301 Hyperemesis Gravidarum

Definition/Cut-off Value

Hyperemesis Gravidarum (HG) is defined as severe and persistent nausea and vomiting during pregnancy which may cause more than 5% weight loss and fluid and electrolyte imbalances (1). This nutrition risk is based on a chronic condition, not single episodes. HG is a clinical diagnosis, made after other causes of nausea and vomiting have been excluded.

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

Participant Category and Priority Level

<table>
<thead>
<tr>
<th>Category</th>
<th>Priority</th>
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<tbody>
<tr>
<td>Pregnant Women</td>
<td>I</td>
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</table>

Justification

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

Risk Factors for HG

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

Various hormones such as estrogen, progesterone, adrenocorticotropic hormone, cortisol, growth hormone, prolactin and human chorionic gonadotropin (HcG) play an influential role in HG. Increased levels of HcG, which may occur in molar (see clarification) or multi fetal pregnancies may be associated with HG. Studies indicate that HG increases when HcG level reaches its peak at 9 weeks of gestation (8). It should be noted that thyroid function is affected in pregnancy. For pregnant women with hyperthyroidism, decreased levels of thyroid stimulating hormone may be implicated for HG (9, 10).

HG and Adverse Maternal Outcomes

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

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

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

**HG and Adverse Birth Outcomes**

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

**Implications for WIC Nutrition Services**

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

- Refer to a health care provider for appropriate monitoring and treatments as necessary.

- Provide education on how to recognize symptoms of dehydration such as: Increased thirst, dry mouth, low urine output or urine that is darker in color than normal.

- Offer suggestions to help with nausea such as:
  - Avoid foods and smells that seem to trigger nausea (e.g., fried or greasy foods, spicy foods, foods of a certain texture).
  - Eat crackers or dry cereal before getting out of bed to curb nausea in the morning.
  - Avoid large fluid intakes in the morning. Drink liquids between meals instead of with meals.
  - Choose foods carefully. Select foods that are high in carbohydrates or protein, low in fat, and easy to digest. Salty foods are sometimes helpful, as are foods that contain ginger — such as ginger lollipops. Avoid greasy, spicy and fatty foods. Consume foods that settle the stomach and calm the nausea. (24)
  - Eat several small meals throughout the day instead of three large meals. Meals should contain more carbohydrate than fat and acid. Protein-rich meals also decrease symptoms. Lighter snacks, including nuts, dairy products, and beans, are recommended. (25)
Take prenatal supplement at night or before bedtime.

- Review weight gain goal and weight gain pattern. If weight loss is a problem, discuss nutrient and calorie-dense food choices and refer to the health care provider.
- Encourage women to take prenatal vitamins if considering becoming pregnant again. Studies indicate that taking prenatal vitamins a month before conception may help alleviate the symptoms of HG during pregnancy (26).

Clarification

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

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

References


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 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

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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.

References


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:

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

2. **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

<table>
<thead>
<tr>
<th>Time (h)</th>
<th>100-g Oral Glucose Load</th>
<th>75-g Oral Glucose Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting</td>
<td>95 mg/dL (5.3 mmol/L)</td>
<td>95 mg/dL (5.3 mmol/L)</td>
</tr>
<tr>
<td>1</td>
<td>180 mg/dL (10.0 mmol/L)</td>
<td>180 mg/dL (10.0 mmol/L)</td>
</tr>
<tr>
<td>2</td>
<td>155 mg/dL (8.6 mmol/L)</td>
<td>155 mg/dL (8.6 mmol/L)</td>
</tr>
<tr>
<td>3</td>
<td>140 mg/dL (7.8 mmol/L)</td>
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</tbody>
</table>

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).
303 History of Gestational Diabetes

Definition/Cut-off Value

History of diagnosed gestational diabetes mellitus (GDM).

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

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<td>I</td>
</tr>
<tr>
<td>Non-Breastfeeding Women</td>
<td>III, IV, V or VI</td>
</tr>
</tbody>
</table>

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 woman 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).

References


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.
### 304 History of Preeclampsia

#### Definition/Cut-off Value

History of diagnosed preeclampsia.

