 2002;99(1):41-4.

16. The American College of Obstetricians and Gynecologists, Women's Health Care Physicians. ACOG Practice bulletin no. 115: Vaginal birth after previous cesarean delivery. Obstet Gynecol. 2010;116(NO.2 Pt 1):450-63.

17. King JC. The Risk of Maternal Nutritional Depletion and Poor Outcomes Increases in Early or Closely Spaced Pregnancies. J. Nutr. 2003;133:1732S–1736S.

18. van Eijsden M, Smits LJ, van der Wal MF, Bonsel GJ. Association between short interpregnancy intervals and term birth weight: the role of folate depletion. Am. J. Clin. Nutr. 2008;88(1):147-53.

19. Smits LJ, Essed GG. Short interpregnancy intervals and unfavorable pregnancy outcome: role of folate depletion. Lancet. 2001;358:2074-7.

20. Dunlop AL, Dubin C, Raynor BD, Bugg GW Jr, Schmotzer B, Brann AW Jr. Interpregnancy primary care and social support for African-American women at risk for recurrent very-low-birthweight delivery: a pilot evaluation. Matern Child Health J. 2008;12(4):461-8.

21. Centers for Disease Control and Prevention. Use of Supplements Containing Folic Acid Among Women of Childbearing Age --- United States, 2007. MMWR. 2008;57(01);5-8.

22. Finer LB, Zolna MR. Shifts in intended and unintended pregnancies in the United States, 2001-2008. Am J Public Health. 2014;104: S43–S48.

23. Conde-Agudeloa A, Belizána JM, Bremanb R, Brockmanb SC, Rosas-Bermudez A. Effect of the interpregnancy interval after an abortion on maternal and perinatal health in Latin America. Int J Gynaecol Obstet. 2005;89(1):S34–S40.

24. Love ER, Bhattacharya, Siladitya; Smith NC, Bhattacharya Sohinee. Effect of interpregnancy interval on outcomes of pregnancy after miscarriage: retrospective analysis of hospital episode statistics in Scotland. BMJ. 2010;341:c3967.

25. Bhattacharya, Sohinee; Smith N. Pregnancy following miscarriage: what is the optimum interpregnancy interval? Women's Health. 2011;7(2):139-141.

High Risk References

1. Rodrigues T, Barros H. Short interpregnancy interval and risk of spontaneous preterm delivery. Eur. J Obstet. Gynecol. 2007.

2. Van Eijsden M, Smits LJM, Van der Wal MF, Bonsel GJ. Association between short interpregnancy intervals and term birth weight: the role of folate depletion. Am J Clin Nutr. 2008;88:147-53.

3. DaVanzo J, Hale L, Razzaque A, Rahman M. Effects of interpregnancy interval and outcome of the preceding pregnancy on pregnancy outcomes in Metlab, Bangladesh. 2007;114:1079-1087.

4. Conde-Agudelo A, Rosas-Bermudez A, Kafury-Goeta AC. Birth Spacing and Risk of Adverse Perinatal Outcomes. JAMA. 2006;295(15)1809-1823.

5. Grisaru-Granovsky S, Gordon ES, Haklai Z, Samueloff A, Schimmel MM. Effect of interpregnancy interval on adverse perinatal outcomes – a national study. Contraception. 80 (2009): 512-518.

333 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/ Non-Breastfeeding:

Most recent pregnancy

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N

Parameters for Auto Assignment

Auto assigned for pregnant women if LMP at < 20 years of age and ≥ 3 previous pregnancies at least 20 weeks duration.

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.

Justification for High Risk

Not Applicable

References

1. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 201-204.

2. Kramer et al.: Determinants of low birth weight: Methodological assessment and meta - analysis. Bull. World Health Organization; 1987; 65:663-73.

3. MacLeod & Kiely: The effects of maternal age and parity on birthweight: A population based study in New York City; Int. J. Gynecol. Obstet; 1988; 26:11-19.

4. Taffel: Trends in low birthweight: United States, 1975 - 1985. Centers for Disease Control, National Center for Health Statistics; 1989.

334 Lack of Prenatal Care

Definition/Cut-Off Value

Prenatal care beginning after the 1st trimester (after 13th week) of pregnancy

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	3rd Trimester

Parameters for Auto Assignment

Auto assigned if Nutrition Interview states prenatal care began after the 13th week of pregnancy.

High Risk Flag

Must be manually selected

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). 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).

Justification for High Risk

The scientific literature indicates that prenatal care initiated in the third trimester has been associated with increased risk of:

- Neonatal death
- Stillborn infant
- Prematurity
- Low birth weight

Prenatal care is a primary component of preventive care for pregnant women. Early and regular prenatal care provides an opportunity for maternal and fetal screening, diagnosis, and treatment of complications. Women who reported not receiving all recommended advice (i.e., breastfeeding, taking vitamins, eating a proper diet, avoiding alcohol, tobacco, and drugs, maintaining proper weight gain) were more likely to deliver a low birth weight infant than women who reported receiving this advice (1). Lack of prenatal care has also been associated with birth of a small for gestational age (SGA) infant (3).

Studies have also shown that most women who do not receive early and adequate prenatal care are often in a demographic category that is already at risk for poor pregnancy outcomes (4).

Additional Counseling Guidelines

- Explain importance of receiving early and adequate prenatal care

References

1. The American Academy of Pediatrics and the American College of Obstetricians and Gynecologists: Guidelines for Perinatal Care; 4th ed., Chapter 4; Washington, D.C.;

August 1997.

2. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 208-210.

3. Kessner DM, Singer J, Kalk CE, Schlesinger ER: Infant Death: An Analysis by Maternal Risk and Health Care. Contrasts in Health Status; Vol. I, Washington, DC; Institute of Medicine; National Academy of Sciences; 1973.

4. Centers for Disease Control and Prevention: Prenatal Nutrition Surveillance System User's Manual. Atlanta, GA: CDC; 1994; page 8.

References for High Risk

1. White DE, Fraser-Lee NJ, Tough S, Newburn-Cook, CV. The content of prenatal care and its relationship to preterm birth in Alberta, Canada. *Health Care for Women International*. 2006;27:777-792.

2. Chen XK, Wen SW, Yang Q, Walker MC. Adequacy of prenatal care and neonatal mortality in infants born to mothers with and without antenatal high-risk conditions. *Australian and New Zealand J of Obstet and Gynecol*. 2007; 47:122-127.

3. Heaman MI, Newburn-Cook CV, Green CG, Elliott LJ, Helewa ME. Inadequate prenatal care and its association with adverse pregnancy outcomes: A comparison of indices. *BMC Pregnancy and Childbirth*. 2008; 8:15-23.

4. Phillippi JC. Women's perceptions and access to prenatal care in the United States: A literature review. *J Midwifery Womens Health*. 2009; 54:219-225.

5. Wehby GL, Murray JC, Castilla EE, Lopez-Camelo JS, Ohsfeldt RL. Prenatal care effectiveness and utilization in Brazil. *Health Policy and Planning*. 2009;24:175-188.

335 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	High Risk
Pregnant	I	Y
Breastfeeding	I	Y
Non-Breastfeeding	VI	N

Parameters for Auto Assignment

Auto assigned if “Multifetal Gestation” is marked on the pregnancy panel.

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned for pregnant and breastfeeding women.

Justification

Multifetal 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.

Justification for High Risk

Multiple fetal gestations are associated with low birth weight, fetal growth restriction, placental and cord abnormalities, preeclampsia, anemia, shorter gestation, and increased risk of infant mortality. Multifetal gestations are at greater risk for having a shortened pregnancy which increases risk of preterm delivery and risk for infants developing neurological abnormalities. Complications are not only restricted to gestation, as these infants typically have poor neonatal outcomes and a prolonged hospital stay.

These mothers also have greater risk for intrauterine growth restriction and developing gestational diabetes contributed to by the mother's nutritional status and higher levels of hormones. Cesarean deliveries, prolonged hospital stay and early hospital admissions are more common for mothers of multiple births. Other adverse outcomes include miscarriage, premature rupture of membranes and polyhydramnios. Triplets and quadruplet pregnancies specifically have a greater risk for mothers to experience pre-eclampsia, anemia, and postpartum hemorrhag. Mortality is also increased in multifetal gestations not only for infants but also for mothers. Maternal mortality is three times greater in multiple pregnancies than a singleton pregnancy.

A woman meeting this risk criterion can benefit from assessment of her weight gain and individual nutrition counseling through WIC.

Additional Counseling Guidelines

Pregnant participants:

- For twin gestations, the recommended range of maternal weight gain is 37-54 pounds with a gain of 1.5 pounds per week during the second and third trimesters
    - Underweight women should gain at the higher end of the range and overweight women should gain at the lower end of the range
    - Four to six pounds should be gained in the first trimester
- 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 pregnancy.
- Generally accepted dietary recommendations include:
    - Increased needs for calories, protein, iron, calcium, folate, vitamin B6, and zinc (table of food guidelines to follow)
    - A need for increased weight gain (table of guidelines follow) during pregnancy, especially for those women who are of low or normal pre-pregnancy weight
- Encourage early weight gain due to reduced stomach capacity as pregnancy progresses
- Encourage small, frequent energy-dense meals every 2-3 hours at first, then every hour or two as the pregnancy proceeds
    - A liberal fat intake (40% of calories) may be needed due to volume restrictions
- Encourage an extra serving of milk for each fetus to meet calcium needs
- Recommend iron supplements beginning in the second trimester

- Recommend limiting caffeinated beverages to 3 servings/day

The Daily Food Guide listed below represents the minimum number of servings recommended for a singleton pregnancy. However, for women pregnant with multiples 300 calories more a day, compared to women pregnant with one baby, are needed. Women pregnant with multiples should discuss the number of extra calories they should eat with their health care providers.

Reference: "Multiples: Twins, Triplets, and Beyond," March of Dimes Website

Daily Food Guide	Provides:	Servings
Meat	protein, iron, zinc, B vitamins	2
Milk Products	protein, calcium	2
Grains & Cereals (select whole grains whenever possible)	carbohydrates, B vitamins, iron	6
Fruit	vitamins A & C	2-4
Vegetables	vitamins A & C	3-5

- Each of the "Healthy Choices" listed below has about 300 calories
  - 1 slice of bread with 2 tablespoons of peanut butter
  - 3 oz. of meat with ½ cup of sweet potatoes
  - 1 flour tortilla with ½ cup of refried beans, ½ cup of cooked broccoli and ½ cup of cooked red peppers

Breastfeeding participants:

- Assess:
  - Dietary adequacy of mother
  - Growth of infants (including test weighing)
- Reassure mother that she can provide adequate milk
- Encourage simultaneous breastfeeding to increase prolactin levels
  - Teach positions for simultaneous breastfeeding (double clutch, parallel, double cradle)
- Verify proper latch-on and positioning
- Could refer to support group for multiples

References

1. Brown JE and Carlson M. Nutrition and multifetal pregnancy. J Am Diet Assoc. 2000;100:343-348.

2. Institute of Medicine. WIC nutrition risk criteria: a scientific assessment. National Academy Press, Washington, D.C.; 1996.

3. Institute of Medicine. Weight gain during pregnancy: reexamining the guidelines (Prepublication Copy). National Academy Press, Washington, D.C.; 2009. www.nap.edu. Accessed June 2009.

Additional Related References

1. Brown JE, Schloesser PT. Pregnancy weight status, prenatal weight gain, and the outcome of term twin gestation. Am.J.Obstet.Gynecol. 1990;162:182-6.

2. Suitor CW, editor. Maternal weight gain: a report of an expert work group. Arlington, Virginia: National Center for Education in Maternal and Child Health; 1997. Sponsored by Maternal and Child Health Bureau, Health Resources and Services Administration, Public Health Service, U.S. Department of Health and Human Services.

3. Williams RL, Creasy RK, Cunningham GC, Hawes WE, Norris FD, Tashiro M. Fetal growth and perinatal viability in California. Obstet.Gynecol. 1982;59:624-32.

4. Worthington-Roberts, BS. Weight gain patterns in twin pregnancies with desirable outcomes. Clin.Nutr. 1988;7:191-6.

References for High Risk

1. Dudenhausen JW, Maier RF. Perinatal Problems in Multiple Births. *Ceutsches Arzteblatt International.*2010; 107(38): 663-668.

2. Rauh-hain JA, Rana S, Tamez H, Wang A, Cohen B, Cohen A, Brown F, Ecker JL, Darumanchi SA, Thadhani R. Risk for developing gestational diabetes in women with twin pregnancies. *The Journal of Maternal-Fetal and Neonatal Medicine.* 2009; 22(4):293-299.

3. Ounjai K, Suwanrath C, Suntharasaj T, Getpook C, Leetanaporn R. Outcomes of multifetal pregnancies. *J. Obstet. Gynaecol. Res.* 2007;33(1):49-55.

4. Dola C, Tran T, Linhuber AM, Cierny J, Deicola N, Chong E, Bhuiyan A. Preterm birth after mature fetal lung indices: is there any neonatal morbidity? *The Journal of Maternal-Fetal and Neonatal Medicine.* 2011; 24(1): 73-78.

336 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	High Risk
Pregnant	I	Y

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel

High Risk Flag

High risk designation will automatically activate when this risk factor is assigned

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, pre-pregnancy 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.

Justification for High Risk

Fetal Growth Restriction (FGR) usually leads to low birth weight which is the strongest possible indicator for prenatal mortality risk. Severely growth restricted infants are at increased risk of: fetal and neonatal death, hypoglycemia, polycythemia, SGA, cerebral palsy, anemia, bone disease, birth asphyxia, and long-term neurocognitive delays.

Some maternal risk factors which contribute to FGR include lupus, cardiac disease, high blood pressure, diabetes with vascular disease, smoking, use of illegal drugs, malnutrition, low socioeconomic status, history of FGR, and extreme ages. Pregnant mothers who have been diagnosed with FGR have a greater risk of developing pre-eclampsia later in the pregnancy. Low birth weight caused by FGR is associated with renal and cardiovascular disease in the infant's adult life. Additionally, a recent study found that FGR increases rates of stillbirths and perinatal mortality.

Although few causes of FGR can be prevented, there are some interventions that have proven effective in prevention. This would include addressing and changing modifiable risk factors such as smoking cessation, eating a balanced diet with protein supplementation (especially pregnant teens), avoiding alcohol and uncooked meat, and reducing contact with animals. Mothers who quit smoking before 16 weeks gestation are no longer at risk for FGR.

Early detection of FGR is related to a reduction in infant morbidity and mortality rates. WIC services can benefit these mothers and assist them in addressing the modifiable risk factors.

Additional Counseling Guidelines

- Assess nutritional status with emphasis on well-balanced intake
- Assess and promote healthy weight gain
    - food supplementation during pregnancy to improve weight gain reduces the risk of FGR

References

1. Institute of Medicine: Nutrition During Pregnancy: Part I, Weight Gain; and Part II, Nutrient Supplements; National Academy Press; 1990.

2. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996.

3. Williams, SR: Nutrition and Diet Therapy; 1989; 6th edition.

4. Worthington-Roberts, BS and Williams, SR: Nutrition During Pregnancy and Lactation; 1989; 4th edition.

5. Stein, ZA and Susser, M.: Intrauterine Growth Retardation: Epidemiological Issues and Public Health Significance. Seminars in Perinatology; 1984; pp. 8:5-14.

6. Altman D.G. and Hytten F.E.: Intrauterine growth retardation: Let's be clear about it; Br. J. Obstet. Gynaecol. 96:1127-1132.

7. Barros, F.C., S.R. Huttly, C. G. Victora, B. R., Kirkwood, and J.P. Vaughan: Comparison of the causes and consequences of prematurity and intrauterine growth retardation: A longitudinal study in southern Brazil. Pediatrics; 1992; 90:238-244.

8. Kramer, M.S., M. Olivier, F.H. McLean, G.E. Dougherty, D.M. Willis, and R.H. Usher: Determinants of fetal growth and body proportionality. Pediatrics; 1990; 86:18-26.

9. Kramer, M.S., M. Olivier, F.H. McLean, D.M. Willis, and R.H. Usher: Impact of Intrauterine growth retardation and body proportionality on fetal and neonatal outcome; Pediatrics; 86:707-713.

10. Institute of Medicine: Nutrition During Pregnancy; National Academy Press; 1990; pp. 212-20, 10-12, 18, 20.

References for High Risk

1. Baschat A. Early severe fetal growth restriction: Evaluation and treatment. *MFM Consult, "Comptemporary OB/GYN.* 2011; February.

2. Weiler J, Tong S, Palmer KR. Is fetal growth restriction associated with a more severe maternal phenotype in the setting of early onset pre-eclampsia? A retrospective study. *PLoS ONE*. 2011;6(10);e26937.

3. Grif CM. Intrauterine fetal growth restriction. A challenge in diagnosis and management. *University of Medicine and Pharmacy, Department of Obstetrics and Gynecology 2.*

4. Zanardo V, Fanelli T, Weiner G, Fanos V, Zaninotto M, Visentin S, Cavallin F, Trevisanuto D, Cosmi E. Intrauterine growth restriction is associated with persistent aortic wall thickening and glomerular proteinuria during infancy. *Kidney International.* 2011; 80: 119-123.

5. Imdad A, Yakoob MY, Siddiqui S, Bhutta ZA. Screening and triage of intrauterine growth restriction (IUGR) in general population and high risk pregnancies: a systematic review with a focus on reduction of IUGR related stillbirths. *BMC Public Health*. 2011; 11(3):S1.

337 History of Birth of a Large for Gestational Age Infant

Definition/Cut-Off Value

Pregnant Women:

Any history of giving birth to an infant weighing ≥ 9 pounds (4000 grams)

Breastfeeding/Non-Breastfeeding Women:

Most recent pregnancy, or history of giving birth to an infant weighing ≥ 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	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N

Parameters for Auto Assignment

Auto assigned for breastfeeding and non-breastfeeding women if associated infant is marked as LGA on Anthropometric screen.

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel for pregnant women

Justification

Women with a previous delivery of an infant weighing > 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 > 9 lbs. (4000 grams). Risks for the infant include dystocia, meconium aspiration, clavicular fracture, brachia plexus injury, and asphyxia (3).

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Maternal obesity, high pre-pregnancy weight, and large gestational weight gain contribute significantly to LGA
- Counsel on recommended weight gain based on pre-pregnancy BMI
- Review weight gain pattern from previous pregnancies
- If woman is diabetic see NRF #302 for counseling tips

References

1. Boyd ME, Usher RH, McLean FH. Fetal macrosomia: prediction, risks, proposed management. Obstet.Gynecol. 1983;61:715-22.

2. Institute of Medicine. WIC nutrition risk criteria a scientific assessment. Washington (DC): National Academy Press;1996. p. 117.

3. Institute of Medicine: Nutrition during pregnancy. Washington, (DC): National Academy Press;1990. p. 190.

338 Pregnant and Currently Breastfeeding

Definition/Cut-Off Value

Breastfeeding woman now pregnant

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

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.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Ensure that WIC's advice is consistent with MD's recommendations
- Encourage adequate rest.
- Monitor stress level
- Other important considerations include:
    - The age of the nursing child

- The natural decrease in milk supply that occurs during pregnancy (usually in the last 4 months) could compromise the infant's nutritional needs, if the baby is less than a year old
- Suggest that mother keep track of the baby's weight gain and offer supplemental feedings if they are needed
- The child's need to nurse (physically and emotionally)
- Some babies wean on their own during pregnancy
- Other babies who weaned during pregnancy may want to breastfeed again once the new baby is born
- Whether the mother is experiencing any breastfeeding related discomforts (such as sore nipples caused by hormonal changes) and the degree of her discomfort
- The mother's past nursing experience(s)
- Health concerns related to the pregnancy (which may be medical reasons to consider weaning)
    - Uterine pain or bleeding while breastfeeding (uterine contractions stimulated by breastfeeding usually pose no danger to the unborn baby and do not increase the risk of premature delivery, but refer participant to physician immediately)
    - History of premature birth
    - Continued loss of weight by mother during pregnancy

- Hormones of pregnancy will not be harmful to breastfeeding infant or toddler
- During last few months of pregnancy milk changes to colostrum in preparation for birth
- Nursing child cannot "use up" the colostrum -- no matter how much he nurses; the colostrum will still be available at birth for the newborn
- If mother chooses to nurse both after baby's birth ("tandem nursing"), follow-up with Dietitian/Lactation Educator is appropriate
- Remember that newborn is priority of the two children
- Listen to the mother's feelings, as it is an individual decision whether or not to continue breastfeeding through a pregnancy (and after)

References

1. Mohrbacher, N., Stock, J.: The Breastfeeding Answer Book: Revised Edition Schaumburg, IL; La Leche League International; 1997.

341 Nutrient Deficiency Diseases

Definition/Cut-Off Value

Diagnosis of nutritional deficiencies or a disease caused by insufficient dietary intake of macro and micro nutrients

Diseases include:

- Protein Energy Malnutrition
- Scurvy
- Rickets
- Beri Beri
- Hypocalcemia
- Osteomalacia
- Vitamin K Deficiency
- Pellagra
- Cheilosis
- Menkes Disease
- Xerophthalmia

Presence of nutrient deficiency diseases 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

Parameters for Manual Assignment

Category	Priority	High Risk
Pregnant	I	Y
Breastfeeding	I	Y
Non-Breastfeeding	VI	Y
Infants	I	Y
Children	III	Y

Must be manually selected in Nutrition Interview or Risk Panel

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned

Justification

The presence of macro- and micro-nutrient deficiencies indicates current nutrition health risks.

Persistent malnutrition may lead to elevated morbidity and mortality rates. Important functional disturbances may occur as a result of single or multiple nutrient deficiencies. Examples include impaired cognitive function, impaired function of the immune system, and impaired function of skeletal muscle. Participation in the WIC Program provides key nutrients and education to help restore nutrition status and promote full rehabilitation to those with an overt nutrient deficiency.

Justification for high risk

Persistent malnutrition may lead to elevated morbidity and mortality rates. Important functional disturbances may occur as a result of a single or multiple nutrient deficiencies including: impaired cognitive function, impaired function of the immune system, and impaired function of skeletal muscle. Participants who meet these criteria are extremely high risk and need counseling which addresses their individual needs.

Nutrient deficiencies are not caused by one single factor, but rather by a combination of causes including food fads, medications, poverty, medical illnesses, gastrointestinal disorders such as celiac or Crohn's disease, and psychiatric illnesses including autism, alcoholism or eating disorders. WIC provides nutritional guidance that can prevent or treat malnutrition in both women and children.

Additional Counseling Guidelines

- Review WIC foods high in nutrient(s) individual to participant's nutrient deficiency
    - Discuss ways in which to incorporate WIC foods into diet
- Explain potential risks particular to participant's nutritional disease
    - Provide basic nutrition counseling appropriate for specific nutritional disease

References

1. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 159-166.

2. Worthington, Vonnie S., et al.: Nutrition Throughout the Life Cycle, 2nd ed.; 1992; pp. 102-107.

3. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 164-165.

References for High Risk

1. Mayo-Wilson E, Imdad A, Marshall KH, Yakoob MY, Sheriff Z. Vitamin A supplements for preventing mortality, illness, and blindness in children aged under 5: systematic review and meta-analysis. *BMJ* 2011; 343:d5094.

2. Wagner CL, Greer FR, and the Section on Breastfeeding and Committee on Nutrition. Prevention of rickets and vitamin D deficiency in infants, children and adolescents. *Pediatrics* 2008; 122:1142-1152.

3. Institute of Medicine Food and Nutrition Board. Dietary reference intakes for calcium and vitamin D. Washington D.C.: The National Academies Press, 2011.

4. Tierney EP, Sage RJ, Shwayder T. Kwashiorkor from a severe dietary restriction in an 8-month infant in suburban Detroit, Michigan: case report and review of the literature. *Int J Dermatol* 2010; 49:500-506.

5. Jen M, Yan AC. Syndromes associated with nutritional deficiency and excess. *Clin Dermatol* 2010; 28:669-685.

342 Gastro-Intestinal Disorders

Definition/Cut-Off Value

Diseases and/or or conditions that interferes with the intake, digestion, and/or absorption of nutrients.

The diseases and/or conditions include, but are not limited to:

- Gastroesophageal reflux desease (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 gastro-intestinal 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	High Risk
Pregnant	I	Y
Breastfeeding	I	Y
Non-Breastfeeding Women	VI	Y
Infants	I	Y
Children	III	Y

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned

Justification

Gastrointestinal disorders increase nutrition risk through 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.

Justification for High Risk

GI disorders increase nutrition risk through a number of ways: impaired food intake, impaired digestion of food, generalized or specific nutrient malabsorption, and excessive GI losses. Frequent loss of nutrients through vomiting, diarrhea, malabsorption or infections can lead to malnourishment and lowered resistance to disease in individuals with chronic symptoms. It is important that WIC participants receive individual counseling tailored to meet the nutritional needs of their GI disorder.

Additional Counseling Guidelines

- Explain potential nutritional risks of participant's specific GI disease
- Recommend increased nutrient intake, if needed, to correct existing deficiencies, or to counterbalance excessive losses of nutrients or fluid
- Review signs of dehydration and malnutrition due to frequent loss of nutrients via vomiting, diarrhea, malabsorption, and/or infections

Note: 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.

References

1. Institute of Medicine. WIC nutrition risk criteria: a scientific assessment. National Academy Press, Washington, D.C.; 1996.

2. American Dietetic Association, Pediatric Nutrition Practice Group. Pediatric manual of clinical dietetics. Chicago: Pediatric Nutrition Dietetic Practice Group, American Dietetic Association, 1998.

3. Stenson W. The esophagus and stomach. In: Maurice ES, Olson JA, Shike M, Ross AC, editors. Modern nutrition in health and disease. 9th ed. Lippincott Williams & Wilkins 1999. p. 1125-1133.

4. Beyer PL. Medical nutrition therapy for upper gastrointestinal tract disorders. In: Mahan LK, Escott-Stump S, editors. Krause's food nutrition and diet therapy. 11th ed. Philadelphia: Saunders; 2004. p. 688-690.

5. American Dietetic Association. Nutrition Care Manual. Gastrointestinal disease; Peptic ulcers; 2006. http://www.nutritioncaremanual.org. Accessed 1/08.

6. Allied Health Sciences Section Ad Hoc Nutrition committee: Aills L, Blankenship J, Buffington C, Furtado M and Parrott J. Bariatric nutrition: suggestions for the surgical weight loss patient. Review. Surgery for Obesity and Related Diseases 2008 May 17.

7. Scolapio JS, Fleming R. Short Bowel Syndrome. In: Maurice ES, Olson JA, Shike M, Ross AC, editors. Modern nutrition in health and disease. 9th ed. Lippincott Williams & Wilkins; 1999. p. 1135-1140.

8. Farrell M. Gastrointestinal disorders of infancy and childhood (with nutrition support and probiotics) In: Ekvall SW, Ekvall VK. editors. Pediatric nutrition in chronic diseases and developmental disorders. 2nd ed. Oxford University Press; 2005. p. 248-249.

9. Griffiths A. Inflammatory bowel disease. In: Maurice ES, Olson JA, Shike M, Ross AC, editors. Modern nutrition in health and disease. 9th ed. Lippincott Williams & Wilkins; 1999. p. 1141-1149.

10. Lieber CS. Nutrition in liver disorders. In: Maurice ES, Olson JA, Shike M, Ross AC, editors. Modern nutrition in health and disease. 9th ed. Lippincott Williams & Wilkins; 1999. p. 1177-1189.

11. Raimondo M, Dimagno EP. Nutrition in pancreatic disorders. In: Maurice ES, Olson JA, Shike M, Ross AC, editors. Modern nutrition in health and disease. 9th ed. Lippincott Williams & Wilkins; 1999. p. 1169-1176.

12. Hasse JM, Matarese JE. Medical nutrition therapy for liver, biliary system and exocrine pancreas disorders. In: Mahan LK, Escott-Stump S, editors. Krause's food nutrition and diet therapy. 11th ed. Philadelphia: Saunders; 2004. p. 758-760.

References for High Risk

1. Allied Health Sciences Section Ad Hoc Nutrition committee: Allis L, Blankenship J, Buffington C, Furtado M and Parrott J. Bariatric Nutrition: suggestions for the surgical weight loss patient. Review. Surgery for Obesity and Related Diseases 2008 May 17.

2. American Dietetic Association. Nutrition Care Manual. Gastrointestinal disease; Peptic ulcers; 2006. http://www.nutritioncaremanual.org.Accessed 1/08.

3. Seetharam P, Rodrigues G. Short bowel syndrome: A review of management options. *Saudi J Gastroenterol*. 2011; July-Aug;17(4):229-235.

4. Mijac DD, Jankovic GLJ, Jorga J, Krstic MN. Nutritional status in patients with active inflammatory bowel disease: Prevalence of malnutrition andmethods for routine nutritional assessment. *EJIM*. 2010; 21 (4): 315-319.

5. Raatikainen K, Justonen J, Pajala MO, Heikkinen M, Heinonen S. The effects of pre- and post-pregnancy inflammatory bowel disease diagnosis on birth outcomes. *Aliment Pharmacol Ther.* 2011; 33: 333-339.

6. Molnar T, Farkas K, nagy F, Lakatos PL, Mihelller P, Nyari T, Horvath G, Szepes Z, Marik A, Witmann T. Pregnancy outcome in patients with inflammatory bowel disease

according to the activity of the disease and the medical treatment: A case control study. *Scandinavian Journal of Gastroenterology*. 2010; 45(11): 1302-1306.

7. Academy of Nutrition and Dietetics. Nutrition Care Manual. Pancreatitis; 2012. http://nutritioncaremanual.org.Accessed 4/12.

343 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 physician's orders.

Participant Category and Priority Level

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

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned

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).

Justification for High Risk

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. Poorly controlled diabetes can also lead to adverse health related events such as diabetic ketoacidosis.

High maternal BMI and type-1 diabetes are independent risk factors for maternal and perinatal complications, with type-1 diabetes being a stronger risk factor for adverse outcomes when compared to obesity (5).

The prevalence of adolescent type-2 diabetes is rising and has serious long term effects on health. Chronic conditions seem to progress more rapidly in adolescents with type-2 diabetes than in those of the same age who are affected by type-1 diabetes (4).

Improving diabetes outcomes by reducing chronic complications is possible through life-style interventions and dedicated attention of nutritional management and personalized education. The WIC nutritionist can play a vital role in providing nutrition counseling and assuring the participant receives comprehensive follow-up outside WIC.

Additional Counseling Guidelines

- Empower women to self-manage by obtaining information from health care providers
- Explain potential risks of DM, such as:
  All diabetics:
  - Cardiovascular disease
  - Renal disease
  - Circulatory disease
  - Foot problems
  - Vision loss
  - Hypertension

  Pregnant diabetics:
  - Difficult labor and delivery
  - Increased risk of infection, preeclampsia, toxemia, fetal malformation, fetal and neonatal death, large birth size, congenital abnormalities, neonatal death
  - More complications for infants at birth, such as may be poor feeders, may have hyperbilirubinemia or be hypoglycemic

  Breastfeeding diabetics:
  - During first few days after childbirth, diabetic mothers often experience drastic changes in blood sugar levels
    - Because it is body's natural response to childbirth hormones responsible for lactation cause physiological changes to occur more naturally
  - Drastic changes in blood sugars may occur after giving birth (i.e. increased risk of hypoglycemia during first few weeks); they require close monitoring, along with insulin and dietary adjustments
    - Once control is achieved mom should have no further problems if she follows good management practices
  - Important to receive prompt lactation support soon after delivery and while in hospital due to possible NICU and other interventions that could delay or interfere with breastfeeding
  - Milk may be a little slower coming in
    - 5 to 6 days if in good control; 6 to 7 days without good control vs. 3 to 4 days in non-diabetic moms
    - This is due to fluctuating insulin requirements and other physiologic changes

        - Early and frequent feedings may help bring in milk
    - Very important to recognize and treat hypoglycemia, especially following night-time breastfeeding
    - May be more prone to mastitis and infections of nipples and vagina
        - Risk of yeast infection increases when blood sugar levels increase
        - Use good hygiene
        - Keep nipples clean and dry after nursing
        - Treat plugged ducts, lump, sore spots promptly
- Encourage breastfeeding with MD approval
    - Breastfeeding appears to have protective effect on onset of diabetes in childhood
    - Amount of insulin needed during breastfeeding may decrease (can be up to half!) due to hormones released (insulin is compatible with breastfeeding)
        - Hormones released during breastfeeding relax mother, reducing stress (Stress can aggravate diabetes.)
    - Overall, breastfeeding tends to make diabetes more manageable
    - Psychologically, breastfeeding can help mom feel "normal" because like every other breastfeeding mother, she is able to give her baby the best
- For all diabetic participants provide basic diabetic counseling to facilitate normal blood glucose levels, such as how to:
    - Maintain optimal blood glucose levels by balancing food, activity & medications
    - Keep <u>timing</u> of meals <u>consistent</u> from day to day with carbohydrate content fairly evenly divided from meal to meal
    - Plan for midmorning and midafternoon snacks, if needed, to match food intake to peak insulin action
    - Plan for bedtime snack to prevent nocturnal hypoglycemia
    - Limit sodium intake (if participant has hypertension)
    - Limit/abstain from alcohol, especially on empty stomach
    - Consume calories adequate to maintain healthy weight
    - Maintain normal growth & development pattern in infants and children
    - Plan for periods of increased physical activity
    - Maintain appropriate blood glucose levels during illness, infections, nausea/vomiting
    - Plan for hypoglycemic episodes

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.

References

1. American Diabetes Association. Diagnosis and classification of diabetes mellitus. Diabetes Care. Jan 2008; 31 Suppl 1:S55-60.

2. Franz MT, Ratner RE. Diabetes and Complications. In: Pathophysiology of the diabetes disease state: a Core Curriculum for Diabetes Educators American Association of Diabetes Educators. 5th ed. 2003.

3. Dean L, McEntrye J. The genetic landscape of diabetes. 2004; Bethesda: NCBI, 2004. Http://www.ncbi.nlm.nih.gov/books/bv.fcgi?call=bv.veiw..showtoc&rid=diabetes.toc&depth=1 .

4. American Diabetes Association. Nutrition recommendations and interventions for diabetes: a position statement of the American Diabetes Association. Diabetes Care. 2006; 29: 2140-2157:S48-S65.

References for High Risk

1. Renzaho A MN, Skouteris H, Oldroyd J. Preventing gestational diabetes mellitus among migrant women and reducing obesity and type 2 diabetes in their offspring: A call for culturally competent lifestyle interventions in pregnancy. *JADA.* 2010; 110: 1814-1817.

2. Aslander-van V E, Smart C, Waldron S. Nutritional management in childhood and adolescent diabetes. *Pediatr Diabetes*. 2007; 8: 323-339.

3. Delahanty L M. Research charting a course for evidence-based clinical dietetic practice in diabetes. *J Hum Nutr Diet.* 2010; 23: 360-370.

4. Pinhas-Hamiel O, Zeitler P. Acute and chronic complications of type 2 diabetes mellitus in children and adolescents. *Lancet.* 2007; 369:1823-31.

5. Persson M, Pasupathy D, Hanson U, Westgren M, Norman M. Pre-pregnancy body mass index and the risk of adverse outcome in type 1 diabetic pregnancies: a population-based cohort study. *BMJ.* 2012; 2(1): e000601.

344 Thyroid Disorders

Definition/Cut-Off Value

Thyroid dysfunctions that occur in pregnant and postpartum women, during fetal development, and in childhood are caused by the abnormal secretion of thyroid hormones. The medical conditions include, but are not limited to, the following:

Thyroid Dysfunction	Definition
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 Grave's disease) or persistent (due to genetic mutation).
Congenital Hypothyroidism	Infants 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 an 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. See Clarification for more information about self-reporting a diagnosis.

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N
Infants	I	N
Children	III	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

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

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 (I 2) 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).

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Explain potential risks of **Hyperthyroidism**:
  - Result of overactive thyroid gland, leading to too much thyroid hormone in the body (must be treated medically)
- Symptoms include:
  - "Pop eyes"
  - Goiters (enlarged thyroid)
  - Strain on heart, muscles, nervous system
  - Fast pulse
  - Extreme nervousness
  - Muscle tremors
  - Weight loss, depleted body stores
- Considerations for breastfeeding mothers include:
  - The ability to breastfeed does not appear to be affected by hyperthyroidism
    - Mother's health care provider must be involved in her decision to breastfeed
  - Breastfed infants of mothers with treated hyperthyroidism must have their thyroid monitored for normal function
    - Some thyroid suppressants may suppress baby's thyroid as well; therefore mother needs to find breastfeeding compatible medications such as PTU (Propylthiouracil) Carbimazole, or methimazole (tapazole)
- Compensate for lost weight, exhausted body reserves and depleted vitamin and minerals stores via:
  - High calorie/protein/carbohydrate diet
  - Multi-vitamin/mineral supplement (calcium, phosphorus, B-complex, and vitamin D)
- Explain potential risks of **Hypothyroidism**:
- Hypothyroidism is result of sluggish thyroid gland producing too little thyroid hormone (must be treated medically)
- Symptoms include
  - fatigue ("bone tired")
  - puffed up hands, face, eyelids
  - weight gain (because metabolism kicks into low gear)
  - depression
  - poor appetite
  - cold intolerance
  - dry skin and thinning hair
- Considerations for infants include:
  - Infant should be screened to rule out hypothyroidism (T4 & TSH testing process should not be a hazard to nursing.)

    - May not grow properly, leading to stunting
    - Breastfed infants of mothers with untreated hypothyroidism may not gain weight satisfactorily
        - Infant may fail to gain weight on breast milk alone
        - Monitor breastfed infants weight
- Considerations for breastfeeding women include:
    - Untreated hypothyroidism can result in reduced milk supply
    - Woman should be well controlled by thyroid replacement therapy to ensure full lactation
        - Health care provider must be involved in decision to breastfeed to assure thyroid supplements are compatible with breastfeeding
    - Due to sluggish metabolism leading to weight gain, low calorie diet may be warranted for mother
- Considerations for postpartum women include:
    - Identify hypothyroidism in postpartum women, especially with normal thyroid women have prolonged “baby blues” fatigue or depression
    - Screen for self-medication with drugs or herbs

References

1. National Academy of Sciences. Institute of Medicine. Food and Nutrition Board. Dietary reference intakes: The essential guide to nutrient requirements. 2001.
2. Los Alamos National Labs Chemistry Division Periodic Table. http://periodic.lanl.gov/elements/53.html. Accessed December 2009.
3. WebElements: The periodic table on the web. http://www.webelements.com/iodine/. Accessed December 2009.
4. Smallridge RC, Glinoer D, Hollowell JG, Brent G. Thyroid function inside and outside of pregnancy: What do we know and what don’t we know? Thyroid. 2005;15(1):54-59.
5. Lee SL, Ananthakrishnan S, Pearce EN. Iodine deficiency. [updated July 27, 2006]. Available from: http://www.emedicine.com/med/topic1187.htm.
6. Nguyen PH. Autoimmune thyroid disease and pregnancy. [updated December 21, 2004;cited 2007 Sept 7]. Available from: http://www.emedicine.com.
7. American Association of Clinical Endocrinologists (AACE) Thyroid Task Force. AACE Medical guidelines for clinical practice for the evaluation and treatment of hyperthyroidism and hypothyroidism. 2006 Amended Version. Endocrine Practice 2002;8(6):457-469.

8. LaFranchi SH, Haddow JE, Hollowell JG. Is thyroid inadequacy during gestation a risk factor for adverse pregnancy and developmental outcomes? Thyroid 2005;15(1):60-71.

9. Muller AF, Drexhage HA, Berghout A. Postpartum thyroiditis and autoimmune thyroiditis in women of childbearing age: Recent insights and consequences for antenatal and postnatal care. Endocrine Reviews. 2001 Oct; 22(5):605-630.

10. Association for Clinical Biochemistry, British Thyroid Association, British Thyroid Foundation. UK guidelines for the use of thyroid function tests. 2006 July;1-86.

11. Polak M, Legac I, Vuillard E, Guibourdenche J, Castanet M, Luton D.Congenital hyperthyroidism: The fetus as a patient. Horm Res. 2006;65:235-242 (DOI: 10.1159/000092454)

12. O'Malley B, Hickey J, Nevens E. Thyroid dysfunction – weight problems and the psyche: The patients' perspective. J Hum Nutr Dietet. 2000 May;13:243-248.

13. American Thyroid Association. American Thyroid Association statement on early maternal thyroidal insufficiency: Recognition, clinical management and research directions. Consensus statement #2. Thyroid. 2005;15(1):77-79.

14. Riordan J. Breastfeeding and human lactation, 3rd ed. Jones & Bartlett Publishers, Inc., 2005; p. 157, 461.

15. American Thyroid Association. Thyroid and weight, 2005. Available from: http://www.thyroid.org

16. American Academy of Pediatrics. American Thyroid Association, Lawson Wilkins Endocrine Society. Update of newborn screening and therapy for congenital hypothyroidism. Pediatrics. 2006; Jun;117(6): 2290-2303.

17. American Academy of Pediatrics Committee on Nutrition. Use of Soy protein-based formulas in infant feeding. Pediatrics. 2008;121(5):1062-1068 (doi:10.1542/peds.2008-0564).

Additional References

Hashimoto's Thyroiditis online reference:

http://www.medicinenet.com/hashimotos_thyroiditis/article.htm

345 Hypertension and Pre-Hypertension

Definition/Cut-Off Value

Presence of hypertension or pre-hypertension 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	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-breastfeeding Women	VI	N
Infants	I	N
Children	III	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

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 presence of the condition by asking more pointed questions related to that diagnosis.

References

1. American Dietetic Association. Nutrition Care Manual. Hypertension; 2006. http://www.nutritioncaremanual.org. Accessed May 2009.

2. Krummel DA. Medical nutrition therapy in hypertension. In: Manhan LK, Escott-Stump S, editors. Krause's food nutrition and diet therapy. 11th ed. Philadelphia: Saunders; 2004. p. 901-902.

3. Chobian, AV, Bakris, GL, Black, HR, et al. The seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure: the JNC 7 report. JAMA, 2003. Downloaded from www.jama.com at the University of Florida on May/2009.

4. National Heart Lung and Blood Institute. www.nhlbi.nih.gov. Accessed May 2009.

5. Chobian, AV. Prehypertension Revisited. Hypertension 2006. Downloaded from hyper.ahajournals.org at Health Science Library on May/2009.

6. Appel LJ, Brands MW, Daniels SR, Karanja N, Elmer PJ, Sacks FM; American Heart Association. Dietary approaches to prevent and treat hypertension: a scientific statement from the American Heart Association. Hypertension 2006; 47:296--308.

7. Roberts JM, Bodnar LM. Report on the WIC nutrition risk criterion for hypertension in pregnancy. July 2007. Unpublished.

8. National Heart Lung and Blood Institute. Report of the working group on research on hypertension during pregnancy, 2001. www.nhlbi.nih.gov. Accessed May 2009.

9. National Heart, Lung, and Blood Institute. Working group report on high blood pressure in pregnancy; 2000 Jul. NIH Publication No. 00-3029.

10. Lawrence RA, Lawrence RM. Breastfeeding a guide for the medical profession. 6th ed. Philadelphia: Elsevier Mosby; 2005. p. 590.

11. American Academy of Pediatrics and the American College of Obstetricians and Gynecologists. Breastfeeding handbook for physicians. 2006. p. 179.

12. Lee, SY, Kim, MT, Jee, SH, Yang, HP. Does long-term lactation protect premenopausal women against hypertension risk? A Korean women's cohort study. Preventive Medicine, 2005. Available online at www.sciencedirect.com. Accessed May 2009.

13. US Department of Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute. The fourth report on the diagnosis, evaluation, and treatment of high blood pressure in children and adolescents. Revised May 2005.

14. Hassink SG. Pediatric obesity: Prevention, intervention, and treatment strategies for primary care. American Academy of Pediatrics; 2007. p. 179.

15. Luma GB, SpiottaRT. Hypertension in children and adolescents. Am Fam Physician 2006 May 6;73: 1158-68.

16. Committee on Nutrition, American Academy of Pediatrics. Pediatric nutrition handbook. 6th ed. Elk Grove, Ill: American Academy of Pediatrics; 2009.

346 Renal Disease

Definition/Cut-Off Value

Any renal disease including pyelonephritis and persistent proteinuria, but excluding urinary tract infections (UTIs) 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

Parameters for Manual Assignment

Category	Priority	High Risk
Pregnant	I	Y
Breastfeeding	I	Y
Non-Breastfeeding	VI	Y
Infants	I	Y
Children	III	Y

Must be manually selected in Nutrition Interview or Risk Panel

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned

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.

Justification for High Risk

Renal disease can result in growth failure in children and infants. Children who suffer from chronic kidney disease (CKD) experience a negative impact on growth, and are significantly growth restricted in the first year of life. Typically, children with CKD fall below the 3rd percentile in length during their first 15 months and then grow at a rate parallel to the growth curve. Addressing nutrient deficiencies and metabolic acidosis can improve linear growth; however, these children most commonly receive growth hormone to achieve a normal height (3).

Children with CKD are also at greater risk for suffering chachexia or protein-energy wasting (PEW). The insufficient energy and nutrient intake may contribute to PEW. Existing evidence supports the effectiveness of supplementing calories in order to promote appropriate growth in children up to the age of 2 (4).

In pregnant women, fetal growth is often limited and there is a high risk of developing pregnancy-aggravated hypertension. Pregnant women with chronic renal disease have an increased risk of azotemia and an increased risk of other perinatal and maternal morbidities such as pre-eclampsia, preterm delivery, cesarean delivery and anemia. However, many pregnancies can be expected to have a positive and successful pregnancy outcome depending on the severity of renal disease related to increased risks. The degree of renal insufficiency is most important when predicting pregnancy outcome. When symptoms such as hypertension and proteinuria (> 500mg – 1mg/day) are poorly controlled there is an increased likelihood of detrimental outcomes in pregnancy (2, 5). Women with chronic kidney disease and mild renal insufficiency with normal or controlled hypertension have a good renal outcome and an uneventful pregnancy (5).

Overall, all WIC participants with renal disease need individual counseling with an RD, to assure that appropriate food packages and referrals are provided.

Additional Counseling Guidelines

- Potential risks for pregnant women include:
  - Decreased kidney function (temporary or permanent) as pregnancy progresses
    - Depending on disease state, may end up on hemodialysis before pregnancy ends
  - Strong possibility of developing preeclampsia-like syndrome superimposed on underlying vascular disease (i.e. pregnancy-induced hypertension)
  - Increased anemia
  - Women with chronic renal disease often have proteinuria (i.e. protein in the urine) but additional risk of azotemia is increased if she increases her protein intake
  - Premature delivery
  - SGA infant
  - Fetal loss and morbidity
- Potential risks for infants and children include:
  - Oral aversion is common
    - Infants may miss the “bonding” stage with food, so often don’t “feel” hungry
  - Inadequate growth and developmental delay leading to growth failure (i.e. FTT) as disease progresses

- Participant may be on a protein restricted diet (with greater percent being of high biological value)
- Reinforce early intervention and constant adherence to dietary recommendations and restrictions
- Refer to heath care provider for individual assessment of calcium, iron, thiamine, riboflavin, niacin and folic acid levels
- Considerations for breastfeeding women:
    - Option to breastfeed is a matter of risk:benefit ratio
        - Decision must be made with health care provider(s)

References

1. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 174-175.

References for High Risk

1. Ramin SM, Vidaeff AC, Yeomans ER, Gilstrap LC. Chronic Renal Disease in Pregnancy. *Obstetrics and Gynecology.* 2006;108(6):1531-1539.

2. Williams D, Davison J. Chronic kidney disease in pregnancy. *Practice.* 2008;336:211-215.

3. Greenbaum LA, Warady BA, Furth LS. Current Advances in Chronic Kidney Disease in Children: Growth, Cardiovascular, and Neurocognitive Risk Factors. *Semin Nephrol.* 2009;29(4):425-434.

4. Mak RH, Cheung WW, Zhan JY, Shen Q, Foster BJ. Cachexia and protein-energy wasting in children with chronic kidney disease. *Pediatr Nephrol.* 2012;27:173-181.

5. Edipidis K. Pregnancy in women with renal disease. Yes or no? *Hippokratia.* 2011;15(Suppl. 1):8-12.

6. Mekahli D, Shaw V, Ledermann SE, Rees L. Long-term Outcome of Infants with Severe Chronic Kidney Disease. *Clin J Am Soc Nephrol.* 2010;5(1):10-17.

347 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	High Risk
Pregnant	I	Y
Breastfeeding*	I	Y
Non-Breastfeeding	VI	Y
Infants	I	Y
Children	III	Y

*Some cancer treatments may contraindicate breastfeeding.

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned

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.

Justification for high risk

Participants are at medical and nutritional risk depending on the stage of disease, form of cancer, and type of treatment. The most common nutritional risk is Protein Energy Malnutrition (PEM) and wasting. Irradiation treatment also contributes to PEM. It has been suggested that 20% of cancer patients' die as a result of malnutrition rather than the cancer itself (1).

PEM is associated with impaired immune competence, increased susceptibility to infections, major organ dysfunction, and increased morbidity and mortality. Hematopoietic, GI, and immunologic systems are most affected by PEM. Some chemotherapy drugs (e.g. cytosine arabinoside) are toxic to the GI tract and pose additional nutritional risks. Symptoms of malnutrition in cancer patients include anorexia, dry mouth, nausea, stomach pain, constipation, and diarrhea. Weight loss can be detrimental if cancer patients reach a BMI ≤ 18.5, as there is a decreased chance of survival. However, it is important to not use BMI alone when assessing risk as patients with high body weights can mask loss of lean body mass. Other methods should be used in addition to BMI in order to address nutritional status (1,2,4).

Nutritional status obviously declines after initiation of treatment, where related symptoms can affect prognosis and lower patients' quality of life. WIC can assist participants in monitoring symptoms and provide patients with appropriate nutrition to maintain appropriate weight and prevent a decline in quality of life.

Additional Counseling Guidelines

- Help problem solve identify areas in dietary plan that could be improved
- Provide tricks such as modifying temperatures, textures, or using supplemental food products, especially if treatment or medications affected taste perception or appetite
    - Low-lactose diet may improve abdominal discomfort and diarrhea caused by treatment or GI infections
- If appropriate, provide additional ideas for increased calorie and protein intake
- The type of cancer and stage of disease progression determines the type of medical treatment and nutrition management
    - The type of ongoing treatment may put the participant at increased nutrition risk and health risk (irradiation to the neck, esophagus, abdomen, pelvis, or intense or frequent use of corticosteroid therapy)
- PEM (Protein Energy Malnutrition) and wasting are the most common nutritional risks
    - PEM is associated with impaired immune competence, increased susceptibility to infections, etc.
    - Explain need for protein and energy
    - Assist with meal planning and following the daily food guide with emphasis on meeting the protein group
- Dietary fat intake may need to be modified if malabsorption, maldiegestion occurs

- Identify and provide counseling tips on ways to manage symptoms that impact nutrition such as dry mouth, diarrhea, nausea, constipation, difficulty chewing, anorexia, dysphagia, etc.

References

1. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 175-176.

2. Zeman FJ. Clinical Nutrition and Dietetics. Lexington, Mass: The Collamore Press; 1993.

3. Robinson CH, Weigley ES, Mueller DH. Basic Nutrition and Diet Therapy. New York, NY: Macmillan Publishing Company; 1980.

4. Powers DE, Moore AM. Food Medication Interactions. Tempe, AZ: F-MI Publishing; 1983.

5. American Dietetic Association: Pediatric Manual of Clinical Dietetics 2nd Edition; 2003

References for High Risk

1. Laky B, Janda M, Cleghorn G, Obermair A. Comparison of different nutritional assessments and body-composition measurements in detecting malnutrition among gynecologic cancer patients. *Am J Clin Nutr.* 2008;87:1678-85.

2. Kubrak C, Olson K, Jha N, Jensen L, McCargar L, Seikaly H, Harris J, Scrimger R, Parliament M, Baracos VE. Nutrition Impact Symptoms: Key Determinants of Reduced Dietary Intake, Weight Loss, and Reduced Functional Capacity of Patients with Head and Neck Caner before Treatment. *Head Neck.* 2010;32(3)290-300.

3. Chaves MR, Boleo-Tome C, Monteiro-Grillo I, Camilo M, Ravasco P. The Diversity of Nutritional Status in Cancer: New Insights. *The Oncologist.* 2010;15:523-530.

4. Murphy AJ, White M, Davies PSW. Body composition of children with cancer. *Am J Clin Nutr.* 2010;92:55-60.

5. Tong H, Isenring E, Yates P. The prevalence of nutrition impact symptoms and their relationship to quality of life and clinical outcomes in medical oncology patients. *Support Care Cancer.* 2009;17:83-90.

348 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	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N
Infants	I	N
Children	III	N

Parameters for Auto Assign

Must be manually selected in Nutrition Interview or Risk Panel

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.

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.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Considerations for **Epilepsy**:
  - Find out if seizures controlled by medications
    - Identify medications
    - Reinforce following prescription instructions
    - Identify possible drug nutrient interaction (e.g. Phenobarbital may increase needs of folate, vitamin D, K, calcium, B vitamins, increase risk of osteomalacia, increase appetite, increase nausea, vomiting, anorexia)
    - Address possible drug nutrient interaction through dietary recommendations
- Considerations for **Cerebral Palsy (CP)**:
  - For underweight participants, recommend increased calorie and nutrient intake and vitamin/mineral supplementation
  - For overweight participants discuss prevention of obesity
- Considerations for **Neural tube defects (NTDs)**:
  - Symptoms may include:
    - genitourinary problems, bladder and bowel incontinence
    - variable weakness to flaccid paralysis in lower extremities
    - hydrocephalic
    - possible decreased intelligence
  - For overweight participants discuss prevention of obesity
  - Encourage foods high in folic acid
    - Bioavailability of folic acid in foods is approximately half
  - If appropriate, recommend folic acid supplementation, with MD approval
    - Recommend maternal intake of at least 400µg (.4 mg) daily
    - .4 mg daily for women who have had an affected infant previously in the periconceptional period is believed to greatly reduce the risk of having infant with NTD
  - Refer women on anticonvulsant drugs to MD regarding increased risk of NTD birth (e.g. Valproic acid/Depakene and Carbamazapine are associated with NTD; folic acid reduces the risk)
  - Possible disorders of ascorbic acid metabolism may occur
  - Increase fluids to prevent bladder infections
  - Consume high fiber diet to avoid constipation
- Considerations for **Multiple Sclerosis (MS)**:

- Identify if chewing or swallowing is affected
  - Provide recommendations for appropriate food choices and modifying food textures
  - May need to try thicker drinks, shakes, puddings
  - May need to avoid foods that crumble (e.g. crackers, toast, cakes) that can cause choking
  - Try soft, blenderized, mashed foods or stewed/cooked fruits/vegetables vs. raw
- Identify if characteristic problems such as: vision problems, weakness, fatigue, decreased coordination, numbness, paralysis, and decreased mobility affect:
  - Food shopping
  - Meal preparation
  - Self feeding
- Provide recommendations
- Encourage to maintain normal weight (appropriate BMI) as activity decreases
- If constipation is a problem, provide recommendations for high fiber, increased water, exercise, etc.
- Possibly limit caffeine intake
- Encourage exercise as recommended by MD
  - Encourage to prevent overheating with exercise
  - Exercise in cool water, in an air-conditioned environment, with appropriate clothing (overheating temporarily aggravates MS symptoms)
- Refer postpartum women to MD if symptoms temporarily increase after delivery (sometimes there are less symptoms during pregnancy) Studies show that pregnancy does not alter the long-term course of MS

- Considerations for **Parkinson's disease**:
  - Parkinson's is usually diagnosed in age groups in late 40s (average age 55 – 65)
  - Medications frequently used are L-dopa and carbidopa (sinemet) and have fewer restrictions with diet interactions (e.g. protein, B6 Pyridoxine)
    - A very small percentage of patients need to decrease amount of protein in diet
    - Distribute the protein throughout day in several meals and separate taking their medications from the protein meals by 1 -1/2 hours.
  - Maintain appropriate BMI (prevent low BMI or weight loss)
  - Encourage exercise with MD approval
  - Provide high calorie diet
    - Encourage calorie dense food choices diet (e.g. peanut butter, cheese, whole milk)
    - Encourage more foods per day, more frequent meals
  - Identify if characteristic involuntary muscle movements affect:
    - Self feeding
    - Meal preparation/cooking
    - Walking and working in the kitchen

- Identify swallowing difficulties (which can lead to weight loss)
  - Modify foods, textures to accommodate
- Eating slowly or not finishing meals may be common
- Plan cold foods for end of meal (so cooked meals do not get cold and unappealing to eat)
- Identify if medications cause nausea or GI upset
  - Recommend small amount of food (e.g. crackers, bread) eaten with medication to help prevent nausea
- Identify if there is constipation
  - Increase fiber and liquids in diet

References

1. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 177-178.

2. Zeman FJ. Clinical Nutrition and Dietetics. Lexington, Mass: The Collamore Press; 1993.

3. Robinson CH, Weigley ES, Mueller DH. Basic Nutrition and Diet Therapy. New York, NY: Macmillan Publishing Company; 1980.

4. Pike RL, Brown ML. Nutrition an Integrated Approach. New York, NY: John Wiley & Sons; 1984.

5. Institute of Medicine: Nutrition During Pregnancy. Washington, DC: National Academy Press; 1990.

6. Mayo Clinic Diet Manual: A Handbook of Nutrition Practices; Seventh Edition; 1994; pp. 287-291.

7. Sarnoff, J, and Rector, DM. MS Information, Food for Thought: MS and Nutrition; 5/14/99; pp. 1-6.

8. Chang, MW, Rosendall, B, and Finlayson, BA. Mathematical modeling of normal pharyngeal bolus transport: a preliminary study. J. Rehabil Res Dev, 1998 Jul; 35 (3): 327-34.

9. Berkow, et al.: Merck Manual; 1992; 16th Edition; pp. 1354-1356.

349 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.

Includes:

- Cleft lip or palate
- Down's syndrome
- Thalassemia major
- Sickle cell anemia (not sickle cell trait)
- 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	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N
Infants	I	N
Children	III	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

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 bladder, 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.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Explain that disorders affect nutrition if they cause problems with self-feeding, digestion, absorption or utilization of nutrients and/or hypoxia (low oxygen levels)
- Considerations for **Cleft Lip and Palate**:
    - Discuss and address solutions to feeding difficulties
    - Infant cannot create an airtight seal (for negative pressure) to suck
    - Swallowing can be affected (excessive air intake)

- Discuss and address solutions to other difficulties, such as:
  - Respiratory problems
  - More ear infections
  - Weight and height can be subnormal, due to feeding problems
  - Dental decay
- Discuss feeding methods
  - Determined by severity of cleft
  - Breastfeeding and/or pumped breast milk
    - Mom and baby may need breastfeeding assistance
    - Breastfeeding provides benefits of decreased infections, ear and respiratory and prior to surgeries and post surgery protection
    - Aids in development of orofacial muscles
    - Breastfeeding at breast with cleft palates is very difficult and many medical professionals do not encourage it due to outcomes
    - Less severe cleft lips, especially after surgery, can be more successful at breast
    - Try different positions to get seal, both mother and baby comfortable, head slightly higher than buttocks
    - Use finger or thumb to seal cleft lips
    - Direct nipple away from back of throat
    - Support breast and chin to prevent tiring (“Dancer” position)
    - Shorter feeds may be necessary due to fatigue
    - Get “let down” before feeding
    - Pump to keep milk supply up
    - Use of hind milk
    - Support breastfeeding mom’s efforts (regardless of outcome)
  - Brecht feeder (syringe with flexible tubing)
  - Beniflex (crossed nipple)
  - Haberman feeder (large nipple with collection receptacle)
  - Supplemental Nutrition System (SNS), Infant Feeding Tube devices
  - Formula
  - Support recommended feeding techniques
  - Use feeding method up to 4-6 months until infant can use cup and spoon feeding
- Explain importance of closely monitoring weight gain
- For older infants receiving solids:
  - Avoid acidic and spicy foods that could cause irritation of the mouth and nose
  - Avoid nuts, peanut butter, leafy vegetables, peeling of raw fruits, creamed dishes that could get caught in cleft
  - Child may eat slower, may tire before eating adequately
  - Offer smaller, more frequent meals of high caloric dense foods (low fluid content)
  -

- Explain lip surgery/repair:
    - Usually schedule when infant reaches 10 lbs or about 6-8 weeks
    - May use feeding assistance device until can resume breastfeeding
    - Offer water after feeding to prevent contamination of suture line
- Explain palate repair:
    - Usually schedule at 12-14 months old
    - Palatal obturator used to keep the hard palate from closing
    - Post operation - use cup feeding not spoon feeding or straw to avoid injury to the repair site
    - Diet of soft, finely pureed or mashed 10-20 days, then normal diet
    - Avoid hard foods (e.g. raw vegetables)
- Considerations for **Down Syndrome**:
    - Discuss feeding method(s)
        - Dependent on if very low tone or have other medical problems
        - Breastfeeding options and using pumped breast milk
        - Use of Supplemental Nursing System (SNS), Infant Feeding Tube device
        - Use of cup, flexible cup (e.g. - Infa Feeder)
        - Use of appropriately suited bottle and nipple
    - Discuss and address solutions to feeding difficulties
        - Mom and baby may need breastfeeding assistance
            - Encourage small frequent feedings and correct latch/positioning
            - Low muscle tone may fatigue or be less effective at feedings (e.g. - 2-3 gum presses and then sweep tongue to get milk from breast)
            - Flat tongue gets less milk at breast (doesn't cup)
            - Gulping and choking happens more easily; airway not as well protected with swallowing
            - Discuss breastfeeding techniques
            - Encourage cuddling, skin to skin for stimulation
            - Encourage to direct nipple away from back of throat or more upward to assist milk flow for easier swallowing
            - Observe nursing patterns, may change with need to burp
            - Support breast and chin to prevent tiring ("Dancer" position)
            - Shorter feeds may be necessary due to fatigue
            - Get "let down" before feeding
            - Use double electric breast pump to keep milk supply up
            - Encourage patience and learning
            - Support breastfeeding mom's efforts (irrelevant of outcome)
    - Explain importance of monitoring weight gain (use Down Syndrome growth chart for counseling)
    - For older infant receiving solids:
        - Avoid nuts, peanut butter, leafy vegetables, or foods that are difficult to manipulate in mouth or cause choking
        - May eat slower, may tire before eating adequately

        - Possibly delay introduction to solid foods due to late appearance of the chewing reflex and of teeth
        - Offer small bites, clear mouth, offer liquids due to storage of food in the high arched palate (thrusting of food out of the mouth with the tongue)
        - Use bibs/overshirts; increased mucus production
        - Offer smaller more frequent meals
- Considerations for **Sick Cell Anemia**:
    - If participant has unusually high or low hematocrit/hemoglobin, refer to MD
    - Dietary intakes should be normally low in iron
    - Iron rich foods such as liver and iron fortified cereals should be excluded
    - Requirements for water soluble vitamins are high
    - Dietary intake of fat should be low (< 30% of total calories especially if participant has liver and gall bladder disease)
    - Zinc supplementation may be helpful (refer to MD)
- Considerations for **Thalassemia**:
    - If participant has unusually high or low hematocrit/hemoglobin, refer to MD
    - Include diet rich in water soluble vitamins
    - Recommend diet low in iron if transfusions are part of treatment
- Considerations for **Muscular Dystrophy**:
    - Refer to MD for monitoring medications and possible side effects, GI problems
    - Calorie requirements may be less than normal
    - Limit high calorie, low nutrient density foods
    - Limit fat to no greater than 30% of total calories
    - Increase fiber if constipation is a problem
    - Watch for increase in weight gain, (increase in BMI), or obesity
        - Encourage following exercise program, physical and respiratory therapies
    - Watch for swallowing difficulties, if phlegm accumulates due to ingestion of dairy
        - Ensure adequate calcium intake and use juices to clear phlegm
    - Watch for changes in functional ability or mobility that affect caloric intake (e.g. self feeding) or caloric expenditure (e.g. ability to walk/move)
    - May need to use rubber mesh mat or moistened paper towel under plate to prevent slipping
    - Use lightweight plastic bowls vs. glass or ceramic
    - Increase diameter of eating utensils with foam
    - Use wide-handled plastic mugs & sip cups, two handled cups or water bottles with straws
    - Cut out rim of disposable cup to fit child's nose (allows chin forward comfort)
    - For swallowing difficulties:
        - Suck ice chips to desensitize the gag reflex (adults)
        - Tip chin down if food gathers in the back of the mouth
        - Place frozen package of peas on the front of the neck to relax muscle spasms

References

1. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 179-181.