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

<table>
<thead>
<tr>
<th>Category</th>
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<tbody>
<tr>
<td>Pregnant Women</td>
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</tr>
<tr>
<td>Non-Breastfeeding Women</td>
<td>III, IV, V or VI</td>
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</table>

#### Justification

Please see risk #345 *Hypertension and Prehypertension*, for a thorough overview of preeclampsia, including incidence, risk factors, signs and symptoms, prevention, and treatment.

Preeclampsia is defined as hypertension with onset during pregnancy, usually after 20 weeks gestation, and typically with proteinuria (high levels of protein found in urine). For some women, proteinuria does not occur; for these women, preeclampsia is diagnosed as hypertension with thrombocytopenia (low platelet count), impaired liver function, renal insufficiency (poor kidney function), pulmonary edema (excess fluid in the lungs), and/or cerebral or visual disturbances (brain and vision problems) (1). The most common type of hypertensive disorder during pregnancy, preeclampsia occurs in 3.4% of pregnancies in the United States and is associated with one maternal death per 100,000 live births in developed countries (1, 2). Worldwide, it leads to the death of over 60,000 women annually (3).

It is important to note that postpartum preeclampsia can also occur, regardless of whether it was present during pregnancy. It is usually diagnosed within 48 hours of delivery but can occur up to 6 weeks postpartum. Thus, women during this period should monitor for preeclampsia symptoms and contact their healthcare provider immediately if they occur. (1, 4)

Women with a history of preeclampsia are at greater risk for future hypertension (HTN), heart attack, stroke, congestive heart failure, metabolic disease, and postpartum depression; these risks increase with repeated incidence of preeclampsia and with preterm delivery (1, 2, 5, 6). Because women with a history of preeclampsia are at increased risk for HTN and related conditions, implementing lifestyle changes after delivery to help prevent HTN is crucial. Lifestyle measures to reduce the risk of HTN for women who are not pregnant include the following:

- Have blood pressure checked at least yearly or as recommended by one’s healthcare provider. For those at risk of HTN, regularly monitoring blood pressure is crucial. Blood pressure levels greater than 180/120 mmHg are extremely dangerous and require immediate medical attention (7).
• Consume a diet consistent with the Dietary Guidelines for Americans or follow the Dietary Approaches to Stop Hypertension (DASH) eating plan. Details regarding the DASH eating plan can be found on the National Heart, Lung, and Blood Institute’s website: [www.nhlbi.nih.gov/health-topics/dash-eating-plan](http://www.nhlbi.nih.gov/health-topics/dash-eating-plan).

• Engage in regular physical activity.

• Achieve and maintain a healthy weight.

• Limit alcohol and avoid any use of tobacco, marijuana or illegal substances. (See risk #371 Maternal Smoking and risk #372 Alcohol and Substance Use.)

Currently, there is inconclusive scientific evidence on preventative measures for preeclampsia in future pregnancies. However, when dietary calcium is inadequate, research indicates adequate dietary calcium or supplementation (1.5-2 grams/day) may help prevent preeclampsia (1, 2, 3, 8). Dietary folate and folic acid supplementation during pregnancy has also been associated with lower risk of preeclampsia (6, 9).

**Breastfeeding**

Women who had preeclampsia face a greater risk of HTN later in life; however, longer breastfeeding duration has been found to reduce this risk. (10, 11). Unfortunately, women who had preeclampsia during pregnancy are more likely to not initiate breastfeeding or to stop breastfeeding earlier than women with normal blood pressure (10, 12). Some potential causes for this include greater incidence of preterm birth, low birth weight, caesarean delivery, exposure to medications not compatible with breastfeeding, and mother/infant separation (12).

Women with history of preeclampsia should be encouraged to breastfeed, unless contraindicated. If postpartum women require antihypertensive medications, medications should be chosen that are compatible with breastfeeding, if possible. It is thus very important for the mother to discuss her breastfeeding status and goals with her healthcare provider to determine the best infant feeding and medication plan.

**Implications for WIC Nutrition Services**

The WIC Program provides support to participants with a history of preeclampsia by offering nutritious food that are important components of a diet to help prevent HTN. WIC nutrition staff also offer nutrition education, counseling, and referrals. In addition, WIC staff can assist participants by:

**Pregnant Women with History of Preeclampsia:**

• Encouraging prenatal care as soon as possible and to attend all health care appointments.