2. Ohio Neonatal Nutritionists: Nutritional Care for High Risk Newborns: Stickley Publishers; 1985; pp. 126-137, 141.

3. Grand, Stephen, and Dietz: Pediatric Nutrition: Theory and Practice; Butterworths; 1987; pp. 481-487.

4. Pediatric Nutrition in Chronic Diseases and Developmental Disorders: Prevention, Assessment and Treatment, Edited by Shirley Walberg Ekvall, PhD, FAAMD, FACN, RD; Oxford University Press; 1993; pp. 289-292.

5. Zeman FJ. Clinical Nutrition and Dietetics. Lexington, Mass: The Collamore Press; 1993.

6. Berkow R, et at. The Merck Manual of Diagnosis and Therapy. Rahway, MJ: Merck Sharp and Dohme Research Laboratories; 1982.

7. Danner SC, Cerutti ER. Nursing Your Baby With A Cleft Palate & Cleft Lip. Waco, TX: Childbirth Graphics; 1996.

8. Danner SC, Cerutti ER. Nursing Your Baby with Down Syndrome. Waco, TX: Childbirth Graphics; 1986.

9. American Dietetic Association: Pediatric Manual of Clinical Dietetics; 1998; pp. 177-178.

10. Berkow, et al.: Merck Manual; 1992; 16th Edition; page 1388.

351 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:

Inborn Errors of Metabolism*	
Amino Acid Disorders	Urea Cycle Disorders
Organic Acid Metabolism Disorders	Carbohydrate Disorders

Fatty Acid Oxidation Disorders	Peroxisomal Disorders
Lysosomal Disorders	Mitochondrial Disorders
**For more information about additional IEM, please see Clarification*	

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	High Risk
Pregnant	I	Y
Breastfeeding	I	Y
Non-Breastfeeding	VI	Y
Infants	I	Y
Children	III	Y

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned

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).

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 (3)

• 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 (5)

• 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 (5)

• 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) (6)

• 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 (6, 8)

• 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 (6, 8)

• 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 (6, 8, 9)

• 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 (6, 5)

• 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.

Implications for WIC Nutrition Services

WIC can provide exempt infant formulas and WIC-eligible medical foods, including those specifically formulated for IEM. Most of the dietary regimens for IEM require a combination of medical food (special formula in most cases) and standard infant formula or prescribed conventional foods. For example, participants with IEM related to essential amino acid metabolism (such as PKU, MSUD), who are not developmentally ready for conventional foods; require both medical food without the offending amino acid(s), and human milk or standard infant formula.

It is recommended that WIC nutritionists collaborate with the clinical dietitians at the metabolic treatment facility, where available, to prescribe WIC food packages (Food Package III) according to the therapeutic diet ordered by the metabolic team, monitor the compliance of the restricted diet, and follow up on the growth and developmental status of the participants with IEM.

Note: Infants with classic galactosemia cannot be breastfed due to lactose in human milk.

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.

The link below lists newborn screening coordinators. The coordinator can direct families to appropriate metabolic treatment facilities based on the newborn screening result: http://genes-r-us.uthscsa.edu/State_contacts.pdf.

Justification for High Risk

Untreated pregnant women with certain inborn errors of metabolism have a higher risk of spontaneous abortion and other health or nutrition risks. Significant adaptation of energy,

carbohydrate and amino acid metabolism occurs early in prenatal and neonatal development (10). Many metabolic errors in metabolism affect these pathways and such disturbances may lead to poor intrauterine growth and maternal health.

Infants born to mothers with untreated PKU may show fetal growth restriction, microcephaly, low birth weight, and congenital heart disease. If not detected and treated soon after birth, infants accumulate abnormal metabolites in their blood, resulting in mental retardation, seizures, growth retardation, and developmental delays. Infants with inborn metabolic errors typically exhibit lethargy, decreased feeding, vomiting, seizures, and failure to thrive. As these infants get older they may miss cognitive milesontes, loss of language skills, progressive deficits in attention or focus and other behavioral changes (4). Appropriate dietary management, which includes the use of special formulas, can minimize the medical risks to the individual. WIC can provide nutritional treatment tailored to each of the inborn errors of metabolism and refer participants to a physician who may recommend carnitine supplementation.

Additional Counseling Guidelines

- Considerations for **Phenylketonuria (PKU)**:
    - Individuals with PKU lack the enzyme to convert phenylalanine (an essential amino acid) to tyrosine
    - Pregnant women are at higher risk of spontaneous abortion or other health or nutrition risks
    - High levels of phenylalanine and its metabolites are toxic to the developing central nervous system
        - Risk to fetus and newborn such as IGR, congenital anomalies, mental retardation
    - Total restriction of phenylalanine can also cause problems such as microcephaly, intrauterine growth retardation, FTT
    - Infants born to mothers with untreated PKU may show fetal growth restriction, microcephaly, LBW, and congenital heart disease
        - Infants need to be treated soon after birth to prevent serious health problems
- Review benefits of treatment:
    - During pregnancy, lowering intake of phenylalanine to normal levels reduces the risk of damage to the fetus or newborn
    - Infants and children who receive early and continuous dietary treatment can normalize blood phenylalanine and can have normal mental development
- Reinforce:
    - Infants with PKU should not be exclusively breastfed
        - They need to follow their prescription for low phenylalanine formula in conjunction with breastfeeding (e.g. Phenex 1, Analog XP)
    - Individuals with disorder, or parent/caregiver, need to learn foods low in phenylalanine, portion sizes, planning for diet
    - Not to use artificial sweetener aspartame

        - For foods containing it, read labels (no NutraSweet, Equal)
- Considerations for **Galactosemia**:
- Reinforce:
    - Importance of receiving ongoing medical/dietary care
    - No breastfeeding
    - Importance of following prescribed formula or dietary prescription which may change with the participant's needs
- Considerations for **Hyperlipoproteinemia (HLP)**:
- Reinforce:
    - Need for ongoing medical/dietary care
    - Need to follow dietary recommendations (which are individualized depending on the type) such as:
        - Decrease saturated fat
        - Decrease cholesterol
        - Increase fiber
        - Decrease alcohol
    - Follow medications
    - Participants with high triglyceride levels and/or hypertension need to follow MD treatment, such as:
        - No smoking
        - Regular exercise
    - Encourage compliance to prevent atherosclerosis and coronary heart disease

References

1. Metabolic backgrounder: The Ross metabolic formula system for meeting special nutrition needs. Columbus, OH: Ross Products Division; 2007.

2. Levy PA. Inborn Errors of Metabolism: part 1: Overview. Pediatr Rev. 2009Apr; 30(4):131-7.

3. Wilcken B. An introduction to nutritional treatment in Inborn errors of metabolism – different disorders, different approaches. Southeast Asian J Trop med Public Health. 2003; 34 Suppl 3: 198-201.

4. Hendricks KM, Duggan C. Manual of pediatric nutrition, 4th ed. 2005; 626-657.

5. Ekval S, Ekvall, VK, editors. Pediatric nutrition in chronic diseases and developmental disorders: prevention, assessment and treatment. 2nd ed. Oxford University Press; 2005. Part III. Chapters 37 -59.

6. GeneReviews are expert-authored, peer-reviewed, current disease descriptions that apply genetic testing to the diagnosis, management, and genetic counseling of patients and families with specific inherited conditions. Available at:

http://www.ncbi.nlm.nih.gov/sites/GeneTests/review?db=GeneTests (last accessed 8/5/2010).

7. Stanley CA. Disorders of fatty acid oxidation. In: Fernandes J, et al editors. Inborn metabolic diseases. Berlin Springer; 2000. p. 141-150.

8. Agamanolis D. Inherited metabolic disorders in neuropathology: an illustrated interactive course for medical students and residents. Akron OH: Akron Children's Hospital, Northeastern Ohio University College of Medicine. Available at: http://www.neuropathologyweb.org/chapter10/chapter10aLSDgeneral.html.

9. Van Veldhoven, PP, Leuven KU. Biochemistry and genetic disorders of inherited disorders of peroxisomal fatty acid metabolism. J Lipid Res. 2010 June. Available at: http://www.jlr.org/cgi/rapidpdf/jlr.R005959v1.

References for High Risk

1. Meas T, Deghmoun S, Armoogum P, Alberti C, Levy-Marchal C. Consequences of being born small for gestational age on body composition: An 8-year follow-up study. *J Clin Endocrinol Metab.* 2008; 93(10):3804-3809.

2. Ibanez L, Ong K, Dunger DB, Zegher F. Early development of adiposity and insulin resistance after catch-up weight gain in small-for-gestational-age children. *J Clin Endocrinol Metab.* 2006; 91(6):2153-2158.

3. Wang X, Cui Y, Tong X, Ye H, Li S. Glucose and lipid metabolism in small-for-gestational age infants at 72 hours of age. *J Clin Endocrinol Metab.* 2007;92(2):681-684.

4. Clayton PE, Cianfarani S, Czernichow P, Johannsson G, Rapaport R, Rogol A. Management of the child born small for gestational age through to adulthood: A consensus statement of the international societies of pediatric endocrinology and the growth hormone research society. *J Clin Endocrinol Metab.* 2007; 92(3):804-810.

5. Singhal A, Cole TJ, Fewtrell M, Kennedy K, Stephenson T, Elias-Jones A, Lucas A. Promotion of faster weight gain in infants born small for gestational age: Is there an adverse effect on later blood pressure? *Circulation.* 2007;115:213-220.

6. Barness LA. An approach to the diagnosis of metabolic diseases. *Fetal and Pediatric Pathology.*2004;23:3-10.

7. Nasser M, Javaheri H, Fedorowicz Z, Noorani Z. Carnitine supplementation for inborn errors of metabolism (Review). *The Cochrane Collaboration.* 2012; 2:1-22.

8. Mannenback MS. Children with inborn errors of metabolism: recognizing the unusual and life-threatening. 2008; 13:10.

9. Raghuveer TS, Garg U, Graf W. Inborn errors of metabolism in infancy and early childhood: an update. *American Family Phisician.* 2006;73:11.

10. Illsinger S, Das AM. Impact of selected inborn errors of metabolism on prenatal and neonatal development. *IUBMB Life.* 2010; 62(6); 403-413.

352 Infectious Diseases

Definition/Cut-Off Value

A disease caused by growth of pathogenic microorganisms in the body severe enough to affect nutritional status

Includes:

- AIDS (Acquired Immunodeficiency Syndrome)*****
- Bronchiolitis (3 episodes in last 6 months)
- Hepatitis*****
- HIV (Human Immunodeficiency Virus infection)*****
- Meningitis
- Parasitic infections
- Pneumonia
- Tuberculosis

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	N
Breastfeeding*	I	N
Non-Breastfeeding	VI	N
Infants	I	N
Children	III	N

*Breastfeeding is contraindicated for women with HIV or AIDS.
*Breastfeeding may be permitted for some women with hepatitis (see counseling guidelines).

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

Justification

Chronic, prolonged, or repeated infections adversely affect nutritional status through increased nutrient requirements as well as through decreased ability to take in or utilize nutrients.

Catabolic response to infection increases energy and nutrient requirements and may increase the severity of medical conditions associated with infection.

Bronchiolitis is a lower respiratory tract infection that affects young children, usually under 24 months of age. It is often diagnosed in winter and early spring, and is caused by the respiratory syncytial virus (RSV). Recurring episodes of bronchiolitis may affect nutritional status during a critical growth period and lead to the development of asthma and other pulmonary diseases.

HIV is a member of the retrovirus family. HIV enters the cell and causes cell dysfunction or death. Since the virus primarily affects cells of the immune system, immunodeficiency results (AIDS). Recent evidence suggests that monocytes and macrophages may be the most important target cells and indicates that HIV can infect bone marrow stem cells. HIV infection is associated with the risk of malnutrition at all stages of infection.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Discuss need for receiving adequate nutrients, calories and protein to:
  - Maintain health status
  - Fight infection (e.g. -- more calories utilized with fever)
  - Prevent malnutrition
  - Maintain adequate protein stores, prevent catabolism
  - Promote healing
- Discuss:
  - Changes in dietary intake, appetite
  - If participant is anorexic, nauseous
  - Recent weight loss or changes

    - Appropriate weight status or recommended weight gain for growth or pregnancy
    - If medically allowed, moderate physical activity
    - Basic precautions of spreading infectious disease (e.g. - frequent handwashing with food preparation)
- Discuss appropriate dietary recommendations:
    - Include food sources of vitamin A, C, iron and zinc
    - Offer small, frequent meals if intake is poor
    - Cater to personal preferences to spark appetite and encourage better intake
    - Offer high calorie, nutrient dense foods to maintain or increase weight
    - Reinforce to follow directions on medications (if to be taken with or without foods); identify possible food nutrient interactions (NRF #357)
- Discourage:
    - Drug use
    - Smoking
    - Alcohol use
- Encourage:
    - Adequate rest, prevention of fatigue
    - Limiting stress
    - Receiving help from other services specific to the disease
- Breastfeeding recommendations:
    - It is not recommended for women to breastfeed if they have HIV/AIDS
    - Hepatitis: developments in the management and prevention of hepatitis have changed the management of infected women during pregnancy and have made breastfeeding safe. The following are guidelines for breastfeeding women with hepatitis, as found in the Technical Information Bulletin (10/97) “A Review of the Medical Benefits and Contraindications to Breastfeeding in the United States”:
        - Hepatitis A: Breastfeeding is permitted as soon as the mother receives gamma globulin
        - Hepatitis B: Breastfeeding is permitted after the infant receives Hepatitis B specific immunoglobin (HBIG) and the first dose of the series of Hepatitis B vaccine
        - Hepatitis C: Breastfeeding is permitted for mothers without co-infection (e.g. HIV)
    - For other infectious diseases, breastfeeding has specific immunological benefits to prevent infant from disease
    - If the woman’s health and nutrition status is severely compromised, consult MD regarding breastfeeding

References

1. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 184-186.

2. Berkow, et al.: Merck Manual; 1992; 16th Edition.

3. Grand, Stupen, and Dietz: Pediatric Nutrition: Theory and Practice; Butterworths; 1987; pp. 549-570, 571-578, 651-664.

4. Zeman FJ. Clinical Nutrition and Dietetics. Lexington, Mass: The Collamore Press; 1993.

5. Lawrence, Ruth A: Maternal and Child Health Technical Information Bulletin: A Review of Medical Benefits and Contraindications to Breastfeeding in the United States; 1997; pp. 14-17.

353 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	High Risk
Pregnant	I	N
Breastfeeding*	I	N
Non-Breastfeeding	VI	N
Infants	I	N
Children	III	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

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:

o http://www.fda.gov/downloads/ForConsumers/ConsumerUpdates/UCM254727.pdf. Accessed May 2012.

o http://www.webmd.com/allergies/foodtriggers. Accessed May 2012.

o 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, placebo-controlled 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)

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Explain definition of a food allergy.
  - True food allergies involve abnormal immunologic responses to food proteins
  - The proteins are resistant to digestion and elicit the formation of antibodies
  - This allergic response occurs immediately after food is eaten (this is different from a food intolerance)
- Explain characteristics of a food allergy:
  - Will always result in same symptomatic reaction for that individual (could be more mild or severe)
  - If individual is ill or stressed, symptoms may be more severe
  - Sensitization can occur; may have previously tolerated a food but now has a reaction

    - There may be potential for thresholds for individuals with multiple allergies (from contacting, inhaling or ingesting allergens)
    - Some food allergy reactions can be more severe for those who have other allergies (even though not food allergens) (e.g. during pollen season)
- Inform that:
    - The most common offending foods are: peanuts, cow's milk, eggs, soy beans, nuts from trees, wheat, and seafood
    - Prevalence:
        - 4 - 8% young infants
        - 1 - 2% children
        - < 1% adults
- Discuss reactions that can occur:
    - GI - nausea, vomiting, diarrhea, abdominal pain, colic, loss of appetite, constipation, malabsorption, cheilitis and stomatitis (inflammation of the lip and mouth)
    - Dermatologic - itchy "wheels", hives, eczema, dermatitis, rash around mouth, or ulcers in/around mouth
    - Respiratory - chronic rhinitis, asthma, recurrent bronchitis, recurrent croup, recurrent otitis media, chronic coughing, spitting up blood from irritated lungs or bronchioles
    - CNS - headache, insomnia, irritability, listlessness, drowsiness
    - Hematologic – anemia
    - Systemic - anaphylaxis, FTT, malnutrition
- Assist with:
    - Eliminating allergenic food(s) from diet
    - Meal planing at home, away from home, at restaurants
    - Adjusting food package: try goat's milk (40% of those sensitive to cow's milk can tolerate goat's milk) or soy-based beverage (for children)
    - Reading labels to identify allergenic foods (see NRF #354 "Celiac Disease" and #355 "Lactose Intolerance" for food list and other ideas)
    - Identify unobvious allergen sources in foods; they are widely found in commercial and prepared foods (e.g. corn, eggs)
    - Modifying or substituting recipes
- If the CPA/RD determines that a client's calcium intake is compromised, offer calcium fortified orange juice by providing the client with a Special Food letter indicating the client's need for calcium fortified orange juice
- Educate participant about anaphylactic response
    - It is a whole-body systemic reaction in which airway can be blocked, shock can occur, etc. in seconds to minutes
- If allergic individual has potential for anaphylactic response they should know
    - What foods could precipitate anaphylactic response - legumes, especially peanuts, tree nuts, seafood particularly shellfish, and berries
    - What treatments or medications should be administered at time of reaction

    - Wearing a medical alert bracelet or jewelry could provide for more immediate treatment
- For pregnant participants:
    - Follow diet without emphasis on any one food
    - Not recommended to eat large quantities of any high allergenic food
    - Replace diet with nutrients and energy due to the elimination of the allergenic foods (e.g. - provide calcium food list if milk is eliminated)
    - If foods are eliminated long term, recommend vitamin/mineral supplements
- For infants:
    - Infants are more susceptible to the development of food allergies than adults
    - Their digestive system is more permeable to proteins and is not fully mature
    - Infants born to parents with allergies are at a greater risk
    - Infants may have less allergies when they are older
- Recommendations for infants:
    - Exclusively breastfeed for a minimum of 1 year to reduce severe allergic disease, especially in the high risk infant
    - If breastfed infant shows signs of digestive problems:
        - Do not stop breastfeeding!
        - Refer to MD/RD/CLC
        - Eliminate potential allergenic foods in lactating mother's diet
    - For non-breastfed infants provide milk or soy based or hydrolysate infant formulas
        - Reinforce that formulas, unlike breast milk, do not have the immunologic benefits to actually reduce/prevent allergies
    - Delay introduction of solids until infant is developmentally ready
    - Adjust for gestational age for introduction of foods
    - Delay high allergenic foods in infants with family history of allergies
        - If cow's milk allergy, wait a minimum of first 12 months to introduce diary products
    - Allow a minimum of 3-5 days to introduce new foods and confirm no adverse reactions
    - Allow for adequate time to rechallenge foods
- Recommendations for children:
    - Provide psychological support to the child with multiple allergies; they do not need to feel different or fragile
    - Provide special treats or foods (e.g. - at birthdays, holidays) to replace other foods the child cannot have
    - Refer to www.foodallergy.org for up-to-date food recalls or warnings because of undisclosed milk or other common allergens and accurate information about food allergies and anaphylaxis

References

1. Boyce, J. et al. Guidelines for the diagnosis and management of food allergy in the United States: Report of the NIAID-Sponsored Expert Panel. Journal of Allergy and Clinical Immunology. 2010; 126(6):S1-S58. http://www.jacionline.org/article/S0091-6749(10)01566-6/fulltext. Accessed May 2012.

2. Gupta, R. et al. The prevalence, severity and distribution of childhood food allergy in the United States. Pediatrics. 2011; 128(1):e9-e17. Available at: http://pediatrics.aappublications.org/content/128/1/e9.full.html. Accessed May 2012.

3. National Institute of Allergy and Infectious Disease website: How do allergic reactions work? Available at: http://www.niaid.nih.gov/topics/foodallergy/understanding/pages/whatisit.aspx. Accessed May 2012.

4. Cianferoni, A, Spergel, JM. Food allergy: review, classification and diagnosis. Allergology International. 2009; 58:457-466.

5. National Institute of Allergy and Infectious Disease. Food allergy: An overview. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, 2010 (NIH Publication No. 11-5518). Available at: http://www.niaid.nih.gov/topics/foodallergy/understanding/pages/whatisit.aspx. Accessed May 2012.

6. Sampson, HA. Food Allergy. Part 1: Immunopathogenesis and clinical disorders. Journal of Allergy and Clinical Immunology. 1999; 103(5):717-728.

7. Davis, C. Food allergies: clinical manifestations, diagnosis, and management. Current Problems in Pediatric Adolescent Health Care. 2009; 39:236-254.

8. Metcalfe DD, Sampson HA, Simon RA, editors. Food allergy: adverse reactions to food and food additives. 4th ed. Malden (MA): Blackwell Publishing; 2008.

9. Greer, F. et al. American Academy of Pediatrics Committee on Nutrition. Effects of early nutritional interventions on the development of atopic disease in infants and children: the role of maternal dietary restriction, breastfeeding, timing of introduction of complementary foods, and hydrolyzed formulas. Pediatrics. 2008; 121(1), pages 183-191.

10. Gartner LM, Morton J, Lawrence RA, et al. American Academy of Pediatrics. Policy Statement: Breastfeeding and the use of human milk. Pediatrics.2005; 115 (2):496– 506.

11. Sicherer S.H., Sampson, HA. Food allergy. Journal of Allergy and Clinical Immunology. 2010; (125):S116-S125.

USDA 6/12

354 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	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N
Infants	I	N
Children	III	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

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.

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).

Implications for WIC Nutrition Services

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:

o http://www.celiac.nih.gov/Default.aspx. Accessed May 2012.
o 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)

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Explain disease
  - Gluten is a protein found in wheat, rice, oats, and barley (WROB)
    - Gluten may be fractionated into two parts: gliadin (the damaging fraction) and glutenin
    - In oats, it is prolamin
  - Lining of small intestine is damaged when gluten is ingested
  - Symptoms include: constipation alternating with diarrhea, steatorrhea, excessive gas, bloating, weight loss with high calorie intake, anemia, itchy blistering lesions, projectile vomiting and growth failure in infants and children
    - Even if participant does not experience symptoms, damage still occurs
    - Can lead to malabsorption and malnutrition
  - If disease is untreated it can lead to other problems such as organ system problems, OB/GYN problems, dental problems, behavioral changes/irritability, decreased concentration in children
  - Celiac disease may be associated with other disorders such as Type I IDDM, hypoglycemia
- Disease typically seen in:
  - infants when cereals are added
  - adolescence - remission and then later reoccurs
  - adults age 20 – 30 secondary to intestinal damage
- Help participant identify/avoid gluten sources
  - Avoid gluten in diet by eliminating wheat, rye, oats, barley, buckwheat (kasha), kamut (hybrid of wheat and rye), millet, quinoa, spelt (ancient wheat) or triticale flours
  - Identify less obvious food sources of gluten such as salad dressing, ice cream, candies, gravies and sauces containing fillers, malted milk, beer and ale from barley, paste products, food containing bran or labeled graham (e.g. - graham crackers), soy sauce solids, food starch – modified (ingredient labeling term that

indicates the presence of gliadin (the damaging fraction of gluten)), flour, self-rising flour, enriched flour, monosodium glutamate (MSG), hydrolyzed vegetable protein (HVP), cereals, cereal extracts, distilled vinegar, emulsifiers and stabilizers
    - Many medications may contain gluten; check with MD, pharmacist or refer to drug information from Celiac Sprue Association
    - Some foods, such as cereals, could be contaminated with gluten during manufacturing
- If medically necessary, gluten free cereals may be approved
    - The following WIC-approved cereals are WROB free:
        - Instant grits
        - Malt-O-Meal puffed rice (special food letter needed)
    - Contact the State agency if special approval is needed
- Recommend to incorporate the following into diet:
    - Life-long adherence to diet
    - Adequate intake of protein, carbohydrate and fat (without WROB)
    - Encourage fat soluble vitamins A, D, E, K, the B vitamins (including folate), through food and vitamin/mineral supplementation
    - Fiber through other sources (e.g. beans, lentils), corn, rice millet, corn breads and flours from rice, arrowroot, corn breads and flours from rice, arrowroot, potato, soy, tapioca
    - Cereals including Cream of Rice, hominy, corn meal, puffed rice
    - Wheat starch can be used to prepare baked products but not substituted freely as flour
    - Use rice vinegar, wine vinegar or pure cider vinegar, not distilled vinegar
- For newly diagnosed individuals:
    - Allow for GI recovery (up to 6 months)
    - Recommend to avoid fat until steatorrhea subsides
    - Recommend to avoid lactose
- Provide simplified meal plan regarding weaning from wheat based to rice based diet
- Avoid overwhelming participant with too many details at once
- Provide a few excellent recipes
- Discuss planning meals when away from home or when in restaurants
- Provide a list of manufacturers who provide special food products
- Provide list of support groups for Celiac Disease

References

1. National Institute of Allergy and Infectious Disease. Food allergy: an overview. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, 2010 (NIH Publication No. 11-5518). Available at:

http://www.niaid.nih.gov/topics/foodallergy/understanding/pages/whatisit.aspx. Accessed May 2012.

2. Case, S. Gluten-free diet: A comprehensive resource guide. Case Nutrition Consulting Inc., 2008.

3. Green, PHR, Cellier, C. Medical progress-celiac disease. The New England Journal of Medicine. 2007 Oct 25:1731-1743.

4. National Institute of Diabetes and Digestive and Kidney Diseases, Celiac Disease, National Institute of Health. Celiac disease. Available at: http://digestive.niddk.nih.gov/ddiseases/pubs/celiac/#what Accessed May 2012.

5. National Institute of Diabetes and Digestive and Kidney Diseases, Celiac Disease, NIH Publication No. 08-4269 September 2008.

6. Guideline for the Diagnosis and Treatment of Celiac Disease in Children: Recommendation of the North American Society for Pediatric Gastroenteroloy, Hepatology and Nutrition. J Pediatr Gastroenterol Nutr. 2005 Jan;40(1):1-19.

7. ESPGHAN Committee on Nutrition: Agostoni, C. et al. Complementary feeding: A commentary by the ESPGHAN Committee on Nutrition, Medical Position Paper. Journal of Pediatric Gastroenterology and Nutrition, January 2008: 46:99-110.

8. Raymond, N, Heap, J, Case, S. The gluten-free diet: An update for health professionals. Practical Gastroenterology. 2006 September: 67-92.

9. American Gastroenterological Association (AGA) Institute Technical Review on the Diagnosis and Management of Celiac Disease. Gastroenterology. 2006 Dec;131(6):1981–2002.

10. Boyce, J. et al. Guidelines for the diagnosis and management of food allergy in the United States: Report of the NIAID-Sponsored Expert Panel. Journal of Allergy and Clinical Immunology. 2010; 126(6):S1-S58. http://www.jacionline.org/article/S0091-6749(10)01566-6/fulltext. Accessed May 2012.

355 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	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N
Infants	I	N
Children	III	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

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).

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.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Explain
  - Lactose intolerance may be secondary to GI upset or illness
- Dietary recommendations to discuss:
  - Avoid foods containing lactose
  - Limit portion size of lactose-containing foods
  - Consume dairy foods with meals (diluted with other foods)
  - Heated milk products may be better tolerated (lactose broken down)
  - Higher-fat dairy foods (ice cream) may be better tolerated, for occasional treats
  - Lactose enzyme tablets are available to take when lactose containing foods are ingested (but are expensive)
  - Try lactose-reduced or lactose-free milks (Lactaid, Dairy Ease)
  - Choose low-lactose foods such as aged hard cheese or yogurt for calcium source
    - Active culture foods such as yogurt help break down lactose
  - Read labels to avoid foods containing milk or lactose such as: milk solids, non-fat milk solids, whey, lactose, margarine, sour cream, malted milk, butter, buttermilk
  - Avoid foods that may contain lactose; breads, candy/cookies, cold cuts, hot dogs, bologna, commercial sauces and gravies, cream soups, dry cereals, frostings, frozen breaded fish/chicken, prepared and processed foods, salad dressings containing milk or cheeses, sugar substitutes, chocolate drink mixes, coffee drinks/mixes

- Kosher foods that contain the word “pareve” or “parve” are acceptable and do not contain milk
- Creamers do no adequately substitute milk
- If dairy intake is compromised, include foods rich in calcium, vitamin A & D
- If participant’s calcium intake is compromised, offer calcium-fortified orange juice by providing the client with a Special Formula/Food letter indicating the client’s need for calcium-fortified orange juice
- Substitute fruit juice or water in baked products that call for milk
  - Choose recipes that produce a good product since texture may be different

- For infants:
  - If breastfeeding, continue to breastfeed (Breast milk is easily digested and will help with recovery of illness, diarrhea and other symptoms.)
  - If formula fed, use lactose reduced formula

References

1. National Institutes of Health Consensus Development Conference Statement: Lactose intolerance and health. February, 2010. Available at: http://consensus.nih.gov/2010/lactosestatement.htm. Accessed May 2012.

2. Heyman MB. Lactose intolerance in infants, children, and adolescents; Pediatrics 2006 September: 118 (#3) 1279-1286. http://aappolicy.aappublications.org/cgi/reprint/pediatrics;118/3/1279.pdf. Accessed May 2012.