• Providing information about the symptoms of preeclampsia (sudden weight gain, swelling of face or hands, upper abdominal pain, difficulty breathing, changes in vision (including seeing spots), severe headache, nausea, and/or vomiting) and of the importance of contacting their healthcare provider immediately if they occur. Also, inform them that preeclampsia can occur postpartum.

• Counseling them on healthy weight gain, prenatal vitamin use, and a nutritious diet, including adequate calcium intake. For women with low calcium intake, refer them to their healthcare provider to discuss whether a calcium supplement is appropriate. Please note that a low-sodium diet and/or weight loss is not recommended as treatment for HTN during pregnancy.

• Encouraging them to discuss individualized physical activity recommendations with their healthcare provider.
• Providing information on avoiding any use of alcohol, tobacco, marijuana or illegal substances, as well as offering substance use referrals. The WIC Substance Use Prevention Manual is available for additional guidance and referral resources (https://wicworks.fns.usda.gov/resources/wic-substance-use-prevention-guide).

• Referring to local home visiting programs for health monitoring and support, if available.

Postpartum Women with History of Preeclampsia:

• Informing them of the symptoms of postpartum preeclampsia and of the importance of contacting their healthcare provider immediately if they occur.

• Providing breastfeeding promotion and support, unless contraindicated. Encourage women to discuss their breastfeeding status and goals with their healthcare provider, especially if medications are prescribed.

• Encouraging them to attend all health care appointments, including their 4-6 week postpartum visit; to develop a plan for future pregnancies; to discuss health conditions and medication needs with their healthcare provider; and to have their BMI, blood pressure, lipids, and fasting glucose assessed yearly (3).

• Counseling them on achieving and maintaining a healthy weight, physical activity, following a diet consistent with the Dietary Guidelines for Americans or the DASH diet.

• Informing them that history of preeclampsia increases their risk of future HTN, cardiovascular disease, and stroke.

• Providing information on avoiding any use of alcohol, tobacco, marijuana or illegal substances, as well as offering substance use referrals. The WIC Substance Use Prevention Manual is available for additional guidance and referral resources (https://wicworks.fns.usda.gov/resources/wic-substance-use-prevention-guide).

• Referring them to their provider to discuss whether a calcium or folic acid supplement is appropriate, if intake of these nutrients seems inadequate.

• Referring to local home visiting programs, if available, for health monitoring and support.

References


**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.
311 History of Preterm or Early Term Delivery

Definition/Cut-off Value

History of preterm and/or early term delivery is defined as follows (1, 2):

- **Preterm**: Delivery of an infant born ≤36 6/7 weeks.
- **Early Term**: Delivery of an infant born ≥37 0/7 and ≤38 6/7 weeks.

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<tr>
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<th>Pregnancy</th>
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<td>Breastfeeding/Non-Breastfeeding</td>
<td>Most recent pregnancy</td>
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Participant Category and Priority Level

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<td>Non-Breastfeeding Women</td>
<td>III, IV, V or VI</td>
</tr>
</tbody>
</table>

Justification

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

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

Preterm Delivery

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

Despite advances in neonatal care, preterm birth remains a leading cause of infant death in the United States (7). More infants die from pre-term related problems than any other single cause (6). Preterm birth strains society’s healthcare resources due to its long-term effects on the health of the newborn (6). Premature infants may have physical problems that have nutritional implications, including immature sucking, swallowing and immature digestion and absorption of carbohydrates and lipids (7). Preterm infants are at risk for a number of illnesses/health conditions that range from minor to severe complications depending on the circumstances. (See risk 142 Preterm or Early Term Delivery for more details.)

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

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

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

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

Additional concerns related to obesity include potential intrapartum, operative, and postoperative complications and difficulties related to anesthesia management. Obese women are also less likely to initiate and sustain breastfeeding (11).