3. Shulman RJ, Feste A, Ou C. Absorption of lactose, glucose polymers, or combination in premature infants. J Pediatr. 1995; 127:626–631.

4. Ranciaro A, Tishoff SA. Population genetics: evolutionary history of lactose tolerance in africa [abstract]. NIH Consensus Development Conference Lactose Intolerance and Health; February 2010; 43-47.

5. U.S. Department of Health and Human Services- Office of the Surgeon General. Bone health and osteoporosis: a report of the surgeon general. 2004.

6. Hearney RP. Consequences of excluding dairy or of avoiding milk in adults [abstract]. NIH Consensus Development Conference Lactose Intolerance and Health. February, 2010; 73-77.

7. Chang, Lin MD. Clinical Presentation: But what if it is not lactose intolerance? [abstract]. NIH Consensus Development Conference Lactose Intolerance and Health; February 2010; 39-42.

Additional Reference

1. National Dairy Council [Internet]. Lactose Intolerance Health Education Kit (2011). Available at: http://www.nationaldairycouncil.org/EDUCATIONMATERIALS/HEALTHPROFESSIONALSEDUCATIONKITS/Pages/LactoseIntoleranceHealthEducationKit.aspx. Accessed May 2012

356 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	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N
Infants	I	N
Children	III	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

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 hypoglycemia 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).

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Hypoglycemia is a manifestation of disease; is not a disease in itself
- Discuss signs and symptoms of hypoglycemia
    - If rate of fall of blood glucose is rapid may experience sweating, weakness, hunger, tachycardia (increased heart rate)
    - If rate of fall of blood glucose is slow (over many hours) may experience headache, blurred vision, incoherent speech, mental confusion
    - If hypoglycemia is prolonged, more serious problems can occur
- If participant experiences symptoms, eat something (e.g. ½ cup juice or milk)
- If hypoglycemia is secondary to disease or other medical condition, follow medical recommendations
- There are many different causes or etiologies
- Signs and symptoms and when they occur may vary
- In infants potential causes of hypoglycemia include:
    - SGA
    - Fetal Growth Restriction
    - mother with Gestational Diabetes
- Dietary recommendations
    - Encourage regular scheduled meals (e.g. 3 meals, 3 snacks)
    - Encourage not to miss meals
- Encourage participant to ask MD about allowed exercise
- If participant is pregnant, discuss with MD feeding plan for newborn
    - Allow mother to breastfeed soon after delivery and frequently thereafter
- If infant is being treated in the hospital, recommend the mother/parents be available for and make arrangements for frequent feedings if medically allowed
    - For breastfed infants - to prevent possible “nipple confusion,” increase milk production, benefits to baby, etc.
    - For formula/bottle fed infants - for bonding and interaction

References

1. National Institute of Diabetes and Digestive and Kidney Diseases (NIDDKD): National Diabetes Information Clearinghouse; NIDDKD internet address: www.niddk.nih.gov;

February 10, 1997.

2. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 217-218.

3. Zeman FJ. Clinical Nutrition and Dietetics. Lexington, Mass: The Collamore Press; 1993.

357 Drug Nutrient Interactions

Definition/Cut-Off Value

Use of prescription or over-the-counter drugs or medications that have been shown to interfere with nutrient intake or utilization, to an extent that nutritional status is compromised

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N
Infants	I	N
Children	III	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

Justification

The drug treatment of a disease or medical condition may itself affect nutritional status. Drug induced nutritional deficiencies are usually slow to develop and occur most frequently in long-term drug treatment of chronic disease. Possible nutrition-related side effects of drugs include, but are not limited to, altered taste sensation, gastric irritation, appetite suppression, altered GI motility, and altered nutrient metabolism and function, including enzyme inhibition, vitamin antagonism, and increased urinary loss.

The marketplace of prescribed and over-the-counter drugs is a rapidly changing one. For knowledgeable information on the relationship of an individual's drug use to his/her nutritional status, it is important to refer to a current drug reference such as Physician's Desk Reference (PDR), a text such as Physician's Medication Interactions, drug inserts, a pharmacist or the Pregnancy Riskline (if the woman is pregnant or breastfeeding).

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Explain the factors associated with drug nutrient interaction
    - All drugs taken by pregnant women can be considered potentially harmful to the fetus
    - Misuse of some drugs during pregnancy can result in fetal malformations
    - Food components affect drug absorption and bioavailability
        - Effects vary for each drug
    - Drugs can affect the stomach emptying time
    - Drugs can compete with nutrients for absorption
    - Drugs can affect appetite, induce nausea, and impair sense of taste which may reduce food intake and contribute to weight loss
    - Use of some prescription and over-the-counter drugs are not advisable in breastfeeding
    - Some adverse effects can be minimized through adequate nutrient intake and timing of intake in relation to meals and breastfeeding
- Explain possible nutrition related side effects of the medication(s) that participant is currently taking
- Refer participant to her health care provider for the drug nutrient interaction or if a drug nutrient reaction is suspected
- Refer participant to the Pregnancy Riskline

References

1. Allen, M: Food-Medication Interactions; 7th edition; Tempe, Arizona; 1991.

2. Physician's Desk Reference; 51st edition; Montvale, New Jersey; Medical Economics Company, Inc.; 1997

3. Diet and Drug Interactions. Daphne A. Roe, M.D., F.R.C.P.

4. Handbook on Drug and Nutrient Interactions: A Reference and Study Guide.
5. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 217-218.

6. Pronsky, ZM: Powers and Moore's Food Medications Interactions; 10th edition; 1997.

7. USPDI: Drug Information for the Health Care Professional; 19th Edition; Micromedex; World Color Book Services, Taunton, Mass.; 1999.

8. Briggs, G. et. al.; Drugs in Pregnancy and Lactation, 5th Edition; Williams & Wilkins, Baltimore, Maryland; 1998.

358 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:

- 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	High Risk
Pregnant	I	Y

Breastfeeding	I	Y
Non-Breastfeeding	VI	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned for pregnant and breastfeeding women

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 non-breastfeeding postpartum women who are extremely preoccupied with rapid weight loss after delivery.

Justification for High Risk

Eating disorders can seriously complicate any pregnancy since weight gain is of critical importance and the nutritional status of the pregnant woman is an important factor in perinatal outcome. Pregnant women with an eating disorder are more likely to have a greater rate of miscarriage or premature labor, IUGR, and babies with higher rates of SGA, LBW, neural tube defects, and microcephaly (2). Some women with bulimia before pregnancy transfer to binge eating disorder (BED) during pregnancy. Women with BED and bulimia consume more total

energy and fat, monosaturated and saturated fat, yet consume less folate, potassium and vitamin C (3). Pregnant women experiencing anorexia are more likely to have SGA infants and are more likely to relapse postpartum. Other maternal postpartum symptoms like postnatal depression, stress of new motherhood, body image concerns and anemia can contribute to an eating disorder relapse (1).

Women with an eating disorder are less likely to breastfeed, or more likely to discontinue breastfeeding before 6 months. If they do breastfeed, mothers with an eating disorder may restrict food from their infants, which will affect the infant's health (2,5).

Individual counseling and WIC food can assist the pregnant woman in gaining an appropriate amount of weight and increasing the baby's birth weight.

Additional Counseling Guidelines

- Explain the potential risks of inadequate weight gain, weight loss during pregnancy or poor weight status prior to pregnancy, if appropriate (see counseling recommendations under risk factors 101, 131, and 132)
- Encourage intake of prenatal vitamins

References

1. Worthington-Roberts, B., and Williams, SR: Nutrition in Pregnancy and Lactation; 5th ed.; Mosby Pub; St. Louis; pp. 270-271.

2. Strober, M: International Journal of Eating Disorders; Vol. 8, No. 3; 1986; pp. 285-295.

3. Institute of Medicine: Nutrition Services in Perinatal Care; 1992; p. 20.

4. Clinical Issues Perinatal Womens Health Nursing; 1992; 3(4); pp. 695-700.

5. Krummel DA, and Kris-Etherton, PM: Nutrition in Women's Health, Aspen Pub; Gaithersburg, MD; pp. 58-102.

References for High Risk

1. Ward, VB: Eating disorders in pregnancy, British Medical Journal; 2008; 336; pp.93-96.

359 Recent Major Surgery, Trauma, Burns

Definition/Cut-Off Value

Major surgery (including C-sections), trauma or burns severe enough to compromise nutritional status

Any occurrence 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	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N
Infants	I	N
Children	III	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

Justification

The body's response to recent major surgery, trauma or burns may affect nutrient requirements needed for recovery and lead to malnutrition. There is a catabolic response to surgery; severe trauma or burns cause a hypermetabolic state. Injury causes alterations in glucose, protein and fat metabolism.

Metabolic and physiological responses vary according to the individual's age, previous state of health, preexisting disease, previous stress, and specific pathogens. Once individuals are discharged from a medical facility, a continued high nutrient intake may be needed to promote the completion of healing and return to optimal weight and nutrition status.

Persons experiencing severe trauma such as an automobile accident or burn exhibit a hypermetabolic state that may reach the basal levels and persist for 2 months or longer.

Alterations in the metabolism of glucose, protein and fat occur following injury.

Justification for High Risk
Not Applicable

Additional Counseling Guidelines

- Explain that participant's recent injury (trauma, burn, surgery) may cause her to have higher nutrient needs than normal for several months
    - Persons experiencing severe trauma such as an automobile accident or burns exhibit a hypermetabolic state that may reach the basal levels and persist for 2 months or longer
    - Alterations in metabolism of glucose, protein and fat occur following injury
- Counsel on methods to achieve adequate diet for age and condition with emphasis on foods of high nutrient density.

References

1. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 188-189.

360 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:

- Juvenile rheumatoid arthritis (JRA)
- Lupus erythematosus (lupus)
- Cardiorespiratory diseases (CRD)
- Heart disease
- Cystic fibrosis (CF)
- 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	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N
Infants	I	N
Children	III	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

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 energy malnutrition (PEM).

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, 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.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Discuss providing adequate energy (calories) and nutritional intake to maintain or provide for normal growth and development and body weight
- Counsel that goal is to prevent malnutrition which can lead to growth retardation, poor development and motor skills
- If appropriate, discuss the use of special formulas, especially higher calorie ones, which may be indicated for some of these conditions, especially to help correct the growth and weight problems in children with JRA, CF and lupus.
- **Juvenile rheumatoid arthritis (JRA)**:
    - Discuss nutritional risk associated with this disease:
        - About 36% experience protein energy malnutrition (PEM)
        - Lowered intakes of energy, vitamin E, calcium and iron
        - Serum vitamin C may be low in patients taking high doses of aspirin

- Counsel participant on increasing energy level in the diet as well as consuming adequate amounts of calories, vitamins A & C, calcium & iron, if appropriate

- **Lupus erythematosus:**
  - In pregnancy, there is an increased risk of late pregnancy losses (after 28 weeks) and spontaneous abortion
  - Late pregnancy losses are secondary to hypertension, renal failure and cardiac defects in the fetus
  - More common in dark-skinned ethnic groups, including blacks, Hispanics, Asians and some American Indian tribes
  - Occurs mostly in women between ages of 15 to 65 years of age
  - Discuss nutritional risk associated with this disease:
    - Increased risk of infection, malaise, anorexia, and weight loss
  - Little is known about nutrient metabolism or requirements in a person with lupus, so emphasis on sound nutritional practices is important
- Cardiorespiratory diseases (CRD) including heart, asthma & Cystic Fibrosis (CF):
  - These diseases interfere with normal physiological processes
  - Counsel regarding nutritional risk of CRD:
    - Failure to thrive
    - Malnutrition
    - Growth failure can also be aggravated because of increased metabolic requirements and difficulty in sucking and swallowing
  - If participant has congestive heart failure, encourage to limit salt intake
  - **Cystic Fibrosis**:
    - Diet should be individualized based on use of pancreatic enzyme replacement therapy
    - Protein deficiency is more common in first year when requirements are greatest
      - Ensure protein intake is adequate
    - Fat recommendations are the same as normal diets (35 – 40% of the calories)
    - Food items with fat should be as tolerated
    - Sodium needs are high because of sweat losses
      - Liberal use of salt is recommended
    - Frequent height and weight evaluation is recommended for infants and children
    - If growth is poor, the diet may need to increase up to 150% of the RDA for calories
    - Goal of nutritional therapy is to overcome energy deficit
    - Reinforce need to follow health care provider recommendations including use of pancreatic enzyme supplementation
    - Vitamin and mineral supplementation should be recommended or reinforced
    - Infants can be fed breast milk and/or all types of formula
      - Breastfed infants may require additional sodium

- Formula fed infants may need additional calories from fat or carbohydrates
- Formula may be recommended up to 24 months
- Follow normal guidelines for introduction of solids

References

1. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 185-187, 190-191.

2. Queen, Patricia and Lang, Carol: Handbook of Pediatric Nutrition; 1993; pp. 422-425.

3. National Heart, Lung, and Blood Institute: Expert Panel Report 2: Guidelines for the Diagnosis and Management of Asthma; 1997; pp. 3, 20, 67-73.

4. National Heart, Lung, and Blood Institute: Management of Asthma During Pregnancy; 1992; pp. 7, 36-37.

5. JAMA: Asthma Information Center: Asthma Medications Misused, Underused in Inner City Residents; 1998, pp. 1-2.

361 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	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

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*.**

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Explain the risk associated with maternal depression for mother and fetus:
  - Appetite changes
  - Anorexia
  - Bulimia
  - Weight loss
  - More likely to smoke during pregnancy
  - Attend prenatal care less frequently
  - Higher incidence of low birth weight babies
  - Higher perinatal mortality rates
- Explain the risks associated with maternal depression for the child:
  - More stomachaches and headaches in preschool children
  - Delayed achievement of developmental milestones
  - Child behavior problems such as sleep problems, feeding problems, child depression, social isolation, ADD, withdrawal and defiant behaviors
- Discuss importance of consuming nutritious, well-balanced diet to promote good physical and mental health
- Reinforce use of medication, if prescribed
- Ensure children are being properly cared for despite maternal depression

References

1. National Institute of Mental Health [Internet]. Major depressive disorders among adults. Available at: **http://www.nimh.nih.gov/statistics/1MDD_ADULT.shtml.** Accessed June 2013.
2. American Psychiatric Association. Consumer Fact Sheet: Let's talk facts about depression. Available at: www.healthyminds.org. Accessed June 2013.
3. Institute of Medicine. WIC nutrition risk criteria: a scientific assessment. National Academy Press, Washington, D.C.; 1996.
4. Kendall-Tackett K. Depression in new mothers: causes, consequences and treatment alternatives, 2nd edition: 2010 pages 17-19, 8, 51-58.
5. Gaynes BN, Gavin N, Meltzer-Brody S, Lohr KN, Swinson T, Gartlehner G, Brody S, Miller WC. Perinatal depression: prevalence, screening accuracy, and screening outcomes. Evidence Report/Technology Assessment No. 119. (Prepared by the RTI-University of North Carolina Evidence-based Practice Center, under Contract No. 290-02-0016.) AHRQ Publication No. 05-E006-2. Rockville, MD: Agency for Healthcare Research and Quality. February 2005.
6. Yonkers KA, Wisner KL, Stewart DE, et al. The management of depression during pregnancy: a report from the American Psychiatric Association and the American College of Obstetricians and Gynecologists September/October 2009.
7. Szigethy EM, Ruiz, P. Depression among pregnant adolescents: an integrated treatment approach. Am J Psychiatry, 2001 Jan; 158(1):22-7.
8. McClanahan KK. Depression in pregnant adolescents: considerations for treatment. J Pediatr Adolesc Gyneco. Feb; 22(1):59-64. 2009.
9. Cash RE, P. N. (2004, February). Depression in children and adolescents: information for parents and educators. Available at: **http://www.nasponline.org/resources/handouts/revisedPDFs/depression.pdf.** Accessed June 2013.
10. National Institute of Mental Health. Depression in children and adolescents. (Fact Sheet for Physicians). Bethesda, MD: Author (NIH Publication No. 00-4744). August 2001.
11. American Academy of Child and Adolescent Psychiatry. Facts for families: when children have children. July, 2004 (No.31). Available at: **www.aacap.org.** Accessed June 2013.
12. Barnet B, Liu J, Devoe M. Double jeopardy: depressive symptoms and rapid subsequent pregnancy in adolescent mothers. Arch Pediatric Adolescent Medicine; 162(3), March 2008.

13. Kendall-Tackett K, Hale TW. Review: The use of antidepressants in pregnant and breastfeeding women: a review of recent studies. Hum Lact May 2010 26: 187-195, first published on August 3, 2009.

14. Mayo Clinic. Antidepressants: safe during pregnancy? Last updated 1/10/12. Available at: **www.mayoclinic.com/health/antidepressants/DN00007/NSECTIONG**. Accessed June 2013.

15. Sanz E, De-las-Cuevas C, Kiuru A, Bate A, Edwards R. Selective serotonin reuptake inhibitors in pregnant women and neonatal withdrawal syndrome: a database analysis. Lancet 2005, 365:451-4.

16. Hale TW, Kendall-Tackett K, Cong Z, Votta R, McCurdy F. Discontinuation syndrome in newborns whose mothers took antidepressants while pregnant or breastfeeding. Breastfeed Med. 2010 Dec ;5(6):283-8. Epub 2010 Aug 31.

17. National Alliance on Mental Health Women and Depression Fact Sheet. Reviewed by Frank E, PhD; Novick D, Masalehdan A. November 2003; Updated October 2009, Reviewed by Duckworth K, MD. October 2009. Available at: **http://www.nami.org/Template.cfm?Section=Women_and_Depression&Template=/ContentManagement/ContentDisplay.cfm&ContentID=89194.** Accessed June 2013.

18. Epperson CN. Postpartum major depression: detection and treatment. American Family Physician. April 15, 1999. Available at: **http://www.aafp.org/afp/990415ap/2247.html.** Accessed June 2013.

19. Kendall-Tackett K. A new paradigm for depression in new mothers: the central role of inflammation and how breastfeeding and anti-inflammatory treatments protect maternal mental health, International Breastfeeding Journal. March 2007.

20. Vericker T, Macomber J, Golden O. Infants of depressed mothers living in poverty: opportunities to identify and serve. Urban Institute, Brief 1, August 2010. Available at: **http://www.urban.org/uploadedpdf/412199-infants-of-depressed.pdf**. Accessed June 2013.

Additional References

1. Healthwise.org [Internet]. Alcohol and drug problems. Available at: **http://health.msn.com/health-topics/addiction/alcohol-and-drug-problems-61.** Accessed June 2013.

2. U.S. Department of Health and Human Services. Health Resources and Services Administration, Maternal and Child Health Bureau. Depression during & after pregnancy: a resource for women, their families & friends. Available at: http://www.mchb.hrsa.gov/pregnancyandbeyond/depression/index.html. Accessed June 2013.

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.

Nutrition Risk Criterion #357 ***Drug-Nutrient Interactions*** may be assigned, as appropriate, to women taking anitdepressants.

362 Developmental Delays

Definition/Cut-Off Value

Developmental, sensory or motor disabilities that restrict the ability to intake, chew or swallow food or require tube feeding to meet nutritional needs

Includes:

- 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	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N
Infants	I	N
Children	III	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

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.

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 1/2 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. foods 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:

1) difficulty with transition to textures, especially during infancy;

2) increased sensory sensitivity; restricted intake due to color, texture, and/or temperature of foods;

3) decreased selection of foods over time;

4) 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 an adequate diet.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Explain that nutrition and energy needs must be individualized for each person
- Discuss providing adequate energy and nutrient intake to maintain or provide for adequate growth and development including appropriate/adequate fluid levels
- Factors to consider include:
    - developmental level or oral-motor skills level (i.e. chewing, swallowing and self feeding)
    - feeding position is of prime importance
        - head and body should be supported to minimize abnormal oral movement patterns and increase participant's voluntary oral control

    - muscle tone, cough and gag reflexes, especially if hypersensitive gag reflexes are a problem
    - tube feeding, oral feeding or the process of transitioning from tube to oral feeding
    - availability and use of specially adapted utensils for feeding
    - bowel management, especially constipation management (fiber and fluid recommendations)
- Discuss:
    - recommended frequency of meals and snacks
    - appropriate mealtime behavior management
    - recognizing and responding to hunger cues
- Discuss ways to select nutritionally adequate food based on participant's oral-motor feeding development levels and total energy needs, including:
    - appropriate choices for texture level, i.e. liquid, pureed, thickened liquids
    - ways to increase or decrease caloric intakes
    - if appropriate, discuss use of special formulas, especially higher calorie formulas, which may be indicated for some of these conditions
- Participant may have special/altered nutrient needs due to drug/nutrient interactions
- Provide family with lots of positive reinforcement and support
- For participants diagnosed with **Autism**:
    - Recognize that child may have a sensory-based feeding problem that results in extreme pickiness, difficulty with changes, sensitivity to tastes, texture, smells and new foods or anything different
        - Picky eating is not a result of inadequate parenting with food
        - Be sensitive to difficulties family experiences with feeding
    - Children with autism who are especially sensitive to tastes, textures, smells or new foods need many exposures to a new food before they will eat it
        - Touching, playing with and otherwise interacting with food can desensitize child
        - Child may move through many stages before food is accepted, including touching, smelling or licking the food
    - Keep mealtimes consistent
    - Use same plates and utensils
    - Eat at same place and at same time
    - Teach social structure of eating
        - Child needs to stay at table with the family
    - Offer small servings of a few (2-3) foods at one time
    - Avoid offering too much food or too many choices
        - Make changes gradually
    - Offer a food the child likes at each meal
    - Offer new foods along with foods child will already eat
    - Introduce foods in forms similar to foods child already eats
    - Continue to offer variety of foods, or child will become more restrictive over time
    - Use non-food reinforcement (verbal praise is best)
        - Reinforce child for ANY positive food behavior

        - Reinforce siblings for appropriate eating behaviors as well
    - Many parents are experimenting with special diets (casein-free, gluten-free) or supplements
        - There is at present no established scientific basis for restrictive diets for children with autism
        - However, if parent chooses to try dietary restriction, refer to dietitian
            - Dietitian should support family and provide guidance on adequate diet and appropriate substitutes for foods restricted (e.g. substitute soy formula for milk, authorize calcium-fortified juice, recommend gluten-free cereal)

References

1. Quinn, Heidi Puelzl; "Nutrition Concerns for Children With Pervasive Developmental Disorder/Autism" Published in Nutrition Focus by the Center on Human Development and Disability; University of Washington, Seattle, Washington; September/October 1995.

2. Paper submitted by Betty Lucas, MPH, RD, CD to the Risk Identification and Selection Collaborative (RISC); November, 1999.

3. Zeman: Clinical Nutrition and Dietetics, 2nd Edition; 1991; pp. 713-14, 721-72, 729-730.

4. Ogata, Beth, and Betty Lucas. *Autism, Nutrition, and Picky Eating.* Center on Human Development and Disability, University of Washington, Seattle, WA. September 1999. (handout in DDPD newsletter)

5. Toomey, Kay A. *When Children Won't Eat: Managing and Preventing Problematic Eating Patterns in Children with Autism.* Presentation at Autism Pre-Conference, May 20, 2000, San Francisco.

363 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	High Risk
Breastfeeding	I	N
Non-Breastfeeding	VI	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

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.

Justification for High Risk

Not Applicable

Reference

a. American Diabetes Association. Clinical practice recommendations: standards of medical care in diabetes. Diabetes Care. 2008 Jan; 31 Suppl 1:S12-54.

b. The Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Report of the expert committee on the diagnosis and classification of diabetes mellitus. Diabetes Care.1997; 20:1183-1197.

c. The Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Follow-up report on the diagnosis of the diabetes mellitus. Diabetes Care. 2003; 26:3160-3167.

d. American Diabetes Association National Institute of Diabetes and Digestive and Kidney Diseases. Position statement on prevention or delay of type 2 diabetes. Diabetes Care. 2004; 27:S47.

e. American Diabetes Association. Executive summary: standards of medical care in diabetes. Diabetes Care. 2008 Jan; 31 Suppl 1:S5-11.

371 Maternal Smoking

Definition/Cut-Off Value

Any daily smoking of tobacco products, i.e., cigarettes, pipes, or cigars

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N

Parameters for Auto Assignment

Auto assigned if “cigarettes per day now” is > 0 in the Nutrition Interview

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 breast milk (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.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Explain potential risks associated with smoking during pregnancy:
  - Spontaneous abortions
  - Stillbirth
  - Bleeding during pregnancy
  - Placental complications (abruptio placenta, placenta previa)
  - Complications of labor (preterm labor, prolonged and premature rupture of the membranes)
  - Fetal growth restriction
  - Small for gestational age
  - Perinatal mortality
- Other adverse effects which are significantly greater as maternal age increases:
  - Prematurity

    - Neonatal mortality (respiratory distress syndrome and SIDS)
- Inform breastfeeding woman that smoking has been reported to:
    - Decrease production and volume of breast milk
- Counsel on ways to achieve adequate diet for age and condition with emphasis on increased intakes of vitamins A & C, fiber, folate and iron

References

1. Breastfeeding Handbook for Physicians, American Academy of Pediatrics and American College of Obstetrics and Gynecologists. 2006.

2. Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium and Carotenoids (2000) Institute of Medicine, the National Academy of Science.

3. McPhillips, C.E.Eaton, et. al.: Dietary Difference in Smokers and Non- Smokers from two Southeastern New England communities. JADA; March 1994; pp. 287-292.

4. Giraud, D. Martin, J. Driskell: Plasma and Dietary Vitamin C and E Levels of Tobacco Chewers, Smokers and Nonusers, JADA; July 1995; pp. 798-802.

5. Elsie Pamuk, Tim Byers, Ralph Coates, Jodi Vann, Anne Sowell, Elaine Gunter, Deborah Glass: Effect of Smoking on Serum Nutrient Concentrations in African-American Women. Am J Clin Nutr; 1994; 59:891-5.

6. Manual of Clinical Dietetics 6th ed., American Dietetic Association. 2000.

7. U.S. Department of Health and Human Services. The Health Consequences of Smoking: A Report of the Surgeon General--Executive Summary. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2004.

8. Women and Smoking: A Report of the Surgeon General – 2001. http://www.cdc.gov/tobacco/data_statistics/sgr/sgr_2001/sgr_women_chapters.htm

372A Alcohol Use

Definition/Cut-Off Value

For Pregnant Women:

- Any current alcohol use

For Breastfeeding and Non-Breastfeeding Women:

- Routine current use of ≥ 2 drinks per day (1) OR
  - A serving or standard sized drink is: 1 can of beer (12 fluid oz.); 5 oz. Wine; and 1 1/2 fluid ounces liquor (1 jigger gin, rum, vodka, whiskey (86-proof), vermouth, cordials or liqueurs).
- Binge Drinking, i.e., drinks 5 or more (≥ 5) drinks on the same occasion on at least one day in the past 30 days.

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	Y
Breastfeeding	I	N
Non-Breastfeeding	VI	N

Parameters for Auto Assignment

Auto assigned for pregnant women if “alcohol per week now” is > 0 in the Nutrition Interview

Auto assigned for breastfeeding and non-breastfeeding women if current alcohol intake is marked as > 5 drinks/wk in the Nutrition Interview

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned

Justification

Drinking alcoholic beverages during pregnancy can damage the developing fetus. Excessive alcohol consumption may result in low birth weight, reduced growth rate, birth defects, and mental retardation. WIC can provide supplemental foods, nutrition education and referral to medical and social services which can monitor and provide assistance to the family.

"Fetal Alcohol Syndrome" is a name given to a condition sometimes seen in children of mothers who drank heavily during pregnancy. The child has a specific pattern of physical, mental, and behavioral abnormalities. Since there is no cure, prevention is the only answer.
The exact amount of alcoholic beverages pregnant women may drink without risk to the developing fetus is not known as well as the risk from periodic bouts of moderate or heavy drinking. Alcohol has the potential to damage the fetus at every stage of the pregnancy. Therefore, the recommendation is not to drink any alcoholic beverages during pregnancy.

Studies show that the more alcoholic beverages the mother drinks, the greater the risks are for her baby. In addition, studies indicate that factors such as cigarette smoking and poor dietary practices may also be involved. Studies show that the reduction of heavy drinking during pregnancy has benefits for both mother and newborns. Pregnancy is a special time in a woman's life and the majority of heavy drinkers will respond to supportive counseling.

Heavy drinkers, themselves, may develop nutritional deficiencies and more serious diseases, such as cirrhosis of the liver and certain types of cancer, particularly if they also smoke cigarettes. WIC can provide education and referral to medical and social services, including addiction treatment, which can help improve pregnancy outcome.

Justification for High Risk

The exact amount of alcoholic beverages pregnant women may drink without risk to the developing fetus is not known as well as the risk from periodic bouts of moderate or heavy drinking. Alcohol has potential to damage the fetus at every stage of pregnancy leading to miscarriage or preterm birth,
LBW, and fetal alcohol syndrome (FAS). Birth defects of FAS children are usually first characterized by facial abnormalities then mental retardation specifically in memory, attention and cognition, a decreased IQ, and social problems (1, 3). After giving birth to a child with FAS, mothers are at a high risk of abusing alcohol, which can interfere with mother-child bonding and infant rearing. During the postnatal year, alcohol users and binge drinkers are more likely to experience depression (1).

There is no cure for FAS, prevention is the only answer. Therefore, the recommendation is not to drink any alcoholic beverage during pregnancy. WIC can provide supplemental foods, nutrition education and referral to medical and social services which can monitor and provide

assistance to the family. An intensive interview method of asking about alcohol use before recognition of pregnancy has more positive affects than by the single clinic screening question asking their date of last drink (3).

Additional Counseling Guidelines

- Explain risks associated with drinking alcohol during pregnancy and breastfeeding:
  - It is rapidly transmitted through placenta and through breast milk
  - There is no known safe amount during pregnancy
  - It can damage the fetus at any stage of pregnancy
- Excessive alcohol during pregnancy can cause:
  - Low birth weight
  - Reduced growth rate
  - Birth defects
  - Mental retardation
  - Adverse physical and behavioral effects
  - Spontaneous abortions
  - Subtle behavioral effects
  - Poor postnatal growth in children without full Fetal Alcohol Syndrome (FAS)
  - FAS
- Excessive alcohol during breastfeeding period may be associated with:
  - Failure to initiate let-down reflex
  - Lethargy in breastfed infant
  - Low intake of folate, thiamin, etc.
- Excessive alcohol consumption may impair a postpartum woman's ability to care for her infant
- Counsel on ways to provide an adequate diet for age and condition:
- If appropriate, emphasize nutrients that chronic alcoholics frequently have a lower nutrient intake of:
  - Protein from meat
  - Vegetable sources
  - Dairy foods and calcium sources
  - Cereals and breads
  - B vitamins and vitamin D
- If appropriate, discuss nutrient deficiencies that occur in heavy drinkers and food sources of these nutrients to combat deficiencies:
  - Zinc
  - Vitamin A
  - Folate
  - Thiamin

References

1. USDA/DHHS Dietary Guidelines; 1995.

2. Lawrence, Ruth: Maternal & Child Health Technical Information Bulletin: A Review of the Medical Benefits and Contraindications to Breastfeeding in the United States; October 1997.

3. Weiner, L., Morse, B.A., and Garrido, P.: FAS/FAE Focusing Prevention on Women at Risk; International Journal of the Addictions; 1989; 24:385-395.

4. National Clearinghouse for Alcohol and Drug Information; Office for Substance Abuse Prevention; The fact is…alcohol and other drugs can harm an unborn baby; Rockville; 1989.

5. Institute of Medicine: Nutrition During Pregnancy; National Academy of Press; 1990; pp. 88, 177, 391-394.

6. Jones, C. and Lopez, R.: Drug Abuse and Pregnancy; New Perspectives in Prenatal Care; 1990; pp. 273-318.

7. National Household Survey on Drug Abuse, Main Findings 1996; Office of Applied Studies, Substance Abuse and Mental Health Services Administration, DHHS.

References for High Risk

1. Muckle G, Laflamme D, Gagnon J, Boucher O, Jacobson JL, Jacobson SW. Alcohol, Smoking, and Drug Use Among Inuit Women of Childbearing Age During Pregnancy and the Risk to Children. *Alcohol Clin Exp Res.* 2011; 35(6):1081-1091.

2. Peadon E, Payne J, Henley N, D'Antoine H, Bartu A, O'Leary C, Bower C, Elliott EJ. Attitudes and behavior predict women's intention to drink alcohol during pregnancy: the challenge for health professionals. *BMC Public Health*. 2011; 11:584.

3. Hughes SC, Chambers CD, Kassem N, Wahlgren DR, Larson S, Riley EP, Hovell MF. Inconsistent report of pre-pregnancy-recognition alcohol use by Latinas. *Matern Child Health J*. 2009; 13:857-864.

4. Mullally A, Cleary BJ, Barry J, Fahey TP, Murphy DJ. Prevalence, predictors and perinatal outcomes of peri-conceptional alcohol exposure-retrospective cohort

study in an urban obstetric population in Ireland. *BMC Pregnancy and Childbirth*. 2011; 11:27.

372B Illegal Drug Use

Definition/Cut-Off Value

Any current illegal drug use

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	Y
Breastfeeding	I	N
Non-Breastfeeding	VI	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned

Justification

Pregnant women who smoke marijuana are frequently at higher risk of still birth, miscarriage, low birth weight babies and fetal abnormalities, especially of the nervous system. Heavy cocaine use has been associated with higher rates of miscarriage, premature onset of labor, IUGR, congenital anomalies, and developmental/behavioral abnormalities in the preschool years. Infants born to cocaine users often exhibit symptoms of cocaine intoxication at birth. Infants of women addicted to heroin, methadone, or other narcotics are more likely to be stillborn or to have low birth weights. These babies frequently must go through withdrawal soon after birth. Increased rates of congenital defects, growth retardation, and preterm delivery, have been observed in infants of women addicted to amphetamines.

Pregnant addicts often forget their own health care, adding to their unborn babies' risk. One study found that substance abusing women had lower hematocrit levels at the time of prenatal care registration, lower pregravid weights and gained less weight during the pregnancy. Since nutritional deficiencies can be expected among drug abusers, diet counseling and other efforts to improve food intake are recommended.

Heroin and cocaine are known to appear in human milk. Marijuana also appears in a poorly absorbed form but in quantities sufficient to cause lethargy, and decreased feeding after prolonged exposure.

Justification for High Risk

The exact amount of illegal drugs a pregnant woman can take in without risk to the developing fetus is not known. Drugs have the potential to damage the fetus at every stage of pregnancy by inhibiting growth and neurodevelopment while increasing the risk for low birth weight and head circumference as well as premature birth. The effects of prenatal substance abuse are irreversible. Therefore, the recommendation is to not take any illegal drugs during pregnancy.

Mothers who abuse substances are likely to experience additional comorbidities which include mental illness, emotional or sexual abuse, and gynecological complaints. WIC can provide supplemental foods, nutrition education and referral to medical and social services which can monitor and provide assistance to the family.

Additional Counseling Guidelines

- Explain risks associated with use of illegal drugs during pregnancy and breastfeeding:
    - Rapidly transmitted through placenta and through breast milk
    - No known safe amount during pregnancy
    - Can damage the fetus at any stage of pregnancy
- If appropriate, explain specific risks of illegal drug use during pregnancy:
    - Marijuana can cause higher rates of:
        - Low birth weight
        - Miscarriage
        - Stillbirth
        - Fetal abnormalities
    - Cocaine can cause higher rates of:
        - Miscarriage
        - Premature onset of labor
        - Intrauterine Growth Retardation (IUGR)

        - Developmental/behavioral abnormalities in children in the preschool years
        - Infants may exhibit signs of cocaine toxicity
    - Heroin, methadone and other narcotics may more likely cause:
        - Stillborn
        - Low birth weight
        - Need to go through withdrawal soon after birth
    - Amphetamines may cause higher rates of:
        - Congenital defects
        - Growth retardation
        - Preterm delivery
- For breastfeeding women:
    - Marijuana, cocaine, and heroin appear in breast milk
    - Marijuana may cause lethargy and decreased feedings in the infant
    - Cocaine and heroin put infant at considerable risk of toxicity
- For postpartum women, illegal drug use may impair ability to care for infant
- Counsel on ways to provide adequate diet for age and condition emphasizing any nutrients participant may be low in
    - Cocaine, phencyclidine (PCP), and marijuana users may have low serum levels of iron or folate
    - Cocaine is an appetite suppressant and may cause participant to reduce intake of energy and nutrients

References

1. USDA/DHHS Dietary Guidelines; 1995.

2. Lawrence, Ruth: Maternal & Child Health Technical Information Bulletin: A Review of the Medical Benefits and Contraindications to Breastfeeding in the United States; October 1997.

3. Weiner, L., Morse, B.A., and Garrido, P.: FAS/FAE Focusing Prevention on Women at Risk; International Journal of the Addictions; 1989; 24:385-395.

4. National Clearinghouse for Alcohol and Drug Information; Office for Substance Abuse Prevention; The fact is…alcohol and other drugs can harm an unborn baby; Rockville; 1989.

5. Institute of Medicine: Nutrition during Pregnancy; National Academy of Press; 1990; pp. 88, 177, 391-394.

6. Jones, C. and Lopez, R.: Drug Abuse and Pregnancy; New Perspectives in Prenatal Care; 1990; pp. 273-318.

7. National Household Survey on Drug Abuse, Main Findings 1996; Office of Applied Studies, Substance Abuse and Mental Health Services Administration, DHHS.

8. Behnke, M., Eyler, F., Garvan, C., Wobie, K.: The Search for Congenital Malformations in Newborns with Fetal Cocaine Exposure; Pediatrics Vol. 107, No. 5 May 2001.

References for High Risk:

1. Frank DA, Rose-Jacobs R, Crooks D, Cabral HJ, Gerteis J, Hacker KA, Martin B, Weinstein ZB, Heeren T. Adoslescent Initiation of Licit and Illicit Substance Use: Impact of Intrauterine Exposures and Post-natal Exposure to Violence. *Neurotoxicol Teratol.* 2011; 33(1): 100-109.

2. Muckle G, Laflamme D, Gagnon J, Boucher O, Jacobson JL, Jacobson SW. Alcohol, Smoking, and Drug Use Among Inuit Women of Childbearing Age During Pregnancy and the Risk to Children. *Alcohol Clin Exp Res.* 2011; 35(6):1081-1091.

3. Miles M, Francis K, Chapman Y. Challenges for midwives: pregnant women and illicit drug use. *Australian Journal of Advanced Nursing.* 8:1.

4. Hayatbaksh MR, Kingsbury AM, Flenady V, Gilshenan K, Hutchinson DM, Najman JM. Illicit drug use before and during pregnancy at a tertiary maternity hospital 2000=2006. *Drug and Alcohol Review.* 2011; 30: 181-187.

381 Oral Health Conditions

Definition/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	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N
Infants	I	N
Children	III	N

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel

Justification

Oral health reflects and influences general health and well-being. 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 Foods and Snacks

Noncariogenic	Low Cariogenicity	High Cariogenicity
Cheese Chicken Cottage Cheese Eggs Flavored Club Soda Nuts and seeds* Plain Cow's Milk (unflavored) Plain Yogurt Popcorn* Seltzer Vegetables	Flavored Milk Fresh fruits Whole grain products	Breakfast Bars Cake Candies** Cookies Doughnuts Granola bars Pretzels Raisins and other dried fruits Soda crackers Sweetened beverages (including fruit juice) Sweetened dry cereals

*Not appropriate for infants and toddlers due to potential 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 birth weight 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 birth weight 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 birth weights (<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.**

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Explain risks associated with dental problems
  - In adults:
    - Missing teeth affects the chewing ability and nutritional intake
    - For pregnant women with gingivitis there is an increased risk of pre-term low birth weight as a result of preterm labor or premature rupture of the membranes
  - In children:
    - Increased risk of primary tooth loss
    - Possible feeding problems
    - Damage to permanent teeth
    - Potential speech problems
- Emphasize correcting inappropriate dental feeding practices and teaching participant preventative practices
  - For infants:
    - Hold infant for bottle and breast feedings
    - Do not allow the infant/toddler to sleep with the bottle or use it unsupervised during waking times
    - Wipe infant's gums with a soft cloth after feeding
    - Introduce foods, beverages and meals/snacking behaviors that promote oral health (i.e. fruit juices in a cup)
- For women and children:
  - Eating frequency is associated with caries risk
  - Drink water to satisfy thirst and hydration needs

- Limit consumption of sweetened beverages
  - Consume them with meals and snacks that contain other foods (such as proteins) which can buffer them
- The more times a day the child consumes solid or liquid food, the higher the caries risk
  - Caregivers should be counseled to offer structured meal and snack patterns

References

1. Policy on Early Childhood Caries (ECC): Classifications, consequences and preventive strategies. Am Academy of Pediatric Dentistry (2011) 47-49.
2. ADA Dental 101: Taking care of your teeth and gums. American Dental Association, 2008: 1-28.
3. American Academy of Pediatrics Policy Statement: Oral health risk assessment timing and establishment of the dental home. Pediatrics, (2003) Vol 11, No 5: 1113-1116.
4. Douglass BDS, et al. A practical guide to infant oral health. America Family Physician, (2004) Vol 70, No 11: 2113-2120.
5. Rocha Peres RC, et al. Cariogenic potential of cows', human and infant formula milks and effect of fluoride supplementation. British Journal of Nutrition (2009), 101, 376-382.
6. Boggess K, Edelstein B. Oral health in women during preconception and pregnancy: implications for birth outcomes and infant oral health. Matern Child Health J. (2006) 10: S169-S174.
7. Bobetsis Y, et al. Exploring the relationship between periodontal disease and pregnancy complications. J Am Dent Assoc. Vol 137, Suppl 2, 7S-13S, 2006.
8. Review Council, Guideline on Fluoride Therapy. American Academy of Pediatric Dentistry. Reference Manual 33/No 6. 11/12 153-156.
9. J Berg, et al. Evidence-based clinical recommendations regarding fluoride intake from reconstituted infant formula and enamel fluorosis: a report of the American Dental Association Council on Scientific Affairs. JADA, Jan 2011 Vol 142 79-87.
10. Position of the Academy of Nutrition and Dietetics: the impact of fluoride on health. Journal of the Academy of Nutrition and Dietetics, Sept 2012, Vol 112, No. 9 1443-1453.
11. HHS Proposed Guidelines on Fluoride in Drinking Water, Commentary by Dr. Howard Koh, Jan 2011.
12. Krochak M, Rubin JG. An overview of the treatment of anxious and phobic dental patients. Compend Contin Educ Denta, Vol XIV, No 5: 604-614.
13. Ogata B, Trahms C. For children with special health care needs. Nutrition Focu.s Nov/Dec 2003 Vol 18, No 6.

14. Suri L, et al. Delayed Tooth Eruption: Pathogenesis, diagnosis, and treatment. A Literature Review Am J of Orthodontics and Dentofacial Orthopedics, (Oct 2004) 432-445.

15. Palmer CA. Diet and nutrition in oral health, 2nd ed. Pearson Education Inc. 2007. Chapter 15, 315-330.

16. Policy Statement: Preventive oral health intervention for pediatricians. Pediatrics (2008). Vol 122, No 6: 1387-1394.

17. American Academy of Pediatrics. *A Pediatric Guide to Oral Health Flip Chart and Reference Guide*. 2011. Copyright 2012.

18. Holt K, et al. Bright Futures Nutrition, 3rd Edition. American Academy of Pediatrics, 2011.

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.

382 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	High Risk
Infants	I	Y
Children	III	Y

Parameters for manual assignment

Must be manually selected in the Nutrition Interview or Risk Panel

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned

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.

Justification for High Risk

FAS has severe consequences and is defined by damage to the central nervous sytem, the presence of at least two facial abnormalities, and growth retardation. These consequences significantly inhibit normal growth, cause developmental delay, and affect the overall quality of life for these children. Complications that are often made manifest in children with FAS are failure to thrive, poor growth throughout childhood, and poor suck in the infant.

There is no cure for FAS and prevention is the only answer. Therefore, the recommendation is not to drink any alcoholic beverage during pregnancy. There are certain common characteristics among mothers who have give birth to a child with fetal alcohol syndrome including: the mother being unmarried, unemployed, an ethnic minority, older, living in poverty, or without prenatal care. These mothers are also more likely to have lower education levels, be on public assistance or Medicaid, and smoke or use illicit drugs during pregnancy (2). With a history of alcohol or substance abuse these mothers may also be deficient in nutritents. WIC can provide supplemental foods, nutrition education and referrals to medical and social services which can monitor and provide assistance to the family.

Additional Counseling Guidelines

- Explain risks associated with FAS:
    - Irreversible birth defects
    - Failure to thrive
    - Pattern of poor growth throughout childhood
    - Poor suck (for infants)
    - Babies are also more irritable, have difficulty feeding and sleeping
    - Poor appetite due to slower rate of growth
    - May lead to feeding behavioral problems
    - Delays in feeding skills due to slower rate of growth
    - Auditory and vision problems
    - Malformed and misaligned secondary teeth
    - Learning difficulties
    - Language delays
    - Attention deficit disorders
- All of above risks place child at risk for poor nutrition
- If appropriate, discuss extra family stress of a special needs child
- Counsel on ways to provide adequate diet and nutritional intake for age and developmental level
- Special consideration should be given to:
    - Feeding skill level and appropriate textures
    - Meal planning and infant food preparation

- Feeding and meal times
  - If child has short attention span, more feeding times may be appropriate
  - If excessive weight gain is a problem in children, stress lower caloric food choices and exercise

References

1. Clarren, S.K., and Smith, D.W.: The Fetal Alcohol Syndrome; New England Journal of Medicine; May 11, 1978; 298:1063-1067.

2. Jones, K.L., Smith, D.W., Ulleland, C.N., and Streissguth, A.P.: Pattern of Malformation in Offspring of Chronic Alcoholic Mothers. Lancet; June 9, 1973; 815:1267-1271.

3. Masis, B., M.D., May, A.: A Comprehensive Local Program for the Prevention of Fetal Alcohol Syndrome, Public Health Reports; September-October 1991; 106: 5; pp. 484-489.

4. Lujan, C.C., BeBruyn, L., May, P.A., and Bird, M.E.: Profile of Abuse and Neglected Indian Children in the Southwest; Child Abuse Negligent; 1989; 34: 449-461.

5. Institute of Medicine: Fetal Alcohol Syndrome, Diagnosis, Epidemiology, Prevention and Treatment; 1996.

6. Weiner, L., Morse, B.A., and Garrido, P.: FAS/FAE Focusing Prevention on Women at Risk; International Journal of the Addictions; 1989; 24:385-395.

References for High Risk

1. Feldman HS, Jones KL, Lindsay S, Slymen D, Klonoff-Cohen H, Kao K, Rao S, and Chambers C. Prenatal Alcohol exposure patterns and alcohol-related birth defects and growth deficiencies: A prospective study. *Alcohol Clin Esp Res*. 2012: 1-7. DOI: 10.1111/j.1530-0277.2011.01664.

2. Paintner A, Williams, AD, Burt L. Fetal Alcohol Spectrum Disorders—Implications for child neurology, Part 2: Diagnosis and management. *J Child Neurol*. 2011: 1-8. DOI: 10.1177/0883073811428377.

3. Cannon MJ, Dominique Y, O'Leary LA, Sniezek JE, Floyd RL. Characteristics and behaviors of mothers who have a child with fetal alcohol syndrome. *Neurotoxicol Teratol*. 2012;34: 90-95.

4. Ismail S, Buckley S, Budacki R, Jabbar A, Gallicano IG. Screening, diagnosing and prevention of Fetal Alcohol Syndrome: Is this syndrome treatable? *Dev Neurosci*. 2010:32:91-100.

5. de Sanctis L, Memo L, Pichini S, Tarani L, Vagnarelli F. Fetal alcohol syndrome: new perspectives for an ancient and underestimated problem. *J Matern-fetal Neo M*. 2011; 24(S(1)): 34-37.

401 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	High Risk
Pregnant Women	IV	N
Breastfeeding Women	IV	N
Non-Breastfeeding Women	VI	N
Children $\geq$ 2 years of age	V	N

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel

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 f*ailure 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)

Summary 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 listed.)

• 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 listed.)

"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 misclassification 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*

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

None

References

1. United States Department of Agriculture and the United States Department of Health and Human Services. Dietary Guidelines for Americans, 7th Edition, 2010. Available at: www.usda.gov/cnpp.

2. Institute of Medicine (IOM); Committee on Scientific Evaluation of WIC Nutrition Risk Criteria. WIC nutrition risk criteria: A scientific assessment. Washington, DC: National Academy Press; 1996.

3. United States Department of Agriculture and the United States Department of Health and Human Services. Dietary Guidelines for Americans, 5th Edition, 2000. Available at: www.usda.gov/cnpp.

4. Institute of Medicine (IOM); Committee on Dietary Risk Assessment in the WIC Program. Dietary risk assessment in the WIC program. Washington, DC: National Academy Press; 2002. Available at: http://www.iom.edu/Reports/2002/Dietary-Risk-Assessment-in-the-WIC-Program.aspx.

USDA 6/12

411 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.
(See 411: A-K)

Participant Category and Priority Level

Category	Priority	High Risk
Infants	IV	N

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel

Inappropriate Nutrition Practices for Infants	Examples of Inappropriate Nutrition Practices (including but not limited to)
411a Routinely using a substitute(s) for breast	Examples of substitutes:

Inappropriate Nutrition Practices for Infants	Examples of Inappropriate Nutrition Practices (including but not limited to)
milk or for FDA approved iron-fortified formula as the primary nutrient source during the first year of life.	▪ 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."
411b 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.
411c Routinely offering complementary foods* or other substances that are inappropriate in type or timing. **Complementary foods are any foods or beverages other than breast milk or infant formula.*	Examples of inappropriate complementary foods: ▪ Adding sweet agents such as sugar, honey, or syrups to any beverage (including water) or prepared food, or used on a pacifier; and ▪ Any food other than breast milk or iron-fortified infant formula before 4 months of age.
411d Routinely using feeding practices that disregard the	▪ 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

Inappropriate Nutrition Practices for Infants	Examples of Inappropriate Nutrition Practices (including but not limited to)
developmental needs or stage of the infant.	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 foods 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).
411e Feeding foods to an infant that could be contaminated with harmful microorganisms or toxins	Examples of potentially harmful foods for an infant: ▪ Unpasteurized fruit or vegetable juice; ▪ Unpasteurized dairy products or soft cheeses such as feta, Brie, Camembert, blue-veined, and Mexican-style cheese; ▪ Honey ▪ Raw or undercooked meat, fish, poultry, or eggs; ▪ Raw vegetable sprouts (alfalfa, clover, bean, and radish); ▪ Deli meats, hot dogs, and processed meats (avoid unless heated until steaming hot).
411f 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.
411g Routinely limiting the frequency of nursing of the exclusively breastfed infant when breast milk is the sole source of nutrients.	Examples of inappropriate frequency of nursing: ▪ Scheduled feedings instead of demand feedings; ▪ Less than 8 feedings in 24 hours if less than 2 months of age; and ▪ Less than 6 feedings in 24 hours if between 2 and 6 months of age.
411h Routinely feeding a diet very low in calories and/or	Examples: ▪ Vegan diet;

Inappropriate Nutrition Practices for Infants	Examples of Inappropriate Nutrition Practices (including but not limited to)
essential nutrients.	▪ Macrobiotic diet; and ▪ Other diets very low in calories and/or essential nutrients.
411i Routinely using inappropriate sanitation in preparation, handling, and storage of expressed breast milk or formula.	Examples of inappropriate sanitation: ▪ Limited or no access to a: – Safe water supply (documented by appropriate officials), – Heat source for sterilization, and/or – Refrigerator or freezer for storage. ▪ Failure to properly prepare, handle, and store bottles or storage containers of expressed breast milk or formula.
411j Feeding dietary supplements with potentially harmful consequences.	Examples of dietary supplements, which when fed in excess of recommended dosage, may be toxic or have harmful consequences: ▪ Single or multi-vitamins; ▪ Mineral supplements; and ▪ Herbal or botanical supplements/remedies/teas.
411k Routinely not providing dietary supplements recognized as essential by national public health policy when an infant's diet alone cannot meet nutrient requirements.	▪ Infants who are 6 months of age or older who are ingesting less than 0.25 mg of fluoride daily when the water supply contains less than 0.3 ppm fluoride. ▪ Breastfed infants who are ingesting less than 500 mL (16.9 ounces) per day of vitamin D-fortified formula and are not taking a supplement of 200 IU of vitamin D. ▪ Non-breastfed infants who are ingesting less than 500 mL (16.9 ounces) per day of vitamin-D fortified formula and are not taking a supplement of 200 IU of vitamin D.

Justification

411.a *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.b 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.c *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 (12). 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).

Feeding solid foods too early (i.e., before 4-6 months of age) by, for example, adding dilute cereal or other solid foods to bottles deprives infants of the opportunity to learn to feed themselves (3, 10, 20, 22). The major objection to the introduction of beikost before age 4 months of age is based on the possibility that it may interfere with establishing sound eating habits and may contribute to overfeeding (5, 23). Before 4 months of age, the infant possesses an extrusion reflex that enables him/her to swallow only liquid foods (1, 12, 24). The extrusion reflex is toned down at four months (20). 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 (5, 20, 23, 24). 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 (5, 23). If solid foods

are introduced before the infant is developmentally ready, breast milk or iron-fortified formula necessary for optimum growth is displaced (1, 20, 24). Around 4 months of age, the infant is developmentally ready for solid foods when (1, 5, 20, 23, 24): 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.

Offering juice before solid foods are introduced into the diet could risk having juice replace breast milk or infant formula in the diet (14). This can result in reduced intake of protein, fat, vitamins, and minerals such as iron, calcium, and zinc (25). It is prudent to give juice only to infants who can drink from a cup (14).

411.d 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.e Feeding foods to an infant that could be contaminated with harmful microorganisms or toxins.

Only pasteurized juice is safe for infants, children, and adolescents (14). Pasteurized fruit juices are free of microorganisms (14). Unpasteurized juice may contain pathogens, such as Escherichia coli, Salmonella, and Cryptosporidium organisms (14, 26). These organisms can cause serious disease, such as hemolytic-uremic syndrome, and should never be fed to infants and children (14). Unpasteurized juice must contain a warning on the label that the product may contain harmful bacteria (14, 27). Infants or young children should not eat raw or unpasteurized milk or cheeses (1)—unpasteurized dairy products could contain harmful bacteria, such as Brucella species, that could cause young children to contract a dangerous food borne illness. The AAP also recommends that young children should not eat soft cheeses such as feta, Brie, Camembert, blue-veined, and Mexican-style cheese—these foods could contain Listeria bacteria (hard cheeses, processed cheeses, cream cheese, cottage cheese, and yogurt need not be avoided) (1).

Honey has been implicated as the primary food source of *Clostridium botulinum* during infancy. These spores are extremely resistant to heat, including pasteurization, and are not destroyed by

present methods of processing honey. Botulism in infancy is caused by ingestion of the spores, which germinate into the toxin in the lumen of the bowel (9, 10, 20, 28, 29).

Infants or young children should not eat raw or undercooked meat or poultry, raw fish or shellfish, including oysters, clams, mussels, and scallops (1)—these foods may contain harmful bacteria or parasites that could cause children to contract a dangerous food borne illness.

According to the AAP, to prevent food-born illness, the foods listed below should not be fed to infants or young children. (1) All of the foods have been implicated in selected outbreaks of food-borne illness, including in children. Background information regarding foods that could be contaminated with harmful microorganisms is also included below:

- Raw vegetable sprouts (alfalfa, clover, bean, and radish)--Sprouts can cause potentially dangerous Salmonella and E. coli O157 infection. Sprouts grown under clean conditions in the home also present a risk because bacteria may be present in seed. Cook sprouts to significantly reduce the risk of illness (30).
- Deli meats, hot dogs, and processed meats (avoid unless heated until steaming hot) -- These foods have been found to be contaminated with *Listeria monocytogenes*; if adequately cooked, this bacteria is destroyed.

411.f 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). Underdilution 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.g 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 (4). Frequent breastfeeding is critical to the establishment and maintenance of an adequate milk supply for the infant (4, 33-37). Inadequate frequency of breastfeeding may lead to lactation failure in the mother and dehydration, poor weight gain, diarrhea, and vomiting, illness, and malnourishment in the infant (4, 34, 37-42). Exclusive breastfeeding protects infants from early exposure to contaminated foods and liquids (40). In addition, infants, who receive breast milk more than infant formulas, have a lower risk of being overweight in childhood and adolescence (43, 44).

411.h Routinely feeding a diet very low in calories and/or essential nutrients.

Highly restrictive diets prevent adequate intake of nutrients, interfere with growth and development, and may lead to other adverse physiological effects (3). Infants older than 6 months are potentially at the greatest risk for overt deficiency states related to inappropriate restrictions of the diet, although deficiencies of vitamins B12 and essential fatty acids may appear earlier (1, 45, 46). Infants are particularly vulnerable during the weaning period if fed a macrobiotic diet and may experience psychomotor delay in some instances (1, 47, 48). Well-balanced vegetarian diets with dairy products and eggs are generally associated with good health. However, strict vegan diets may be inadequate in calories, vitamin B12, vitamin D, calcium, iron, protein and essential amino acids needed for growth and development (49). The more limited the diet, the greater the health risk. Given the health and nutrition risks associated with highly restrictive diets, WIC can help the parent to assure that the infant consumes an adequate diet to optimize health during critical periods of growth as well as for the long term.

411.i Routinely using inappropriate sanitation in preparation, handling, and storage of expressed breast milk 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 (9). 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 (9).

<u>Human Milk</u>

Published guidelines on the handling and storage of human milk may differ among pediatric nutrition authorities (1, 9, 50-53). However, there is consensus on the following human milk feeding, handling, and storage practices that are considered inappropriate and unsafe (9, 50, 54-56):

- 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 another use at another feeding

- Failure to clean a breast pump per manufacturer's instruction

* The appropriate and safe practice is to add chilled freshly expressed human milk, in an amount that is smaller than the milk that has been frozen for no longer than 24 hours.

As stated above, there are variations in human milk storage guidelines among recognized entities, e.g., AAP and Academy of Breastfeeding Medicine (ABM) (1, 53). The ABM guidelines have longer refrigerated storage time than AAP and are cited for several organizations (1, 53). However, the ABM guidelines are for healthy term infants, and while they may be appropriate for a large percentage of the general population, the WIC population is considered an "at risk population". Therefore, it is not possible at this time to identify a clear cut-off to determine unsafe refrigeration limits for WIC risk determination.

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 (57). These properties of human milk are specifically important for the prevention of necrotizing enterocolitis, retinopathy, and bronchopulmonary dysplasia of premature infants (57). 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) as well as health of the infant need to be considered when recommending the length of time human milk may be stored in the refrigerator. Please see the WIC Works Resource System for handling and storage recommendations: **http://www.nal.usda.gov/wicworks/WIC_Learning_Online/support/job_aids/safety.pdf .** These recommendations are based on the AAP's guidelines for the safe handling and storage of human milk.

If the breastfeeding mother uses a breast pump, it is essential for her to fully understand the importance of and 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 (56).

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 (3, 9, 20).

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. During the manufacturing process, powdered formulas can become contaminated with harmful bacteria. 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. Instructions for the sanitary preparation of formulas can be obtained from the WIC Works Resource System at: **http://www.nal.usda.gov/wicworks/WIC_Learning_Online/support/job_aids/formula.pdf** and from the World Health Organization at: **http://www.who.int/foodsafety/publications/micro/pif_guidelines.pdf.** It is generally recommended to boil the water used for infant formula preparation during the first 3 months of life (9). Caregivers should consider the safety of their water source and the health status of the infant in addition to consulting with their health care provider regarding whether to continue boiling the water when preparing infant formula for the infant older than 3 months.

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, 9, 20). Published guidelines on the handling and storage of infant formula indicate that it is unsafe to use prepared formula which (1, 9):

- 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

411.j Feeding dietary supplements with potentially harmful consequences.

An infant consuming inappropriate or excessive amounts of single or multivitamin or mineral or herbal remedy not prescribed by a physician is at risk for a variety of adverse effects including harmful nutrient interactions, toxicity, and teratogenicity (1, 55). While some herbal teas may be safe, some have undesirable effects, particularly on infants who are fed herbal teas or who receive breast milk from mothers who have ingested herbal teas (56). Examples of teas with potentially harmful effects to children include: licorice, comfrey leaves, sassafras, senna, buckhorn bark, cinnamon, wormwood, woodruff, valerian, foxglove, pokeroot or pokeweed, periwinkle, nutmeg, catnip, hydrangea, juniper, Mormon tea, thorn apple, yohimbe bark, lobelia, oleander, Maté, kola nut or gotu cola, and chamomile (56-58). Like drugs, herbal or botanical preparations have chemical and biological activity, may have side effects, and may interact with certain medications--these interactions can cause problems and can even be dangerous (59). Botanical supplements are not necessarily safe because the safety of a botanical depends on many things, such as its chemical makeup, how it works in the body, how it is prepared, and the dose used (59).

411.k Routinely not providing dietary supplements recognized as essential by national public health policy when an infant's diet alone cannot meet. nutrient requirements.

Depending on an infant's specific needs and environmental circumstances, certain dietary supplements may be recommended by the infant's health care provider to ensure health. For example, fluoride supplements may be of benefit in reducing dental decay for children living in fluoride-deficient areas (1, 60). Further, to prevent rickets and vitamin D deficiency in healthy infants and children, the AA P recommends a supplement of 400 IU per day for the following (4, 61):

1. All breastfed infants unless they are weaned to at least 1 liter (or 1 quart) per day of vitamin D-fortified formula or milk.
2. All nonbreastfed infants who are ingesting less than 1 liter (or 1 quart) per day of vitamin D-fortified formula or milk.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Considerations for **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**:

    - Discuss risks of feeding infants a milk that does not provide ideal nutrition
    - Encourage participant to breastfeed or use a formula that will provide optimal nutrition for infants
- Considerations for **Routinely using nursing bottles or cups inappropriately**:
    - Discuss risks associated with improper use of bottles/cups
    - Discuss importance of good oral health
- Considerations for **Routinely offering complementary foods or other substances that are inappropriate in type or timing**:
    - Discuss infant feeding recommendations
- Considerations for **Routinely using feeding practices that disregard the developmental needs or stage of the infant**:
    - Discuss infant feeding recommendations
    - Encourage parents to follow infant's hunger and satiety cues
- Considerations for **Feeding foods to an infant that could be contaminated with harmful microorganisms or toxins**:
    - Discuss foods that may be harmful to an infant due to an immature digestive tract
- Considerations for **Routinely feeding inappropriately diluted formula**:
    - Review correct formula dilution procedure
    - Discuss risks of not properly diluting formula
- Considerations for **Routinely limiting the frequency of nursing of the exclusively breastfed infant when breast milk is the sole source of nutrients**:
    - Review appropriate breastfeeding practices
    - Help mother identify infant's hunger and satiety cues
- Considerations for **Routinely feeding a diet very low in calories and/or essential nutrients**:
    - Review infants' nutrient needs
    - Help parent identify foods that provide adequate nutrients
- Considerations for **Routinely using inappropriate sanitation in preparation, handling, and storage of expressed breast milk or formula**:
    - Review food safety recommendations
- Considerations for **Feeding dietary supplements with potentially harmful consequences**:
    - Review infant feeding recommendations
    - Discuss risks of feeding infants supplements not prescribed by an MD
- Considerations for **Routinely not providing dietary supplements recognized as essential by national public health policy when an infant's diet alone cannot meet nutrient requirements**:
    - Review infants' nutrient needs
    - Discuss why certain dietary supplements (prescribed by an MD) could be beneficial

References

1. Committee on Nutrition, American Academy of Pediatrics. Pediatric nutrition handbook. 6th ed. Elk Grove Village, Ill: American Academy of Pediatrics, 2009.

2. American Academy of Pediatrics, Committee on Nutrition. Iron fortification of infant formula. Pediatrics 1999; 104:119-123.

3. Institute of Medicine. WIC nutrition risk criteria: a scientific assessment. National Academy Press, Washington, D.C.; 1996.

4. American Academy of Pediatrics, Section on Breastfeeding: Breastfeeding and the use of human milk. Pediatrics 2005 Feb;115(2):496-506.

5. Fomon SJ. Nutrition of normal infants. St. Louis: Mosby, 1993.

6. Whitney, EN, Rolfes SR. Understanding nutrition. 9th ed. Wadsworth: Thomson Learning, 2002: p. 541.

7. American Academy of Pediatrics, Committee on Nutrition. The use of whole cow's milk in infancy. Pediatrics 1992;89(6):1105-1109.

8. Friel JK et al. Eighteen-month follow-up of infants fed evaporated milk formula. Canadian Journal of Public Health. Revue Canadienne de Sante Publique, 90.4 (Jul-Aug 1999): 240-3. Abstract.

9. United States Department of Agriculture, Food and Nutrition Service. Infant nutrition and feeding, a guide for use in the WIC and CSF programs. Alexandria, VA: Special Supplemental Nutrition Programs, revised 2008. [FNS-288]

10. Trahms CM, Pipes PL, editors. Nutrition in Infancy and Childhood. WCB/McGraw- Hill; 1997.

11. Bellioni-Businco B, Paganelli R, Lucenti P, Giampietro PG, Perborn H, Businco L. Allergenicity of goat's milk in children with cow's milk allergy. J Allergy Clin Immunol 1999;103:1191-1194.

12. Tang J, Altman DS, Robertson D, O'Sullivan DM, Douglass JM, Tinanoff N. Dental caries prevalence and treatment levels in Arizona preschool children. Public Health Rep 1997;112:319-29.

13. Tinanoff N and Palmer CA. Dietary determinants of dental caries and dietary recommendations for preschool children. J Public Health Dent 2000;60(3):197-206.

14. American Academy of Pediatrics, Committee on Nutrition. The use and misuse of fruit juice in pediatrics. Pediatrics 2001;107:1210-1213.

15. American Academy of Pediatrics and American Academy of Pedodontics. Juice in ready-to-use bottles and nursing bottle carries. AAP News. 1978;29(1):11.

16. Samour PQ, Helm KK, Lang CE. Handbook of pediatric nutrition. 2nd ed. Gaithersburg, MD: Aspen Publishers, Inc.; 1999.

17. American Academy of Pediatric Dentistry. Baby Bottle Tooth Decay/Early Childhood Caries. Pediatr Dent 2000-2001 (revised May 1996); 2001 Mar-Apr;23(2):18.

18. Fitzsimons D, Dwyer JT, Palmer C, Boyd LD. Nutrition and oral health guidelines for pregnant women, infants, and children. J Am Diet Assoc. Feb 1998;98(2):182-6.

19. Shelov SD. Caring for your baby and young child: birth to age 5. Elk Grove Village, IL: American Academy of Pediatrics; 1998.

20. Satter E. Child of mine: Feeding with love and good sense. Palo Alto (CA): Bull Publishing Company; 2000.

21. Tamborlane, WV, editor. The Yale guide to children's nutrition. Connecticut: Yale University; 1997.

22. Williams, CP, editor. Pediatric manual of clinical dietetics. Chicago: American Dietetic Association; 1998.

23. Fomon, SJ. Feeding normal infants: rationale for recommendations. J Am Diet Assoc. 2001; 101:1002-1005.

24. Rolfes, DeBruyne, Whitney. Life span nutrition: conception through life; 1990; pp. 231-237.

25. Gibson SA. Non-milk extrinsic sugars in the diets of pre-school children: association with intakes of micronutrients, energy, fat and NSP. Br J Nutr 1997;78:367-378.

26. Parish ME. Public health and non-pasteurized fruit juices. Crit Rev Microbiol. 1997;23:109-119.

27. Food Labeling. Warning and Notice Statement: Labeling of juice products; Final Rule. 63 Federal Register 37029-37056 (1998) (codified at 21 CFR §101, 120)

28. Botulism Fact Sheet [electronic file]. Atlanta (GA): Centers for Disease Control and Prevention; 1995.

29. Centers for Disease Control and Prevention (US). Botulism in the United States, 1899-1996. Atlanta (GA): Centers for Disease Control and Prevention; 1998.

30. Food and Drug Administration. Updates: Avoid raw sprouts to reduce food poisoning risk, agency advises. FDA Consumer magazine, September-October 1999, see: http://www.fda.gov/fdac/departs/1999/599_upd.html

31. Fein, SB, Falci, CD. Infant formula preparation, handling, and related practices in the United States. J Am Diet Assoc 1999. 99:1234-1240.

32. Biancuzzo, Marie, Breastfeeding the newborn: clinical strategies for nurses. St. Louis, MO; Morby, 1999, Pages 103-104.

33. Mochbracher, Nancy and Stock, Julie, The Breastfeeding answer book (Revised edition). La Leche League International, 1997, Pages 20-23.

34. Eiger MS, Olds SW. The complete book of breastfeeding. New York: Workman Publishing; 1999, p. 88, 112-114.

35. Rosenthal MS. The breastfeeding sourcebook. Los Angeles: Lowell House; 1996, p. 157.

36. Sears M, Sears W. The breastfeeding book. Boston: Little, Brown and Company; 2000, p. 108-110.

37. Johnson DB. Nutrition in infancy: evolving views on recommendations. Nutrition Today 1998; 32: 63-68.

38. Mark DH. Breastfeeding and infant illness: a dose-response relationship. J Amer Med Assoc 1990; 281: 1154.

39. Murtaugh M. Optimal breastfeeding duration. J Am Diet Assoc 1997; 97: 1252-1255.

40. Raisler J, Alexander C, O'Campo P. Breastfeeding and infant illness: a dose-response relationship? Am J Pub Health 1999; 89: 25-30.

41. Scariati PD, Grummer-Strawn LM, Fein SB. A longitudinal analysis of infant mortality and the extent of breastfeeding in the United States. Pediatrics 1997; 99:6.

42. Story M, Hoyt K, Sofka D. Bright futures in practice. National Center for Education in Maternal and Child Health. Arlington: Georgetown University; 2000, p. 25.

43. Gillman MW, Rifas-Shiman SL, Camargo CA Jr, Berkey CS, Frazier AL, Rockett HR, Field AE, Colditz GA. Risk of overweight among adolescents who were breastfed as infants. J Amer Med Assoc 2001; 285(19): 2461-7.

44. Von Kries R, Koletzko B, Sauerwald T, von Mutius E, Barnert D, Grunert V, VonVoss H. Breastfeeding and obesity: cross-sectional study. Br Med J 1999; 319(7203):147-50.

45. Sanders TA, Reddy S. Vegetarian diets and children. Am J Clin Nutr. 1994;59(suppl):1176S-1181S.

46. Sanders TA. Essential fatty acid requirements of vegetarians in pregnancy, lactation and infancy. Am J Clin Nutr. 1999;70:555S-559S.

47. Sanders TA. Vegetarian diets and children. Pediatr Clin North Am. 1995;42:955-965.

48. Dagnelie PC, Vergote FJ, van Staveren, WA, et al. High prevalence of rickets in infants on macrobiotic diets. Am J Clin Nutr. 1990;51:202-208.

49. Duyff RL. American Dietetic Association. The American Dietetic Association's complete food and nutrition guide. Minneapolis, MN: Chronimed Pub; 1996.

50. American Academy of Pediatrics: A woman's guide to breastfeeding. 1999, pp. 13-14.

51. United States Department of Agriculture (USDA), Food and Nutrition Service. Breastfeed Babies Welcome Here [Program Aid 1516]. Alexandria, VA: USDA, 1995, pp. 12-15.

52. Lawrence, RA: Breastfeeding: a guide for the medical profession. 5th edition. St. Louis, MO: Mosby, 1999, pp. 677-710.

53. Duke, C.S. Common concerns when storing human milk. New Beginnings; July-August 1998; 15 (4), p. 109.

54. Neifert, Marianne: Dr. mom's guide to breastfeeding. 1998; New York, NY: Plume, pp. 305-306.

55. Anderson JV, Van Nierop MR. Basic nutrition facts a nutrition reference. Lansing, MI: Michigan Department of Public Health; 1989.

56. Lawrence, RA. Breastfeeding: a guide for the medical profession. 5th edition. St. Louis, MO: Mosby, 1999, pp. 371-377.

57. Siegel RK. Herbal intoxication: psychoactive effects from herbal cigarettes, tea and capsules. JAMA 236:473, 1976.

58. Ridker PM. Toxic effects of herbal teas. Arch Environ Health 42(3):133-6, 1987.

59. Office of Dietary Supplements, National Institutes of Health (NIH). Botanical dietary supplements: background Information. NIH web page, last updated 7/7/2004, see: http://ods.od.nih.gov/factsheets/BotanicalBackground.asp

60. American Academy of Pediatric Dentistry. Fluoride. Pediatr Dent. 1999;21:40.

61. American Academy of Pediatrics, Section on Breastfeeding and Committee on Nutrition. Prevention of rickets and vitamin D deficiency in infants, children, and adolescents. Pediatrics 2008;www.pediatrics.org/cgi/doi/10.1542/peds.2008-1862. Accessed February 2009.

425 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. (See 425: A-I)

Participant Category and Priority Level

Category	Priority	High Risk
Children	V	N

Parameter for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel

Inappropriate Nutrition Practices for Children	Examples of Inappropriate Nutrition Practices (including but not limited to)
425a 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 the CPA determines overweight or obesity is a concern ~~only~~) or sweetened condensed milk; and • Imitation or substitute milks (such as inadequately or unfortified rice- or soy-based beverages, non-dairy creamer), or other "homemade concoctions."
425b Routinely feeding a child any sugar-containing fluids.	Examples of sugar-containing fluids: • Soda/soft drinks; • Gelatin water; • Corn syrup solutions; and • Sweetened tea.
425c Routinely using nursing bottles, cups, or pacifiers 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.

Inappropriate Nutrition Practices for Children	Examples of Inappropriate Nutrition Practices (including but not limited to)
	• 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.
425d 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).
425e Feeding foods to a child that could be contaminated with harmful microorganisms.	Examples of potentially harmful foods for a child: • Unpasteurized fruit or vegetable juice; • Unpasteurized dairy products or soft cheeses such as feta, Brie, Camembert, blue-veined, and Mexican-style cheese; • Raw or undercooked meat, fish, poultry, or eggs; • Raw vegetable sprouts (alfalfa, clover, bean, and radish); • Deli meats, hot dogs, and processed meats (avoid unless heated until steaming hot).
425f Routinely feeding a diet very low in calories and/or essential nutrients.	Examples: • Vegan diet; • Macrobiotic diet; and • Other diets very low in calories and/or essential nutrients.
425g Feeding dietary supplements with potentially harmful consequences.	Examples of dietary supplements which when fed in excess of recommended dosage may be toxic or have harmful consequences: • Single or multi-vitamins;

Inappropriate Nutrition Practices for Children	Examples of Inappropriate Nutrition Practices (including but not limited to)
	• Mineral supplements; and • Herbal or botanical supplements/remedies/teas.
425h Routinely not providing dietary supplements recognized as essential by national public health policy when a child's diet alone cannot meet nutrient requirements.	• Providing children under 36 months of age less than 0.25 mg of fluoride daily when the water supply contains less than 0.3 ppm fluoride. • Providing children 36-60 months of age less than 0.50 mg of fluoride daily when the water supply contains less than 0.3 ppm fluoride. • Not providing 400 IU of vitamin D if a child consumes less than 1 liter (or 1 quart) of vitamin D fortified milk or formula.
425i Routine ingestion of non-food 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).

Justification

425.a Routinely feeding inappropriate beverages as the primary milk source.

Goat's milk, sheep's milk, imitation milks and substitute milks 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 that increased volume be consumed to satisfy caloric 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, 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*. 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.

425.b 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 dental caries prevalence and progression (6). Consumption of foods and beverages high in fermentable carbohydrates, such as sucrose, increases the risk of early childhood caries and tooth decay (6,7).

425.c Routinely using nursing bottles, cups, or pacifiers improperly.

Dental caries is a major health problem in U.S. preschool children, especially in low-income populations (8). 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 (6). Solid foods such as cereal should not be put into a bottle for feeding; this is a form of forcefeeding (9) 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 (10, 11). While sleeping with a bottle in his or her mouth, a child's swallowing and salivary flow decreases, thus creating a pooling of liquid around the teeth (12). 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 (13).

- 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 (14).
- 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 carbohydrate, which promotes the development of dental caries (10). 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, 14). The sugars in the liquid pool around the child's teeth and gums feed the bacteria there and decay is the result (15). 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 (15). The damage begins as white lesions and progresses to brown or black discoloration typical of caries (15). When early childhood caries are severe, the decayed crowns may break off and the permanent teeth developing below may be damaged (15). Undiagnosed dental caries and other oral pain may contribute to feeding problems and failure to thrive in young children (15). 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) (15). 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.d 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. These interactions comprise the "feeding relationship" (9). 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 (16, 17). Parents who consistently attempt to control their children's food intake may give children few opportunities to learn to control their own food intake (18). 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, 17). 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 has 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 (19, 20). Forcing a child to clean his or her plate may lead to overeating or development of an aversion to certain foods (7). The toddler and preschooler are striving to be independent (7). Self-feeding is important even though physically they may not be able to handle feeding utensils or have good eye-hand coordination (7). Children should be able to manage the feeding process independently and with dispatch, without either unnecessary dawdling or hurried eating (3, 12). 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 (9). 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 feed 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, 7). However, the foods offered should be modified so that the child can chew and swallow the food without difficulty (3).

425.e Feeding foods to a child that could be contaminated with harmful microorganisms.

According to the AAP, to prevent food-borne illness, the foods listed below should not be fed to young children or infants (1). All of the foods have been implicated in selected outbreaks of food-borne illness, including in children.

Background information regarding foods that could be contaminated with harmful microorganisms is also included below:

- Unpasteurized fruit or vegetable juice--Only pasteurized juice is safe for infants, children, and adolescents (10). Pasteurized fruit juices are free of microorganisms (10). Unpasteurized juice may contain pathogens, such as Escherichia coli, Salmonella, and Cryptosporidium organisms (10, 21). These organisms can cause serious disease, such as hemolytic-uremic syndrome, and should never be fed to infants and children (10). Unpasteurized juice must contain a warning on the label that the product may contain harmful bacteria (10, 22).
- Unpasteurized dairy products or soft cheeses such as feta, Brie, Camembert, blue-veined, and Mexican-style cheese--Young children or infants should not eat raw or unpasteurized milk or cheeses (1)—unpasteurized dairy products could contain harmful bacteria, such as

Brucella species, that could cause young children to contract a dangerous food borne illness. The American Academy of Pediatrics also recommends that young children should not eat soft cheeses such as feta, Brie, Camembert, blue-veined, and Mexican-style cheese—these foods could contain Listeria bacteria (hard cheeses, processed cheeses, cream cheese, cottage cheese, and yogurt need not be avoided) (1).

- Raw or undercooked meat, fish, poultry, or eggs--Young children or infants should not eat raw or undercooked meat or poultry, raw fish or shellfish , including oysters, clams, mussels, and scallops (1)—these foods may contain harmful bacteria or parasites that could cause children to contract a dangerous food borne illness.
- Raw vegetable sprouts (alfalfa, clover, bean, and radish)--Sprouts can cause potentially dangerous Salmonella and E. coli O157 infection. Sprouts grown under clean conditions in the home also present a risk because bacteria may be present in seed. Cook sprouts to significantly reduce the risk of illness (23).
- Deli meats, hot dogs, and processed meats (avoid unless heated until steaming hot)-These foods have been found to be contaminated with *Listeria monocytogenes*; if adequately cooked, this bacteria is destroyed.

425.f Routinely feeding a diet very low in calories and/or essential nutrients.

Highly restrictive diets prevent adequate intake of nutrients, interfere with growth and development, and may lead to other adverse physiological effects (24). Well-balanced vegetarian diets with dairy products and eggs are generally associated with good health. However, strict vegan diets may be inadequate in calories, vitamin B12, vitamin D, calcium, iron, protein and essential amino acids needed for growth and development (25). The more limited the diet, the greater the health risk. Given the health and nutrition risks associated with highly restrictive diets, WIC can help the parent to assure that the child consumes an adequate diet to optimize health during critical periods of growth as well as for the long term.

425.g Feeding dietary supplements with potentially harmful consequences.

A child consuming inappropriate or excessive amounts of single or multivitamin or mineral or herbal remedy not prescribed by a physician is at risk for a variety of adverse effects including harmful nutrient interactions, toxicity, and teratogenicity (1, 26). Like drugs, herbal or botanical preparations have chemical and biological activity, may have side effects, and may interact with certain medications--these interactions can cause problems and can even be dangerous (27). Botanical supplements are not necessarily safe because the safety of a botanical depends on many things, such as its chemical makeup, how it works in the body, how it is prepared, and the dose used (27). While some herbal teas may be safe, some have undesirable effects, particularly on young children who are fed herbal teas or who receive breast milk from mothers who have ingested herbal teas (28). Examples of teas with potentially harmful effects to

children include: licorice, comfrey leaves, sassafras, senna, buckhorn bark, cinnamon, wormwood, woodruff, valerian, foxglove, pokeroot or pokeweed, periwinkle, nutmeg, catnip, hydrangea, juniper, Mormon tea, thorn apple, yohimbe bark, lobelia, oleander, Maté, kola nut or gotu cola, and chamomile (28-30).

425.h Routinely not providing dietary supplements recognized as essential by national public health policy when a child's diet alone cannot meet nutrient requirements.

Depending on a child's specific needs and environmental circumstances, certain dietary supplements may be recommended by the child's health care provider to ensure health. For example, fluoride supplements may be of benefit in reducing dental decay for children living in fluoride-deficient areas (1, 31). In addition, the AAP recommends that children who are ingesting less than 1 liter (1 quart) per day of vitamin D-fortified formula or milk, should receive a vitamin D supplement of 400 IU/day (32). Since 1 quart of milk is in excess of the recommended 2 cups of milk per day for pre-school children (33), most children will require a vitamin D supplement.

425.i Routine ingestion by child of nonfood items (Pica).

Pica is the compulsive eating of nonnutritive substances and can have serious medical implications (33). Pica is observed most commonly in areas of low socioeconomic status and is more common in women (especially pregnant women) and in children (30). Pica has also been seen in children with obsessive-compulsive disorders, mental retardation, sickle cell disease (34-36). Complications of this disorder include: iron-deficiency anemia, lead poisoning, intestinal obstruction, acute toxicity from soil contaminants, and helminthic infestations (34, 37, 38).

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Considerations for **Routinely feeding inappropriate beverages as the primary milk source**:
    - Review milk recommendations that are appropriate for the child's age and nutrition needs

- Considerations for **Routinely feeding a child any sugar-containing fluids:**
  - Discuss importance of good oral health
  - Encourage caregiver to help child maintain a healthy weight by giving water to drink most of the time
- Considerations for **Routinely using nursing bottles, cups, or pacifiers improperly**:
  - Discuss importance of good oral health
  - Review methods of weaning child from bottle or pacifier
- Considerations for **Routinely using feeding practices that disregard the developmental needs or stages of the child**:
  - Review feeding recommendations
  - Help caregiver understand importance of following child's hunger and satiety cues
- Considerations for **Feeding foods to a child that could be contaminated with harmful microorganisms**:
  - Review food safety recommendations
- Considerations for **Routinely feeding a diet very low in calories and/or essential nutrients**:
  - Review child's nutrient needs
  - Help parent identify foods that provide adequate nutrients
- Considerations for **Feeding dietary supplements with potentially harmful consequences**:
  - Review child feeding recommendations
  - Discuss risks of feeding children supplements not prescribed by an MD
- Considerations for **Routinely not providing dietary supplements recognized as essential by national public health policy when a child's diet alone cannot meet nutrient requirements**:
  - Review child's nutrient needs
  - Discuss why certain dietary supplements (prescribed by an MD) could be beneficial
- Considerations for **Routine ingestion by child of nonfood items (Pica)**:
  - Discuss risks of ingesting non-food items and help parent identify ways to keep child from eating the nonfood item(s)

References

1. Committee on Nutrition, American Academy of Pediatrics. Pediatric nutrition handbook. 6th Ed Elk Grove Village, Ill: American Academy of Pediatrics, 2009.
~~Committee on Nutrition, American Academy of Pediatrics. Pediatric nutrition handbook. 4th and 5th eds. Elk Grove Village, Ill: American Academy of Pediatrics, 1998 and 2004.~~

2. American Academy of Pediatrics, Committee on Nutrition: Iron fortification of infant formula. Pediatrics 1999; 104:119-123.

3. Trahms CM, Pipes PL, editors. Nutrition in Infancy and Childhood. WCB/McGraw-Hill; 1997.

4. Bellioni-Businco B, Paganelli R, Lucenti P, Giampietro PG, Perborn H, Businco L. Allergenicity of goat's milk in children with cow's milk allergy. J Allergy Clin Immunol 1999;103:1191-1194.

5. Tamborlane, WV, editor. The Yale guide to children's nutrition. Connecticut: Yale University; 1997.

6. Hansen AE, Wiese HF, Boelsche AN, Haggard ME, Adam DJ, Davis H. Role of Linoleic Acid in Infant Nutrition: Clinical and Chemical Study of 428 Infants Fed on Milk Mixtures Varying in Kind and Amount of Fat. Pediatrics. 1963; 31(1), 171-19

7. Uauy R, Castillo C. Lipid requirements of infants: implications for nutrient composition of fortified complementary foods. The Journal of nutrition. 2003; 133(9), 2962S-2972S.

8. Innis SM. Dietary (n-3) fatty acids and brain development. The Journal of nutrition. 2007; 137(4), 855-859.

9. Birch EE, Garfield S, Castañeda Y, Hughbanks-Wheaton D, Uauy R, Hoffman D. Visual acuity and cognitive outcomes at 4 years of age in a double-blind, randomized trial of long-chain polyunsaturated fatty acid-supplemented infant formula. Early human development. 2007; 83(5), 279-284.

10. Daniels, SR, Greer, FR. Lipid screening and cardiovascular health in childhood. Pediatrics. 2008;122(1), 198-208.

11. Tinanoff N, Palmer CA. Dietary determinants of dental caries and dietary recommendations for preschool children. J Public Health Dent 2000;60(3):197-206.

12. Williams, CP, editor. Pediatric manual of clinical dietetics. Chicago: American Dietetic Association; 1998.

13. Tang J, Altman DS, Robertson D, O'Sullivan DM, Douglass JM, Tinanoff N. Dental caries prevalence and treatment levels in Arizona preschool children. Public Health Rep 1997;112:319-29.

14. Satter E. Child of mine: Feeding with love and good sense. Palo Alto (CA): Bull Publishing Company; 2000.

15. American Academy of Pediatrics Committee on Nutrition: The use and misuse of fruit juice in pediatrics. Pediatrics 2001;107:1210-1213.

16. American Academy of Pediatrics and American Academy of Pedodontics. Juice in ready-to-use bottles and nursing bottle carries. AAP News. 1978;29(1):11.

17. Samour PQ, Helm KK, Lang CE. Handbook of pediatric nutrition. 2nd ed. Gaithersburg, MD: Aspen Publishers, Inc.; 1999.

18. Shelov SD. Caring for your baby and young child: birth to age 5. Elk Grove Village, IL: American Academy of Pediatrics; 1998.

19. American Academy of Pediatric Dentistry. Baby Bottle Tooth Decay/Early Childhood Caries. Pediatr Dent 2000-2001 (revised May 1996); 2001 Mar-Apr;23(2):18

20. Fitzsimons D, Dwyer JT, Palmer C, Boyd LD. Nutrition and oral health guidelines for pregnant women, infants, and children. J Am Diet Assoc. Feb 1998;98(2):182-6.

21. Satter, E. Childhood feeding problems. Feelings and Their Medical Significance; Vol. 32, no. 2; Columbus, OH; Ross Laboratories; 1990.

22. Satter EM. The feeding relationship. J.Am.Diet.Assoc. 1986;86:352-6.

23. Johnson SL, Birch LL. Parents' and children's adiposity and eating style. Pediatrics 1994;94:653-61.

24. Olson RE. Is it wise to restrict fat in the diets of children? J Am Diet Assoc 2000 Jan;100(1):28-32.

25. Birch LL, Fisher JO. Development of eating behaviors among children and adolescents. Pediatrics 1998;101:539-549.

26. Parish ME. Public health and nonpasteurized fruit juices. Crit Rev Microbiol. 1997;23:109-119.

27. Food Labeling. Warning and Notice Statement: Labeling of Juice Products; Final Rule. 63 Federal Register 37029-37056 (1998) (codified at 21 CFR §101, 120).

28. Food and Drug Administration. Updates: Avoid Raw Sprouts to Reduce Food Poisoning Risk, Agency Advises. FDA Consumer magazine, September-October 1999 (see: http://www.fda.gov/fdac/departs/1999/599_upd.html)

29. Institute of Medicine. WIC nutrition risk criteria a scientific assessment. National Academy Press, Washington, D.C.; 1996.

30. Duyff RL. American Dietetic Association. The American Dietetic Association's complete food and nutrition guide. Minneapolis, MN: Chronimed Pub; 1996.

31. Anderson JV, Van Nierop MR. Basic nutrition facts a nutrition reference. Lansing, MI: Michigan Department of Public Health; 1989.

32. Office of Dietary Supplements, National Institutes of Health (NIH). Botanical Dietary Supplements: Background Information. NIH web page, last updated 7/7/2004, see: http://ods.od.nih.gov/factsheets/BotanicalBackground.asp

33. Lawrence, RA. Breastfeeding: a guide for the medical profession. 5th edition. St. Louis, MO: Mosby, 1999, pp. 371-377.

34. Siegel RK. Herbal intoxication: psychoactive effects from herbal cigarettes, tea and capsules. JAMA 236:473, 1976.

35. Ridker PM. Toxic effects of herbal teas. Arch Environ Health 42(3):133-6, 1987.

36. American Academy of Pediatric Dentistry. Fluoride. Pediatr Dent. 1999;21:40.

37. American Academy of Pediatrics Section on Breastfeeding and Committee on Nutrition. Prevention of rickets and vitamin D deficiency in infants, children, and adolescents. Pediatrics 2008;www.pediatrics.org/cgi/doi/10.1542/peds.2008-1862. Accessed 2/09.

38. U.S. Department of Agriculture, Center for Nutrition Policy and Promotion. MyPyramid for Preschoolers. http://mypyramid.gov/preschoolers/index.html . Accessed 3/09.

39. Rose EA, Porcerelli JH, Neale AV. Pica: common but commonly missed. J Am Board Fam Pract. 2000;13(5):353-8.

40. LeBlanc LA, Piazza CC, Krug MA. Comparing methods for maintaining the safety of a child with pica. Res Dev Disabil. 1997; 18(3):215-20.

41. Ivascu NS, et al. Characterization of pica prevalence among patients with sickle cell disease. Arch Pediatr Adoles Med 2001; 155(11):1243-7.

42. Calabrese EJ, et al. Soil ingestion: a concern for acute toxicity in children. Environ Health Perspect. 1997; 105(12):1354-8.

43.Wang PY, Skarsgard ED, Baker RJ. Carpet bezoar obstruction of the small intestine. J Pediatr Surg. 1996; 31(12):1691-3.

Additional Related References

1. Food Safety and Inspection Service. Food Safety Focus: Molds On Food: Are They Dangerous? Electronic Consumer Education and Information. April 2002 (see: http://www.nutrition.gov/framesets/search.php3?mw=moldy+food&Submit=Go&url=Select+A+Topic&db=www&mt=all)

2. Food Safety and Inspection Service. FOCUS ON: Food Product Dating. Electronic Consumer Education and Information. Updated June 2001 (see: http://www.nutrition.gov/framesets/search.php3?mw=moldy+food&Submit=Go&url=Select+A+Topic&db=www&mt=all)

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.

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant Women	IV	N
Breastfeeding Women	IV	N
Non-Breastfeeding Women	VI	N

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel

Inappropriate Nutrition Practices for Women	Examples of Inappropriate Nutrition Practices (including but not limited to)
427a Consuming dietary supplements with potentially harmful consequences.	Examples of dietary supplements which when ingested in excess of recommended dosages, may be toxic or have harmful consequences: • Single or multiple vitamins; • Mineral supplements; and • Herbal or botanical supplements/remedies/teas.
427b Consuming a diet very low in calories and/or essential nutrients; or impaired caloric intake or absorption of essential nutrients following bariatric surgery.	• Strict vegan diet; • Low-carbohydrate, high-protein diet; • Macrobiotic diet; and • Any other diet restricting calories and/or essential nutrients.
427c 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).
427d Inadequate vitamin/mineral supplementation recognized as essential by national public health policy.	• Consumption of less than 27 mg of iron as a supplement daily by pregnant woman. • Consumption of less than 150 mcg of supplemental iodine per day by pregnant and breastfeeding women. • Consumption of less than 400 mcg of folic acid from fortified foods and/or supplements daily by non-pregnant woman.
427e Pregnant woman ingesting foods	Potentially harmful foods: • Raw fish or shellfish, including oysters, clams, mussels, and scallops;

Inappropriate Nutrition Practices for Women	Examples of Inappropriate Nutrition Practices (including but not limited to)
that could be contaminated with pathogenic microorganisms.	• Refrigerated smoked seafood, unless it is an ingredient in a cooked dish, such as a casserole; • Raw or undercooked meat or poultry; • Hot dogs, luncheon meats (cold cuts), fermented and dry sausage and other deli-style meat or poultry products unless reheated until steaming hot; • Refrigerated pâté or meat spreads; • Unpasteurized milk or foods containing unpasteurized milk; • Soft cheeses such as feta, Brie, Camembert, blue-veined cheeses and Mexican style cheese such as queso blanco, queso fresco, or Panela unless labeled as made with pasteurized milk; • Raw or undercooked eggs or foods containing raw or lightly cooked eggs including certain salad dressings, cookie and cake batters, sauces, and beverages such as unpasteurized eggnog; • Raw sprouts (alfalfa, clover, and radish); or • Unpasteurized fruit or vegetable juices.

Justification

427.a Consuming dietary supplements with potentially harmful consequences.

Women taking inappropriate or excessive amounts of dietary supplements such as, single or multivitamins or minerals, or botanical (including herbal) remedies or teas, are at risk for adverse effects such as harmful nutrient interactions, toxicity and teratogenicity (1, 2). Pregnant and lactating women are at higher risk secondary to the potential transference of harmful substances to their infant.

Most nutrient toxicities occur through excessive supplementation of particular nutrients, such as, vitamins A, B-6 and niacin, iron and selenium (3). Large doses of vitamin A may be teratogenic (4). Because of this risk, the Institute of Medicine recommends avoiding preformed vitamin A supplementation during the first trimester of pregnancy (4). Besides nutrient toxicities, nutrient-nutrient and drug-nutrient interactions may adversely affect health.

Many herbal and botanical remedies have cultural implications and are related to beliefs about pregnancy and breastfeeding. The incidence of herbal use in pregnancy ranges from 7-55 %

with echinacea and ginger being the most common (1). Some botanical (including herbal) teas may be safe; however, others have undesirable effects during pregnancy and breastfeeding. Herbal supplements such as, blue cohash and pennyroyal stimulate uterine contractions, which may increase the risk of miscarriage or premature labor (1, 5). The March of Dimes and the American Academy of Pediatrics recommend cautious use of tea mixtures because of the lack of safety testing in pregnant women (6).

427.b *Consuming a diet very low in calories and/or essential nutrients; or impaired caloric intake or absorption of essential nutrients following bariatric surgery.*

Women consuming highly restrictive diets are at risk for primary nutrient deficiencies, especially during critical developmental periods such as pregnancy. Pregnant women who restrict their diets may increase the risk of birth defects, suboptimal fetal development and chronic health problems in their children. Examples of nutrients associated with negative health outcomes are:

- Low iron intake and maternal anemia and increased risk of preterm birth or low birth weight (7, 8).
- Low maternal vitamin D status and depressed infant vitamin D status (9).
- Low folic acid and NTD (10, 11, 12).

Low calorie intake during pregnancy may lead to inadequate prenatal weight gain, which is associated with infant intrauterine growth restriction (IUGR) (13) and birth defects (10, 11, 14). The pregnant adolescent who restricts her diet is of particular concern since her additional growth needs compete with the developing fetus and the physiological changes of pregnancy (14).

Strict vegan diets may be highly restrictive and result in nutrient deficiencies. Nutrients of potential concern that may require supplementation are:

- Riboflavin (15, 16)
- Iron (15)
- Zinc (15, 17)
- Vitamin B12 (15, 16, 18)
- Vitamin D (15, 16, 18)
- Calcium (15, 16, 18, 19,)
- Selenium (16)

The pregnant adolescent who consumes a vegan diet is at even greater risk due to her higher nutritional needs (16, 18). The breastfeeding woman who chooses a vegan or macrobiotic diet increases her risk and her baby's risk for vitamin B12 deficiency (18). Severe vitamin B12

deficiency resulting in neurological damage has been reported in infants of vegetarian mothers (18).

With the epidemic of obesity, treatment by gastric bypass surgery has increased more than 600% in the last ten years and has created nutritional deficiencies not typically seen in obstetric or pediatric medical practices (20). Gastrointestinal surgery promotes weight loss by restricting food intake and, in some operations, interrupting the digestive process. Operations that only reduce stomach size are known as “restrictive operations” because they restrict the amount of food the stomach can hold. Examples of restrictive operations are adjustable gastric banding and vertical banded gastroplasty. These types of operations do not interfere with the normal digestive process (21).

Some operations combine stomach restriction with a partial bypass of the small intestine, these are known as malabsorptive operations. Examples of malabsorptive operations are Roux-en-y gastric bypass (RGB) and Biliopancreatic diversion (BPD). Malabsorptive operations carry a greater risk for nutritional deficiencies because the procedure causes food to bypass the duodenum and jejunum, where most of the iron and calcium are absorbed. Menstruating women may develop anemia because not enough iron and vitamin B12 are absorbed. Decreased absorption of calcium may also contribute to osteoporosis and metabolic bone disease (21). A breastfeeding woman who has had gastric bypass surgery is at risk of vitamin B12 deficiency for herself and her infant (22).

427.c 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).

427.d Inadequate vitamin/mineral supplementation recognized as essential by national public health policy.

The Recommended Dietary Allowance (RDA) for pregnant women is 27mg of iron per day (29). The Centers for Disease Control and Prevention recommends iron supplementation for all pregnant women to prevent iron deficiency (30); however, pregnant women should seek guidance from a qualified health care provider before taking dietary supplements (31).

During pregnancy and lactation the iodine requirement is sharply elevated. The RDA for iodine during pregnancy is 220 μg and 290 μg during lactation (29). Severe iodine deficiency during pregnancy can cause cretinism and adversely affect cognitive development in children (32). Even mild iodine deficiency may have adverse affects on the cognitive function of children (33). Since the 1970s, according to the 2001-2002 National Health and Nutrition Examination Surveys (NHANES), there has been a decrease of approximately 50% in adult urinary iodine values. For women of child bearing age, the median urinary iodine value decreased from 294 to 128 μg per liter (34). The American Thyroid Association recommends that women receive prenatal vitamins containing 150 μg of iodine daily during pregnancy and lactation (35). The iodine content of prenatal vitamins in the Unites States is not mandated, thus not all prenatal vitamins contain iodine (36). Pregnant and breastfeeding women should be advised to review the iodine content of their vitamins and discuss the adequacy of the iodine with their health care provider.

Non-pregnant women of childbearing age who do not consume adequate amounts of folic acid are at greater risk for functional folate deficiency, which has been proven to cause neural tube defects (NTDs), such as spina bifida and anencephaly (37-40).

Folic acid consumed from fortified foods and/or a vitamin supplement in addition to folate found naturally in food reduces this risk (12). The terms “folic acid” and “folate” are used interchangeably, yet they have different meanings. Folic acid is the synthetic form used in vitamin supplements and fortified foods (12, 30, 31). Folate occurs naturally and is found in foods, such as dark green leafy vegetables, strawberries, and orange juice (12).

Studies show that consuming 400 mcg of folic acid daily interconceptionally can prevent 50 percent of neural tube defects (12). Because NTDs develop early in pregnancy (between the 17th and 30th day) and many pregnancies are not planned, it is important to have adequate intakes before pregnancy and throughout the childbearing years (14). NTDs often occur before women know they are pregnant. It is recommended that all women capable of becoming pregnant consume a multivitamin containing 400 mcg of folic acid daily (39-41). It is important that breastfeeding and non-breastfeeding women participating in the WIC Program know about folic acid and foods that contain folate to encourage preconceptional preventive practices (38).

427.e Pregnant woman ingesting foods that could be contaminated with pathogenic microorganisms.

Food-borne illness is a serious public health problem (42). The causes include pathogenic microorganisms (bacteria, viruses, and parasites) and their toxins and chemical contamination. The symptoms are usually gastrointestinal in nature (vomiting, diarrhea, and abdominal pain), but neurological and "non-specific" symptoms may occur as well. Over the last 20 years, certain foods have been linked to outbreaks of food-borne illness. These foods include: milk (Campylobacter); shellfish (Norwalk-like viruses), unpasteurized apple cider (Escherichia coli O 157:H7); eggs (Salmonella); fish (ciguatera poisoning); raspberries (Cyclospora); strawberries (Hepatitis A virus); and ready-to-eat meats (Listeria monocytogenes).

Listeria monocytogenes can cause an illness called listeriosis. Listeriosis during

pregnancy can result in premature delivery, miscarriage, fetal death, and severe illness or death of a newborn from the infection (43). Listeriosis can be transmitted to the fetus through the placenta even if the mother is not showing signs of illness.

Pregnant women are especially at risk for food-borne illness. For this reason, government agencies such as the Centers for Disease Control and Prevention, the USDA Food Safety and Inspection Service, and the Food and Drug Administration advise pregnant women and other high risk individuals not to eat foods as identified in the definition for this criterion (42, 43).

The CDC encourages health care professionals to provide anticipatory guidance, including the "four simple steps to food safety" of the Fight BAC campaign, to help reduce the incidence of food-borne illnesses.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Considerations for **Consuming dietary supplements with potentially harmful consequences**:
  - Discuss risks of taking supplements not prescribed by an MD
- Considerations for **Consuming a diet very low in calories and/or essential nutrients; or impaired caloric intake or absorption of essential nutrients following bariatric surgery**:
  - Discuss importance of consuming adequate energy and nutrients

    - People who have undergone bariatric surger are at risk for calcium, iron, and vitamin B12 deficiency. Review ways to prevent deficiency.
- Considerations for **Compulsively ingesting non-food items (pica)**:
    - Discuss risks of ingesting non-food items and help participant identify ways to abstain from eating the nonfood item(s)
- Considerations for **Inadequate vitamin/mineral supplementation recognized as essential by national public health policy**:
    - Discuss why certain dietary supplements (prescribed by an MD) could be beneficial
- Considerations for **Pregnant woman ingesting foods that could be contaminated with pathogenic microorganisms**:
    - Discuss food safety recommendations
    - Review ways to prevent Listeriosis

References

1. Tiran D. The use of herbs by pregnant and childbearing women: a risk-benefit assessment. Complementary Therapies in Nursing and Midwifery. November 2003. 9(4):176-181.

2. Position of the American Dietetic Association: Nutrition and lifestyle for a healthy pregnancy outcome. J Am Diet Assoc. 2002 October;102(10):1479-1490.

3. Position of the American Dietetic Association: Food fortification and dietary supplements. J Am Diet Assoc. January 2001.

4. Langkamp-Henken B, Lukowski MJ, Turner RE, Voyles LM. High levels of retinol intake during the first trimester of pregnancy result from use of over-the-counter vitamin/mineral supplements. J Am Diet Assoc. September 2000.

5. March of Dimes (homepage on the Internet). New York: Herbal Supplements: heir Safety, a Concern for Health Care Providers. [cited May 26, 2004] Available from: http://www.marchofdimes.com

6. American Academy of Pediatrics, Committee on Nutrition. Pediatric Nutrition Handbook. 5th ed. Kleinman, Ronald, editor. Washington DC: American Academy of Pediatrics; 2004.

7. Recommendations to prevent and control iron deficiency in the United States. MMWR [serial on the Internet]. 1998 April [cited 2004 March 12]. Available from: http://www.cdc.gov/mmwr/preview/mmwrhtml/00051880.htm.

8. Rasmussen, K. M. Is there a causal relationship between iron deficiency or iron-deficiency anemia and weight at birth, length of gestation and perinatal mortality? American Society for Nutritional Sciences. 2001;590S-603S.

9. Scanlon KS, editor. Vitamin D expert panel meeting; October 11-12, 2001; Atlanta, Georgia. Available from: http://www.cdc.gov/nccdphp/dnpa/nutrition/pdf/Vitamin D Expert Panel Meeting.pdf.

10. Carmichael SL, Shaw GM, Schaffer DM, Selvin S. Diet quality and risk of neural tube defects. Medical Hypotheses. 2003;60(3):351-355.

11. Shaw GM, Todoroff K, Carmichael SL, Schaffer DM, Selvin S. Lowered weight gain during pregnancy and risk of neural tube defects among offspring. Int J Epidemiol. 2001; 30:60-65.

12. American Academy of Pediatrics, Committee on Genetics. Folic acid for the prevention of neural tube defects. Pediatrics.1999; 104(2):325-327.

13. Strauss RS, Dietz WH. Low maternal weight gain in the second and third trimester increases the risk for intrauterine growth retardation. American Society for Nutritional Sciences. 1999; 988-993.

14. Scholl TO, Hediger ML, Ances IG. Maternal growth during pregnancy and decreased infant birth weight. Am J Clin Nutr. 1990;51:790-793.

15. Position of the American Dietetic Association and Dietitians of Canada: Vegetarian diets. J Am Diet Assoc. 2003; 103(6):748-765.

16. Larsson CL, Johansson GK. Dietary intake and nutritional status of young vegans and omnivores in Sweden. Am J Clin Nutr. 2002; 76:100-106.

17. Bakan R, Birmingham CL, Aeberhardt L, Goldner EM. Dietary zinc intake of vegetarian and nonvegetarian patients with anorexia nervosa. International Journal of Eating Disorders. 1993;13(2):229-233.

18. Specker, Bonny L., Nutritional concerns of lactating women consuming vegetarian diets. Am J Clin Nutr. 1994:59(suppl):1182-1186.

19. Heaney RP, Dowell MS, Rafferty K, Bierman J. Bioavailability of the calcium in fortified soy imitation milk, with some observation on method. Am J Clin Nutr. 2000;71:1166-1169.

20. Steinbrook, R. Surgery for severe obesity. N Engl J Med. 2004; 350(11):1075-9.

21. National Institute of Diabetes and Digestive and Kidney Diseases. Gastrointestinal Surgery for Severe Obesity. [cited August 18, 2004] Available from: http://www.niddk.nih.gov/health/nutrit/pubs/gastric/gastricsurgery.htm

22. Grange DK, Finlay JL. Nutritional vitamin B12 deficiency in a breastfed infant following maternal gastric bypass. Pediatr Hematol Oncol. 1994; 11(3):311-8.

23. Corbett RW, Ryan C, Weinrich SP. Pica in pregnancy: does it affect pregnancy outcomes? American Journal of Maternal and Child Nursing. 2003;28(3):183-189.

24. Rainville AJ. Pica practices of pregnant women are associated with lower maternal hemoglobin level at delivery. J Am Diet Assoc. 1998;98(3): 293-6.

25. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp.270-272.

26. Gulson, Brian L., et. al., Relationships of lead in breast milk to lead in blood, urine, and diet of infant and mother. Environmental Health Perspectives. 1998:106(10): 667-674.

27. Ping-Jian L, Ye-Zhou S, Qian-Ying W, Li-Ya G, Yi-Land W. Transfer of lead via placenta and breast milk in human. Biomedical and Environmental Sciences. 2000; 13:85-89.

28. Canfield, RL, Henderson, C, Cory-Slecha, D, Cox, C, Jusko, T, Lanphear, B. Intellectual impairment in children with blood lead concentrations below 10 mcg per deciliter. N Engl J Med. 2003;348(16):1517-1526.

29. Institute of Medicine. Dietary reference intakes for vitamin A, vitamin K, arsenic, Boron, chromium, cooper, iodine, iron, manganese, molybdenum, nickel, silicon, vanadium and zinc. Food and Nutrition Board. Washington, DC: National Academy Press; 2001.

30. Centers for Disease Control and Prevention. Recommendations to prevent and control iron deficiency in the United States. MMWR 1998:47:RR-3.

31. U.S. National Library of Medicine and National Institutes of Health. Drugs and supplements: iron. Medline Plus. http://www.nlm.nih.gov/medlineplus/druginfo/natural/patient-iron.html#Safety. Accessed May 2009.

32. Zimmerman MB. Iodine deficiency in pregnancy and effects of maternal iodine supplementation on the offspring: a review. Am J Clin Nutr 2009:8(suppl:668S-72S.

33. de Escobar DM, Obregón MJ, del Rey FF. Maternal thyroid hormones early in pregnancy and fetal brain development. Best Pract Res Clin Endoriconl Metab 2004;18:225-48.

34. Caldwell KL, Miller GA, Wang RY, Jain RB, Jones, RL. Iodine status of the U.S. population, National Health and Nutrition Examination Survey 2003-2004. Thyroid 2008;18:1207-14.

35. Becker DV, Braverman LE, Delange F, et al. Iodine supplementation for pregnancy and lactation – United States and Canada: recommendations of the American Thyroid Association. Thyroid 2006;16:949-51.

36. Leung AM, Pearce EN, Braverman, LE. Iodine content of prenatal vitamins in the United States. N Engl J Med 2009;360:9.

37. Centers for Disease Control and Prevention, Division of Birth Defects and Developmental Disabilities. Folic acid and the prevention of spina bifida and anencephaly: 10 years after the U.S. Public Health Service recommendation. MMWR 2002;51:(RR-13)1-3.

38. Centers for Disease Control and Prevention. National Center for Environmental Health, Division of Birth Defects and Developmental Disabilities. Preventing neural tube birth defects: a prevention model and resource guide. Atlanta: CDC, 1998.

39. Centers for Disease Control and Prevention. Recommendations for the use of folic acid to reduce the number of cases of spina bifida and other neural tube defects. MMWR 1992;41:RR-14.

40. Evans MI, Llurba E, Landsberger EJ, O'Brien JE, Harrison HH. Impact of folic acid fortification the Untied States: markedly diminish high maternal serum alpha-fetoprotein values. Am Col Obstetr Gynecol. 2004;103(3):447.

41. Chacko MR, Anding R, Kozinetz CA, Grover JL. Neural tube defects: knowledge and preconceptional prevention practices in minority young women. Pediatrics. 2003;112(3):536-542.

42. Centers for Disease Control and Prevention. Diagnosis and management of foodborne illness: a primer for physicians. MMWR 2001;50:RR-2.

43. Food Safety and Inspection Service, USDA. Listeriosis and pregnancy: what is your risk? [cited August 11, 2004] Available from: http://www.fsis.usda.gov.

Websites for Additional Information

427.1 References - Supplements/Herbs

http://www.marchofdimes.com

http://www.dietary-supplements.info.nih.gov/

http://www.vm.cfsan.fda.gov/

http://www.herbalgram.org

427.2 References - Highly Restrictive Eating/ Nutrient Malabsorption

http://www.eatright.org

http://www.nimh.nih.gov

http://www.eatright.org/

http://www.llu.edu/llu/vegetarian/

http://www.nal.usda.gov/fnic/pubs/bibs/gen/vegetarian.htm

http://www.gastric-bypass-treatment.com/long-term-weight-loss-surgery compications.aspx

427.3 References - Non-Food Ingestion

http://www.nieh.nih.gov/

http://www.epa.gov/

427.4 References - Folic Acid

http://www.cdc.gov/

http://www.aap.org/

http://www.iom.edu/

427.5 References - Listeriosis

http://www.cdc.gov/foodsafety

http://www.cdc.gov/ncidod/dbmd/diseaseinfo/listeriosis_g.htm

http://www.cfsan.fda.gov

http://www.foodsafety.gov

http://www.fightbac.org

http://www.ific.org

428 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	High Risk
Infants 4 to 12 months	IV	N
Children 12 to 23 months	V	N

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel

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.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

None

References

1. American Academy of Pediatrics. Committee on Nutrition. Kleinman RE, editor. Pediatric Nutrition Handbook. 5th ed. 2004.

2. Pelto GH, Levitt E, and Thairu L. Improving feeding practices: Current patterns, common constraints, and the design of interventions. Food and Nutrition Bulletin, 2003; 24(1): 45-82.

3. United States Department of Agriculture. Study of WIC participant and program characteristics. 2000.

4. Institute of Medicine. Food and Nutrition Board. Proposed criteria for selecting the WIC food packages. The National Academies Press, Washington DC, 2004.

5. Hervada AR, Hervada-Page M. Infant Nutrition: The first two years. In: Childhood Nutrition. Lifshitz F, editor. CRC Press; 1995.

6. Pipes PL, Trahms CM. Nutrient needs of infants and children. In: PipesPL, Trahms CM editors. Nutrition in infancy and childhood 5th ed. Mosby Publishing Co. 1993.

7. Hendricks KM, Weaning: Pathophysiology, practice and policy. In: Nutrition in Pediatrics, 3rd edition. B.C. Decker Inc, 2003.

8. Institute of Medicine. Food and Nutrition Board. Dietary reference intakes for vitamin A, vitamin K, arsenic, boron, chromium, copper, iodine, iron, manganese, molybdenum, nickel, silicon, vanadium and zinc. National Academies Press, Washington DC, 2001.

9. Clinical Nutrition Services; Warren Grant Magnuson Clinical Center, Office of Dietary Supplements. Facts about dietary supplements: zinc. National Institutes of Health. Bethesda Maryland; 2002.

10. Hallberg L. Perspectives on nutritional iron deficiency. Annu Rev Nutr. 2001; 21:1-21.

11. Centers for Disease Control and Prevention. Recommendations to prevent and control iron deficiency in the United States. MMWR. April 1998:18-21.

12. Looker AC, Dallman PR, Carroll MD, Gunter EW, Johnson CL. Prevalence of iron deficiency in the United States. JAMA. 1997; 277:973-6.

13. Centers for Disease Control and Prevention. Pediatric surveillance system 2003 annual report, Atlanta: U.S. Department of Health and Human Services, Center for Disease Control and Prevention, 2004. Available at http://www.cdc.gov/pednss (accessed 11/04).

14. Picciano MF, Smiciklas-Wright H, Birch LL, Mitchel DC, Murray-Kolb L, McConchy KL. Nutritional guidance is needed during dietary transition in early childhood. Ped. 2000; 106: 109-114.

15. Kahn JL, Binns HJ, Chen T, Tanz RR, Listernick R. Persistence and emergence of anemia in children during participation in the Special Supplemental Nutrition Program for Women, Infants, and Children. Arch Pediatr Adolesc Med. 2002; 156:1028-32.

16. Proskitt EM. Early feeding and obesity. In: Boulton J, Laron Z and Rey J, editors. Long-term consequences of early feeding. Nestle Nutrition Workshops Series; 1996, Nestle Ltd., Vevey/Lippincott-Raven Publishers, Philadelphia; Vol. 36.

17. Birch LL, Fisher JO. Development of eating behaviors among children and adolescents. Ped. 1998; 101:539-549.

18. Bertness J, Holt K, editors. Promoting awareness, preventing pain: Facts on early childhood caries (ECC) 2nd. Ed. [Fact Sheet on the Internet]. Washington (DC); National Maternal & Child Oral Health Resource Center; 2004. Available from: http://www.mchoralhealth.org.

19. American Academy of Pediatric Dentistry. Baby bottle tooth decay/early childhood caries. Pediatr Dent. 2001 Mar-Apr; 23 (2): 18.

20. al-Shalan TA, Erickson PR, Hardie NA. Primary incisor decay before age 4 as a risk factor for future dental caries. J Pediatr Dent. 1997 Jan-Feb; 9 (1): 37-41.

21. Casamassimo P ed. 1996. Bright futures in practice: oral health. Arlington, VA: National Center for Education in Maternal and Child Health.

22. Northstone K, Rogers I, Emmett P. Drinks consumed by 18-month-old children: Are current recommendations being followed? Eur J Clin Nutr. 2002; 56:236-44.

23. American Academy of Pediatric Dentistry. Policy on early childhood caries (EEC): Classifications, consequences, and prevention strategies. Pediatr Dent; Reference manual 2003-2004: 2004; 25(7):25

24. Butte N, Cobb K, Dwyer J, Graney L, Heird W, Rickard K. The start healthy feeding guidelines for infants and toddlers. J Am Diet Assoc, 2004; 104 (3) 442-454.

25. Northstone, K, Emmett P, Nethersole F. The effect of age of introduction to lumpy solids on foods eaten and reported difficulties at 6 and 15 months. J Hum Nutr Dietet. 2001; 14: 43-54.

26. Baydar N, McCann M, Williams R, Vesper E, McKinney P. WIC infant feeding practices study. USDA Office of Analysis and Evaluation. November 1997.

27. Ponza M, Devaney B, Ziegler P, Reidy K, and Squatrito C. Nutrient intake and food choices of infants and toddlers participating in WIC. J Am Diet Assoc 2004; 104: s71-s79.

28. Harris CS, Baker SP, Smith GA, Harris RM. Childhood asphyxiation by food: A national analysis and overview. JAMA. 1984; 251:2231-5.

29. Lucas B. Normal nutrition from infancy through adolescence. In: Handbook of pediatric nutrition. 2nd ed. Gaithersburg, Maryland: Aspen Publishers, Inc. 1999.

30. United States Department of Agriculture and the United States Department of Health and Human Services. Dietary guidelines for Americans, 5th ed. 2000. Available from:http://www.usda.gov.cnpp.

31. Story M, Holt K, Sofka D, editors. Bright futures in practice: nutrition. 2nd ed. Arlington, VA: National Center for Education in Maternal and Child Health; 2002.

501 Possibility of Regression

Definition/Cut-Off Value

1) 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 CPA determines there is a possibility of regression in nutritional status without the benefits that the WIC Program provides. Participants shall not be considered at nutritional risk based on the possibility of regression for consecutive certification periods.

When regression can be used:
- participant was at nutritional risk during the last certification period
- nutrition risk from last certification period has been resolved
- CPA ruled out the existence of all other risk factors
- participant will regress to previous nutrition risk without WIC benefits

When regression **cannot** be used:
- at the initial certification
- participant can be certified for other risk factors
- for consecutive certifications

Participant Category and Priority Level

Category	Priority	High Risk
Breastfeeding	VII	N
Non-Breastfeeding	VII	N
Infants	VII	N
Children	VII	N

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel

Justification

On occasion, a participant's nutritional status may be improved, to the point that s/he rises slightly 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 against the possibility of their reverting to the prior existing risk condition if they do not continue to receive WIC benefits. 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.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Congratulate participant on improved nutritional status
- Give dietary recommendations appropriate to prevent reoccurrence of previous risk factor(s)
- Reinforce positive practices
- Inform participant of possibility of not requalifying for WIC at next certification

References

1. WIC Program Regulations: Section 246.7(e)(1)(iii)

502 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 until the certification period expires, and shall be accepted as proof of eligibility for program benefits. If the receiving local agency has waiting lists for participation, the transferring participant shall be placed on the list ahead of all other waiting applicants.

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I*	N
Breastfeeding	I*	N
Non-Breastfeeding	VI*	N
Infants	I*	N

Children	III*	N

*This priority is automatically assigned if priority is not known.

Parameters for Auto Assign

Auto assigned if the current Application record is marked as Out-of-State VOC and this is the first certification for the current Application

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.

Justification for High Risk

See specific risk factors

Additional Counseling Guidelines

See specific risk factors

References

1. WIC Program Regulations: Section 246.7(k); FNS Instruction 803-11, Rev. 1.

601 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	High Risk
Pregnant	I, II, or IV*	N
Breastfeeding	I, II, or IV* ~~I - VII*~~	N

~~Note:~~ * Must be the same priority as at-risk infant.

Parameters for Auto Assignment

Auto assigned once risk records have been created for mother and 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 (3). Lactation requires an additional 500 kcal per day (approximately) as increased protein, calcium, and other vitamins and minerals (4, 5). Inadequate maternal nutrition may result in decreased nutrient content of the milk (5).

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Encourage and support continued breastfeeding
- Provide information on any breastfeeding concerns participant may have

References

1. Institute of Medicine. Nutrition During Lactation. National Academy Press, Washington, D.C.; 1991.
2. Lawrence RA. Breastfeeding a guide for the medical profession. St. Louis: Mosby, 1994.
3. National Research Council (U.S.), Subcommittee on the Tenth Edition of the RDAs, National Institutes of Health, Committee on Dietary Allowances. Recommended dietary allowances. Washington, D.C.: National Academy Press, 1989.
4. WIC Program Regulations, Sect. 246.7(e)(1)(iii).
5. Worthington-Roberts BS, Williams SR. Nutrition in Pregnancy and Lactation. St. Louis: Mosby, 1993.

602 Breastfeeding Complications or Potential Complications (Women)

Definition/Cut-Off Value

A breastfeeding woman with any of the following complications or potential complications for breastfeeding:

602a Severe breast engorgement

602b Recurrent plugged ducts

602c Mastitis (fever or flu-like symptoms with localized breast tenderness)

602d Flat or inverted nipples

602e Cracked, bleeding or severely sore nipples

602f Age $\geq$ 40 years

602g Failure of milk to come in by 4 days postpartum

602h Tandem nursing (breastfeeding two siblings who are not twins)

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	I	N
Breastfeeding	I	Y

Parameters for Manual and Auto Assignment

Must be manually selected in the Nutrition Interview or Risk Panel

(602f will auto assign if today's date minus DOB ≥ 40 years)

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned

Justification

a) Severe 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.
b) 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.
c) 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.
d) 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.
e) 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.
f) 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.

g) 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.

h) 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.

Justification for High Risk

Breastfeeding provides optimal nutrition for infants during the first year of life. If complications arise in the breastfeeding process, the possibility that breastfeeding will continue diminishes greatly. The role of the Lactation Educator in the WIC program is to provide breastfeeding information to the WIC participant and triage any problems that arise with the breastfeeding dyad. WIC has the ability to ensure breastfeeding success. It is important to refer these participants to a peer counselor for close follow-up. It may also be imperative to have the participant come back to the clinic for a follow-up visit sooner than the typical 3 month period. This will further ensure the participant receives the support and counsel needed to continue breastfeeding.

Additional Counseling Guidelines

- **Severe breast engorgement**:
  - Review hand expression procedures
  - Massage breast while nursing
  - Cold packs between feedings to reduce swelling
  - Warm shower or warm pack to promote milk ejection
  - Wear supportive bra
  - Loan electric breast pump for 24 hours or issue manual pump for relief
- **Recurrent plugged ducts**
  - Feed on affected side first
  - Massage breast in warm shower
  - Warm compress or gentle massage to area before feedings
  - Position baby's chin close to sore spot
  - Avoid tight fitting bras and clothing
- **Mastitis**
  - Nurse more frequently, at least every 2 hours
  - Feed on affected side first
  - Get plenty of bed rest
  - Increase fluid intake

    - Call MD for probable antibiotic prescription
    - Warm compresses before feedings
    - avoid tight fitting bras
- **Flat or inverted nipples**
    - use breast pump to pull out nipples prior to feedings
    - wear breast shells between feedings
        - start with short time periods, working up to 8 hours
        - do not wear at night
    - compress breast and areola between 2 fingers making it easier for infant to grasp
- **Cracked, bleeding or severely sore nipples**
    - involve the Lactation Educator as soon as possible for assessment
    - check positioning
    - short, frequent feedings – every 1-2 hours
    - begin nursing on the side which is least sore first
    - break baby's suction before removing from the breast
        - slip finger into corner of mouth, between gums
    - rub a small amount of breast milk or pure Lanolin on nipple after each feeding
    - air-dry breasts after each feeding
    - avoid using lotions, soaps, creams
    - avoid using breast pads with plastic liners, rubber nipples or pacifiers
- **Age ≥ 40 years:**
    - mom should be counseled on signs of adequate milk supply
    - 6-8 wet diapers
    - 4 or more bowel movements each day (before 2 months)
    - baby should be gaining weight
    - mother's milk should come in by 4 days postpartum
- **Failure of milk to come in by 4 days postpartum**
    - supplement until milk comes in
    - continue to put baby to breast
    - feed formula with infant dropper or cup to avoid nipple confusion
    - use breast pump to stimulate milk supply
- **Tandem nursing**
    - vary nursing patterns – younger infant needs to receive both fore and hindmilk
    - breastfeed younger infant every 1 ½ to 3 hours
    - give mother assurance that younger baby is receiving enough breast milk
        - 6-8 wet diapers
        - 4 or more bowel movements each day (before 2 months)
    - eat a balanced and nutritious diet including healthy snacks
    - drink to thirst

References

1. Alexander JM, Grant AM, Campbell MJ. Randomised controlled trial of breast shells and Hoffman's exercises for inverted and non-protractile nipples. BMJ 1992; 304:1030-2.

2. Akre J. Infant Feeding. The physiological basis. Bull.World Health Organ 1989; 67 Suppl:1-108.

3. Amier, L, Garland, SM, Dennerstein, L, et al.: Candida albicans: Is it associated with nipple pain in lactating women? Gynecol Obstetr Invest; 1996; 41:30-34.

4. De Coopman J. Breastfeeding after pituitary resection: support for a theory of autocrine control of milk supply? J. Hum. Lact. 1993; 9:35-40.

5. Lawrence RA. Breastfeeding a guide for the medical profession. St. Louis: Mosby, 1994.

6. Livingstone VH, Willis CE, Berkowitz J. Staphylococcus aureus and sore nipples. Can. Fam. Physician 1996; 42:654-9.

7. Mohrbacher N, Stock J, La LL, I. The breastfeeding answer book. Schaumburg, Ill: La Leche
League International, 1997.

8. Neifert M. Early assessment of the breastfeeding infant. Contemporary Pediatr. 1996 Oct; 13:142.

9. Neifert MR. The optimization of breast-feeding in the perinatal period. Clin. Perinatol. 1998; 25:303-26.

10. Neifert MR, Seacat JM, Jobe WE. Lactation failure due to insufficient glandular development of the breast. Pediatrics 1985; 76:823-8.

11. Riodan J, Auerbach KG. Breastfeeding and human lactation. Boston: Jones and Bartlett Publishers, 1993.

12. The Main Trial Collaborative Group: Preparing for breastfeeding: treatment of inverted and non- protractile nipples in pregnancy; Midwifery; 1994; 10:200.

13. Woolridge, MW: Aetiology of sore nipples; Midwifery; 1986; 2:172-6.

References for High Risk

1. Wo, A., Beggel, A., Ru, M., Abou-Dakn, M. and Arck, P.; Predictors of Inflammatory Breast Diseases During; Am J Reprod Immunol; 2010; 63: pp. 28–37

2. Amir, LH., Cullinane, M., Garland, SM., Tabrizi, SN., Donath, SM., Bennett, CM., Cooklin, AR., Fisher, JRW and Payne, MS.; The Role of Micro-Orgnasims)Staphylococcus aureus and Candida albicans) in the Pathogenesis of Breast Pain and Infection in Lactating Women: Study Protocol; BMC Pregnancy and Childbirth; 2011; 11: 54; pp.1471-2393.

3. Wockel A, Beggel A, Rucke M, Abou-Dakn M, Arck P. Predictors of inflammatory breast diseases during lactation—results of a cohort study. *Am J Reprod Immunol*. 2010; 63: 28-37.

4. Caglar MK, Ozer I, Altugan FS. Risk factors for excess weight loss and hypernatremia in exclusively breast-fed infants. *Brazilian Journal of Medical and Biological Research*. 2006; 39: 539-544.

5. Mulder PJ. A concept analysis of effective breastfeeding. J Obstet Gynecol Neonatal Nurs. 2006; 35(3): 332-339.

6. Abou-Dakn M, Fluhr JW, Gensch M, Wockel A. Positive effect of HPA lanolin versus expressed breast milk on painful and damaged nipples during lactation. *Skin Pharmacol Physiol*. 2011; 24: 27-35.

603 Breastfeeding Complications or Potential Complications (Infants)

Definition/Cut-Off Value

A breastfed infant with any of the following complications or potential complications for breastfeeding:

603a Jaundice

603b Weak or ineffective suck

603c Difficulty latching onto mother's breast

603d 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	High Risk
Infants	I	Y

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview or Risk Panel

High Risk Flag

The high risk designation will automatically activate when this risk factor is assigned

Justification

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 "breast milk jaundice" from "breastfeeding jaundice" and determine the appropriate treatment.

- In the condition known as "breast milk 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. Breast milk 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.

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.

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.

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 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. The literature regarding inadequate stooling varies widely in terms of quantification; this condition is best diagnosed by the pediatrician or other health care practitioner.

Justification for High Risk

Breastfeeding provides optimal nutrition for infants during the first year of life. If complications arise in the breastfeeding process, the possibility that breastfeeding will continue diminishes greatly. The role of the Lactation Educator in the WIC program is to provide breastfeeding information to the WIC participant and triage any problems that arise with the breastfeeding dyad. WIC has the ability to ensure breastfeeding success. It is important to refer these participants to a peer counselor for close follow-up. It may also be imperative to have the participant come back to the clinic for a follow-up visit sooner than the typical 3 month period. This will further ensure the participant receives the support and counsel needed to continue breastfeeding.

Additional Counseling Guidelines

- **Breast milk jaundice**
  - Discontinue breastfeeding for 24-36 hours
  - Review pumping guidelines – may need to loan electric pump for 48 hours
- **Breastfeeding jaundice**
  - Avoid water supplements
  - Supplement with extra calories (formula) if necessary
- **Weak or ineffective suck**
  - Feed baby when awake and alert
  - Listen for suck-swallow pattern
  - Swallow after every two or three sucks
  - Suck-swallow pattern should last 5-10 minutes per breast
- **Difficulty latching on to mother's breast**
  - Review counseling for flat or inverted nipples or breast engorgement if appropriate
  - Mother may need to support breast using C-hold

References

1. Auerbach KG, and Gartner LM: Breastfeeding and human milk: their association with jaundice in the neonate; Clinics in Perintology; 1987; 14:89.

2. Maisels MJ, and Newman TB: Kernicterus in otherwise healthy, breastfed term newborns; Pediatr.; 1995; 96:730.

3. Neifert M: Early assessment of the breastfeeding infant; Contemporary Pediatr.; 1996; 13:142.

4. Neifert M: The optimization of breastfeeding in the perinatal period: Clinics in Perintology; June 1998 (In Press); 25.

5. Seidman DS, Stevenson, DK, Ergas, Z, and Gale R: Hospital readmission due to neonatal hyperbilirubinemia; Pediatr.; 1995; 96:727.

6. Tudehope D, Bayley G, Munro D, et al.: Breastfeeding practices and severe hyperbilirubunemia: J Pediatr. Child Health; 1991; 27:240.

7. Barros FC, Victoria CG, Semer TC, et al..: Use of pacifiers is associated with decreased breastfeeding duration: Pediatrics; 1995; 95-497.

8. Kurinij, N and Shiono PH: Early formula supplementation of breastfeeding: Pediatr.; 1991; 88:745.

9. Victoria CG, Behague DP, Barros FC, Olinto MTA, and Weiderpass E: Pacifier use and short breastfeeding duration: cause, consequence, or coincidence? Pediatr.; 1997; 99:445.

10. Bocar, D: The lactation consultant: Part of the health care team; NAACOG's Clinical Issues in Perinatal and Women's Health Nursing; 1992; 3:731.

11. Neifert M, Lawrence R, and Seacat J: Nipple confusion: Toward a formal definition; J Pediatr.; 1995; 126:s-125.

12. Wilson-Clay B: Clinical use of silicone nipple shields; J Hum Lact; 1996; 12:279.

13. Cooper WO, Atherton HD, Kahana M, et al.: Increased incidence of severe breastfeeding malnutrition and hypernatremia in a metropolitan area; Pediatr.; 1995; 96:957.

14. DeCarvalho M, Robertson S, Friedman A, and Klaus M: Effect of frequent breastfeeding on early milk production and infant weight gain; Pediatr.; 1983; 72:307.

15. Meier P, Engstrom JL, Fleming BA, et al.: Estimating milk intake of hospitalized preterm infants who breastfeed; J Hum Lact; 1996; 12:21.

16. Thullen JD: Management of hypernatremic dehydration due to insufficient lactation; Clin Pediatr; 1988; 27:370.

17. Weaver LT, Ewing G, and Taylor LC: The bowel habits of milk-fed infants; J Pediatr Gastroenterol Nutr; 1988; 7:568.

18. Lawrence RA: Breastfeeding: A Guide for the Medical Profession; 4th Edition; 1994; pp. 371-372, 452-454.

19. Mohrbacher, N., Stock, J.: The Breastfeeding Answer Book, La Leche League International, Revised Edition, 1997.

20. Huggins, K.: The Nursing Mother's Companion, 3rd Edition, 1995.

References for High Risk

1. Wo, A., Beggel, A., Ru, M., Abou-Dakn, M. and Arck, P.; Predictors of Inflammatory Breast Diseases During; Am J Reprod Immunol; 2010; 63: pp. 28–37

2. Amir, LH., Cullinane, M., Garland, SM., Tabrizi, SN., Donath, SM., Bennett, CM., Cooklin, AR., Fisher, JRW and Payne, MS.; The Role of Micro-Orgnasims)Staphylococcus aureus and Candida albicans) in the Pathogenesis of Breast Pain and Infection in Lactating Women: Study Protocol; BMC Pregnancy and Childbirth; 2011; 11: 54; pp.1471-2393.

3. Mulder PJ. A concept analysis of effective breastfeeding. J Obstet Gynecol Neonatal Nurs. 2006; 35(3): 332-339.

701 Mom on WIC/Mom Not on WIC during Pregnancy

Definition/Cut-Off Value

An infant < six 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

If mother was not on during pregnancy but would have qualified, the CPA must document what the mother would have qualified for.

Participant Category and Priority Level

Category	Priority	High Risk
Infants	II	N

Parameters for Manual Assignment

Must be manually selected in the Nutrition Interview by selecting 701 checkbox or by answering "Yes" to the question: "Was mother on WIC during her pregnancy?"

May also be manually selected in the Risk Panel

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).

Justification for High Risk

Not Applicable

References

1. WIC Program Regulations: Section 246.7(e)(1)(ii).

2. Journal of the American Dietetic Association: Nutrition Services: A Literature Review; April 1989; Supplement vol. 89(4): s-13, s-19.

3. Ryan, A.S., Martinez, G.A. and Malec, D.J.: The Effect of the WIC Program on Nutrient Intakes of Infants; Medical Anthropology; 1984; vol. 9, no. 2.

702 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	High Risk
Infants	I – VII*	N

Note: Must be the same priority as at-risk mother.

Parameters for Auto Assignment

Auto assigned once risk records have been created for mother and infant

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).

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Encourage and support continued breastfeeding
- Address any breastfeeding concerns she may have

References

1. WIC Program Regulations: Section 246.7(e)(1)(i)

2. WIC Program Regulations: Section 246.7(d)(1)(ii)

3. Worthington-Roberts, BS and Williams, SR: Nutrition in Pregnancy and Lactation; 4th Edition; Times-Mirror/Mosby College Publishing; 1989; pp. 364-365.

4. Food and Nutrition Board: Recommended Dietary Allowances; 10th revision; National Academy of Sciences; National Research Council; 1989; 34-35.

5. Institute of Medicine: Nutrition During Lactation; National Academy Press; 1991; pp. 103, 140, 214.

703 Infant Born of Woman with Mental Retardation or Alcohol or Drug Abuse during Most Recent Pregnancy

Definition/Cut-Off Value

Infant born of a woman:

- diagnosed with mental retardation by a physician or psychologist as self- reported by applicant/participant/caregiver; or as reported or documented by a physician, psychologist, or someone working under physician's orders; or

- documentation or self-report of any use of alcohol or illegal drugs during most recent pregnancy

Participant Category and Priority Level

Category	Priority	High Risk
Infants	I	N

Parameters for Manual Assignment

Must be manually selected in the Risk Panel

Justification

Cognitive limitation in a parent or primary caretaker has been recognized as a risk factor for failure to thrive (FTT) as well as for abuse and neglect. The retarded caretaker may not exhibit the necessary parenting skills to promote beneficial feeding interactions with the infant (2, 4). Maternal mental illnesses such as severe depression and maternal chemical dependency, also represent social risk factors for FTT. Chemical dependency is also strongly associated with abuse and neglect. In 22 States, 90% of caretakers reported for child abuse are active substance abusers (5). All of these maternal conditions may contribute to a lack of synchrony between the infant and mother during feeding and therefore interfere with the infant's growth process. Nutrient intake depends on the synchronization of maternal and infant behaviors involved in feeding interactions (3, 4).

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Review basic infant nutrition
- If bottle feeding
    - discuss bottle sanitation and preparation
    - review formula mixing instructions
        - issue concentrate or ready-to-feed, if appropriate

References

1. WIC Program Regulations: Section 246.7(e)(2)(ii)

2. Accardo, Pasquale and Whitman, Barbara: Children of Mentally Retarded Parents; American Journal of Disease of Children; 1990; 144:69-70.

3. Pollitt, Ernest and Wirtz, Steve: Mother-infant feeding interaction and weight gain in the first month of life; Journal of American Dietetic Association; 1981l 78:596-601.

4. Grand, R, Stephen, J, and Dietz, W.: Pediatric Nutrition: Theory and Practice; Butterworths; 1987; pp. 627-644.

5. McCullough, C: The Child Welfare Response; The Future of Children; Spring 1991; vol. 1(1); pp. 61-71.

801 Homelessness

Definition/Cut-Off Value

A woman, infant or child who lacks a fixed and regular nighttime residence; or whose primary nighttime residence is:

- A supervised publicly or privately operated shelter designed to provide temporary living accommodations
  - This includes group shelters, rescue missions, shelters for victims of domestic violence, motels, etc.
- A public or private place not ordinarily used as a regular sleeping accommodation for human beings
  - Examples include tents, cars, parks, hallways, sidewalks, abandoned buildings, doorsteps, etc.
- A temporary residence for persons intended to be institutionalized

A homeless person may no longer be considered homeless while living in a temporary accommodation of another individual if it has been more than 365 days.

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	IV	N
Breastfeeding	IV	N
Non-Breastfeeding	VI	N
Infants	IV	N
Children	V	N

Parameters for Auto Assignment

Auto assigned if “homeless” is marked on the current Familiy Address record (Contact/Address screen)

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 sizable 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.

Justification for High Risk

Not applicable

Additional Counseling Guidelines

- Review food preparation and safety techniques appropriate for current living conditions
    - Buy powdered or evaporated milk
    - Buy canned meats like tuna, chicken, turkey or ham
    - Buy canned soups with meat and beans for extra protein
    - Buy small amounts or fresh fruits and vegetables
    - Buy fruit juice in bottles or cans

References

1. WIC Program Regulations; Section 246.7(e)(2)(iv).

802 Migrancy

Definition/Cut-Off Value

Categorically eligible women, infants and children who are members of a family 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 a temporary residence for the purpose of such employment.

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	IV	N
Breastfeeding	IV	N
Non-Breastfeeding	VI	N
Infants	IV	N
Children	V	N

Parameters for Auto Assign

Auto assigned if “migrant” is marked on current Family Address record (Contact/Address screen)

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.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Review food preparation and safety techniques appropriate for current living conditions
  - buy powdered or evaporated milk
  - buy canned meats like tuna, chicken, turkey or ham
  - buy canned soups with meat and beans for extra protein
  - buy small amounts or fresh fruits and vegetables
  - buy fruit juice in bottles or cans

References

1. WIC Program Regulations: Section 246.7(e)(2)(iv).

901 Environmental Risk

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).”

State law requires the reporting of known or suspected child abuse or neglect. WIC staff must report such information to Child Protective Services. WIC regulations pertaining to confidentiality do not take precedence over such State law.

Law does not required WIC to report suspected battering; however, extensive referrals must be given.

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	IV	N
Breastfeeding	IV	N
Non-Breastfeeding	VI	N
Infants	IV	N
Children	V	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

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.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- **Child Abuse**

- Neglect and physical, emotional and sexual abuse have long term physical and emotional consequences for children
- Child abuse is a crime
- Report all child abuse to Child Protective Services
- Give mom tips on coping with a crying baby
  - Meet baby's basic needs such as feed, change, make comfortable, etc.
  - Take baby for a ride in stroller or in car
  - Swaddle baby snugly in soft warm blanket
  - If frustrated and need a break, put baby in playpen or crib, go to another part of the house and do something to calm down for a moment
  - Call a friend or relative to take over for a while, then get away and get some rest

- **Domestic Violence**
  - There are five tasks in helping victims of domestic violence
    - Ask questions
    - Assess woman's safety
    - Report to law enforcement
    - Refer her to those who can provide more help
    - Chart the violence and referrals
  - Avoid using the words "domestic violence", "abused", or "battered" when speaking with victim
  - Counsel parent on impact of domestic violence on children:
    - may be injured during an incident of parental violence
    - may be traumatized by fear for their mother, their own helplessness in protecting her, or blame themselves for not preventing /causing it
    - may become violent themselves or have other serious emotional and behavioral problems
  - Let participant know that WIC is a place she can trust to come for help
  - Share these steps for a quick exit with women experiencing domestic violence
    - Always keep some money hidden
    - Pack a suitcase or bag to store with a friend or neighbor
      - Include a change of clothing for self and children, toilet articles, and extra set of keys to the house and/or the car
    - Keep special items in easy to locate but safe place so that they can be located on short notice
      - Items include medicine, ID, social security cards and birth certificates, marriage license, insurance policies, extra cash, checkbook, savings account book, valuable jewelry, credit cards, WIC ID packet, and immunization records
    - Know exactly where to go and how to get family member or friend who will help
    - Call your doctor or go to emergency room if hurt
    - Call law enforcement (911)
      - Physical abuse is a crime

- The only way to protect safety and guarantee that violent partner will get help is to involve legal system

References

1. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 317-321.

2. The Child Abuse Prevention and Treatment Act Reauthorized; October 1996; Public Law 104-25.

902 Woman or Infant/Child of Primary Caregiver with Limited Ability to Make Feeding Decisions

Definition/Cut-Off Value

Woman (pregnant, breastfeeding, or non-breastfeeding) or infant/child whose primary caregiver is assessed to have a limited ability to make appropriate feeding decisions and/or prepare food. Includes individuals who are:

- ≤ 17 years of age;
- mentally disabled/delayed and/or have a mental illness such as clinical depression (diagnosed by a physician or licensed psychologist);
- physically disabled to a degree which restricts or limits food preparation abilities; or
- currently using or having a history of abusing alcohol or other drugs.

Participant Category and Priority Level

Category	Priority	High Risk
Pregnant	IV	N
Breastfeeding	IV	N
Non-Breastfeeding	VI	N
Infants	IV	N
Children	V	N

Parameters for Manual Assignment

Must be manually selected in Nutrition Interview or Risk Panel

Justification

The mother or caregiver ≤ 17 years of age generally has limited exposure and application of skills necessary to care for and feed a total dependent. Cognitive limitation in a parent or primary caregiver has been recognized as a risk factor for failure to thrive, as well as for abuse and neglect. The mentally handicapped caregiver may not exhibit the necessary parenting skills to promote beneficial feeding interactions with the infant. Maternal mental illnesses such as severe depression and maternal chemical dependency are also strongly associated with abuse and neglect. In 22 states, 90% of caregivers reported for child abuse are active substance abusers. Certain physical handicaps such as blindness, para- or quadriplegia, or physical anomalies restrict/limit the caregiver's ability to prepare and offer a variety of foods. Education, referrals and service coordination with WIC will aid the mother/caregiver in developing skills, knowledge and/or assistance to properly care for a total dependent.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Assess need for assistance in shopping, cooking and preparing meals
- Give tips on grocery shopping
- If bottle feeding
    - Discuss bottle sanitation and preparation
    - Review formula mixing instructions
        - Issue concentrate or ready-to-feed, if appropriate

References

1. Accardo and Whitman B.: Children of Mentally Retarded Parents; American Journal of Diseases of Children; 1990; 144:69-70.

2. Pollitt, Ernest and Wirth: Mother-Infant Feeding Interaction and Weight Gain in the First Month of Life; J. Am. Diet Assoc.; 1981; 78:596-601.

3. Grand, Stephen, Dietz: Pediatric Nutrition: Theory and Practice; 1987; pp. 627-644.

4. Institute of Medicine: WIC Nutrition Risk Criteria: A Scientific Assessment; 1996; pp. 321-323.

5. WIC Program Regulations: Section 246.7(e)(2).

903 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	High Risk
Pregnant	IV	N
Breastfeeding	IV	N
Non-Breastfeeding	VI	N
Infants	IV	N
Children	V	N

Parameters for Auto Assignment

Auto assigned if Foster Care indicator is set to “Yes” and today’s date minus Entered Foster Care Date or Changed Foster Care Families Date is ≤ 6 months

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. CPAs 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.

Justification for High Risk

Not Applicable

Additional Counseling Guidelines

- Review nutrition risks that many foster care children have:
  - Anemia
  - Diabetes
  - Seizure disorders
  - Inadequate nutrition
  - Growth retardation including short stature

- Failure to grow

References

1. American Medical News: America's Sickest Children; January 10, 1994; 15-19.

2. Chernoff, Robin, et al: Assessing the Health Status of Children Entering Foster Care; Pediatrics Vol. 93., No. 4; April 1994; 594-600.

3. DuRouseau, Pamela C., et al: Children in Foster Care: Are they at nutritional risk?; Research and Professional Briefs Vol. 91, No. 1; January 1991; 83-85.

4. Government Accounting Office: Foster Care - Health Needs of Many Young Children Are Unknown and Unmet; GAO/HEHS; 95-114; May 1995.

5. Halfon, Neal, et al: Health Status of Children in Foster Care; Archives of Pediatric and Adolescent Medicine; Vol. 149; April 1995; 386-392.

6. Schor, Edward: The Foster Care System and Health Status of Foster Children; Pediatrics Vol. 69, No. 5; May 1982; 521-527.

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	High Risk
Pregnant	I	N
Breastfeeding	I	N
Non-Breastfeeding	VI	N
Infants	I	N
Children	III	N

Parameters for Manual and Auto Assignment

Auto assigned if "Yes" is selected in the Nutrition Interview for the question "Does anyone living in your household smoke inside the home?"

May also be selected in the Risk Panel

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 nonsmokers 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.

References

1. Lesley Butler, et al. RISC/WIC Report on Environmental Tobacco Smoke Exposure. February 2006. Unpublished.

2. Respiratory Health Effects of Passive Smoking (Also Known as Exposure to Secondhand Smoke or Environmental Tobacco Smoke ETS). U.S. Environmental Protection Agency, Office of Research and Development, Office of Health and Environmental Assessment, Washington, DC, EPA/600/6-90/006F, 1992. http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=2835 Accessed March 2006.

3. Pirkle, JL, KM Flegal, DJ Brody, RA Etzel, and KR Maurer. Exposure of the U.S. Population to Environmental Tobacco Smoke. The Third National Health and Nutrition Examination Survey, 1988 to 1991. JAMA; 1996; 275,16; 1233-1240.

4. Witschi, H, JP Joad, and KE Pinkerton. The toxicology of environmental tobacco smoke. Annu Rev Pharmacol Toxicol 1997; 37: 29-52.

5. Seifert, JA, CA Ross, and JM Norris. Validation of a five-question survey to assess a child's exposure to environmental tobacco smoke. Ann Epidemiol 2002; 12:273-277.

6. Adams, JD, KJ O'Mara-Adams, and D Hoffmann. Toxic and carcinogenic agents in undiluted main-stream smoke and sidestream smoke of different types of cigarettes. Carcinogenesis 1987-8:729-731.

7. U.S. Department of Health and Human Services. The Health Consequences of Involuntary Smoking: A Report of the Surgeon General. Rockville (MD): U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Health Promotion and Education, Office on Smoking and Health, 1986. DHHS Publication No. (CDC) 87-8398.

8. U.S. Department of Health and Human Services. The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General—Executive Summary. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2006.

9. National Cancer Institute. Health Effects of Exposure to Environment Tobacco Smoke. Smoking and Tobacco Control Monograph No. 10 (PDF- 71k). Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; 1999. NIH Pub. No. 99-4645. Accessed: March 2006.

10. Dybing, E., and T Sanner. Passive smoking, sudden infant death syndrome (SIDS) and childhood infections. Hum Exp Toxcol 1999;18:202-205.

11. Klonoff-Cohen, HS, SL Edelstein, ES Lefkowitz, IP Srinivasan, D Kaegi, JC Chang, and KJ Wiley. The effect of passive smoking and tobacco exposure through breast milk on sudden infant death syndrome. JAMA 1995; 273:795-798.

12. Cook, DG, and DP Strachan. Health effects of passive smoking-10: Summary of effects of parental smoking on the respiratory health of children and implications for research. Thorax 1999; 54:357-366.

13. Aligne, CA, ME Moss, P Auinger, and M Weitzman. Association of pediatric dental caries with passive smoking. JAMA 2003; 289:1258-1264.

14. Weitzman, M, S Cook, P Auinger, TA Florin, S Daniels, M Nguyen, and JP Winickoff. Tobacco smoke exposure is associated with the metabolic syndrome in adolescents. Circulation 2005; 112:862-869.

15. Yolton, K, K Dietrich, P Auinger, BP Lanphear, and R Hornung. Exposure to environmental tobacco smoke and cognitive abilities among U.S. children and adolescents. Environ Health Perspect 2005;113:98-103.

16. Perera, FP, V Rauh, RM Whyatt, WY Tsai, JT Bernert, YH Tu, H Andrews, J Ramirez, L Qu, and D Tang. Molecular evidence of an interaction between prenatal environmental exposures and birth outcomes in a multiethnic population. Environ Health Perspect 2004;112:626-630.

17. Women and Smoking: A Report of the Surgeon General – 2001. http://www.cdc.gov/tobacco/sgr/sgr_forwomen/index.htm

18. Tredaniel, J, P Boffetta, J Little, R Saracci, and A Hirsch. Exposure to passive smoking during pregnancy and childhood, and cancer risk: the epidemiological evidence. Paediatr Perinat Epidemiol 1994;8:233-255.

19. Tredaniel, J, P Boffetta, R Saracci, and A Hirsch. Exposure to environmental tobacco smoke and risk of lung cancer: the epidemiological evidence. Eur Respir J 1994;7:1877-1888.

20. Janerich, DT, WD Thompson, LR Varela, P Greenwald, S Chorost, C Tucci, MB Zaman, MR Melamed, M Kiely, and MF McKneally. Lung cancer and exposure to tobacco smoke in the household. N Engl J Med 1990;323:632-636.

21. Moffatt, RJ, BA Stamford, and KD Biggerstaff. Influence of worksite environmental tobacco smoke on serum lipoprotein profiles of female nonsmokers. Metabolism 1995;44:1536-1539.

22. Moskowitz, WB, M Mosteller, RM Schieken, R Bossano, JK Hewitt, JN Bodurtha, and JP Segrest. Lipoprotein and oxygen transport alterations in passive smoking preadolescent children. The MCV Twin Study. Circulation 1990;81:586-592.

23. Masi, MA, JA Hanley, P Ernst, and MR Becklake. Environmental exposure to tobacco smoke and lung function in young adults. Am Rev Respir Dis 1988;138:296-299.

24. Upton, MN, GC Watt, G Davey Smith, A McConnachie, and CL Hart. Permanent effects of maternal smoking on offsprings' lung function. Lancet 1998;352:453.

25. Svanes, C, E Omenaas, D Jarvis, S Chinn, A Gulsvik, and P Burney. Parental smoking in childhood and adult obstructive lung disease: results from the European Community Respiratory Health Survey. Thorax 2004;59:295-302.

26. Grant, Stephen G. Qualitatively and quantitatively similar effects of active and passive maternal tobacco smoke on in utero mutagenesis at the HPRT locus. BMC Pediatrics 2005, 5:20, doi:10.1186/1471-2431-5-20.

27. Block, G, M Dietrich, EP Norkus, JD Morrow, M Hudes, B Caan, and L Packer. Factors associated with oxidative stress in human populations. Am J Epidemiol 2002;156:274-285.

28. Morrow, JD, and LJ Roberts, 2nd. Mass spectrometric quantification of F2- isoprostanes in biological fluids and tissues as measure of oxidant stress. Methods Enzymol 1999;300:3-12.

29. Panagiotakos, DB, C Pitsavos, C Chrysohoou, J Skoumas, C Masoura, P Toutouzas, and C Stefanadis. Effect of exposure to secondhand smoke on markers of inflammation: the ATTICA study. Am J Med 2004;116:145-150.

30. Leem JH, Kim JH, Lee KH, Hong Y, Lee KH, Kang D, Kwon HJ. Asthma attack associated with oxidative stress by exposure to ETS and PAH. J Asthma. 2005 Jul-Aug;42(6):463-7. PMID: 16293541.

31. Panagiotakos DB, Pitsavos C, Chrysohoou C, Skoumas J, Masoura C, Toutouzas P, Stefanadis C; ATTICA study. Effect of exposure to secondhand smoke on markers of inflammation: the ATTICA study. Am J Med. 2004 Feb 1;116(3):145-50. PMID: 14749157.

32. Ambrose JA, Barua RS. The pathophysiology of cigarette smoking and cardiovascular disease: an update. J Am Coll Cardiol. 2004 May 19;43(10):1731-7. Review. PMID: 15145091.

33. Sinn DD, Man SF, McWilliams A, Lam S. Progression of airway dysplasia and C-reactive protein in smokers at high risk of lung cancer. Am J Respir Crit Care Med. 2006 Mar 1:173(5): 535-9. Epub 2005 Dec 9. PMID: 16339918.

34. Bartal M. COPD and tobacco smoke. Monaldi Arch Chest Dis. 2005 Dec;63(4):213-25. Review. PMID: 16454221.

35. Haffner SM. The metabolic syndrome: inflammation, diabetes mellitus, and cardiovascular disease. Am J Cardiol. 2006 Jan 16;97(2A):3A-11A. Epub 2005 Dec 5. Review. PMID: 16442931.

36. Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium and Carotenoids (2000) Institute of Medicine, the National Academy of Science.

37. Smit, HA. Chronic obstructive pulmonary disease, asthma and protective effects of food intake: from hypothesis to evidence? Respir Res 2001;2:261-264.

38. Burney, P. The origins of obstructive airways disease. A role for diet? Am J Respir Crit Care Med 1995;151:1292-1293.

39. MacNee, W. Oxidants/antioxidants and COPD. Chest 2000;117:303S-317S.

40. Altose, MD. Approaches to slowing the progression of COPD. Curr Opin Pulm Med 2003;9:125-130.

41. Dietary Reference Intakes: The essential Guide to Nutrient Requirements (2006) Otten, JJ, Hellwig, JP, Meyers, LD, ed., Institute of Medicine of the National Academies. The national Academies Press, Washington D.C.

Appendix A: Not Allowed Nutrition Risk Criteria

- USDA does not currently allow the following nutrition risk factors.
  - Maternal Short Stature
  - Abnormal Postpartum Weight Change
  - Urinary Tract Infections
  - Food Intolerances other than those specifically allowed (Celiac Disease, Lactose Intolerance, etc.)
  - Pregnancy at Age Older than 35
  - History of Post-term Delivery
  - Preeclampsia/Eclampsia
  - Placental Abnormalities
  - Vegetarian Diets other than Vegan
  - Low Level of Maternal Education/Literacy
  - Weight for Age
  - Hemorrhage associated with Pregnancy
  - Risk of Anemia: History of Anemia Requiring Treatment
  - Pre-pregnancy Underweight for Postpartum Women
  - Transfer from Infant to Child Diet
  - Infant Taking More than 1 quart of Formula per Day
  - Rapid Growth (Not Related to Catch Up Growth)
  - Chronic or Recurrent Infections – Bronchitis
  - Otitis Media
  - Passive Smoking
  - Smokeless Tobacco
  - Smoking for Nonlactating Postpartum Women
  - Food Insecurity
  - Nulliparity
  - Consumption of Fish from Water Contaminated with Toxic Substances
  - Accidental Poisoning
  - Consumption of Drinking Water Contaminated with Nitrate
  - Infant or Child of Woman with Diabetes during Pregnancy
  - Attention Deficit Hyperactive Disorder/Attention Deficit Disorder
  - Excessive Caffeine Intake
  - Inadequate Diet