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

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

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

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

**Early Term**

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

Research shows that a fetus will experience a significant amount of development and growth of the lungs, brain, and liver between 37 and 39 weeks of gestation. The brain develops at its fastest rate at the end of the pregnancy, at a rate of up to one third between weeks 35 and 39. Additionally, layers of fat are added under the infant’s skin during the last few weeks of pregnancy which helps them keep warm after birth. According to ACOG, non-medically warranted deliveries prior to 39 weeks should be avoided (19). Early term delivery puts an additional strain on society as the early term infant will likely require a longer hospital stay and may have long term healthcare needs (18). Factors that can increase the risk of a woman delivering an early term infant are the same and are stated above for preterm birth.
When a woman delivers an early term infant or chooses an early elective delivery, she is at increased risk for postpartum depression, cesarean delivery, and other complications requiring longer hospital stays (18). Steps pregnant women can take in order to decrease the prevalence of pre-term births include (18):

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

Implications for WIC Nutrition Services

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

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

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

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


References


312 History of Low Birth Weight

Definition/Cut-off Value

History of low birth weight is defined as the birth of an infant weighing ≤ 5 lb. 8 oz. (≤ 2500 grams) for the following:

<table>
<thead>
<tr>
<th>Category</th>
<th>Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>Any history of low birth weight</td>
</tr>
<tr>
<td>Breastfeeding/Non-Breastfeeding</td>
<td>Most recent pregnancy</td>
</tr>
</tbody>
</table>

Participant Category and Priority Level

<table>
<thead>
<tr>
<th>Category</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>I</td>
</tr>
<tr>
<td>Breastfeeding Women</td>
<td>I</td>
</tr>
<tr>
<td>Non-Breastfeeding Women</td>
<td>III, IV, V or VI</td>
</tr>
</tbody>
</table>

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).

References

321 History of Spontaneous Abortion, Fetal or Neonatal Loss

Definition/Cut-off Value

History of spontaneous abortion, fetal or neonatal loss are defined as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>Any history of fetal or neonatal death or 2 or more spontaneous abortions.</td>
</tr>
<tr>
<td>Breastfeeding Women</td>
<td>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.</td>
</tr>
<tr>
<td>Non-Breastfeeding Women</td>
<td>Spontaneous abortion, fetal or neonatal loss in most recent pregnancy.</td>
</tr>
</tbody>
</table>

Spontaneous abortion, fetal and neonatal death are defined as follows:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spontaneous Abortion (SAB)</td>
<td>The spontaneous termination of a gestation at &lt; 20 weeks or of a fetus weighing &lt; 500 grams.</td>
</tr>
<tr>
<td>Fetal Death</td>
<td>The spontaneous termination of a gestation at ≥ 20 weeks.</td>
</tr>
<tr>
<td>Neonatal Death</td>
<td>The death of an infant within 0-28 days of life.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Category</th>
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</tr>
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<tbody>
<tr>
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<tr>
<td>Breastfeeding Women</td>
<td>I</td>
</tr>
<tr>
<td>Non-Breastfeeding Women</td>
<td>III, IV, V or VI</td>
</tr>
</tbody>
</table>
Justification

Pregnancy

Previous fetal and neonatal deaths are strongly associated with preterm low birth weight (LBW) and small for gestational age (SGA) 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 SAB. Adverse outcomes related to history of SAB include recurrent SAB, low birth weight (including preterm and small for gestational age infants), premature rupture of membranes, neural tube defects and major congenital malformations. Nutrients implicated in human and animal studies include energy, protein, folate, zinc, and vitamin A.

Postpartum women

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

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

References

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 sons or daughter has... ") should prompt the CPA to validated the presence of the condition by asking more pointed questions related to that diagnosis.

Note: A woman who becomes pregnant within 16 months after a SAB (her first) would qualify for risk #332, Closely Spaced Pregnancies.
331 Pregnancy at a Young Age

Definition/Cut-off Value

Pregnancy at a young age is defined as conception at ≤ 17 years of age for the following:

<table>
<thead>
<tr>
<th>Category</th>
<th>Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>Current pregnancy</td>
</tr>
<tr>
<td>Breastfeeding/Non-Breastfeeding</td>
<td>Most recent pregnancy</td>
</tr>
</tbody>
</table>

Participant Category and Priority Level

<table>
<thead>
<tr>
<th>Category</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>I</td>
</tr>
<tr>
<td>Breastfeeding Women</td>
<td>I</td>
</tr>
<tr>
<td>Non-Breastfeeding Women</td>
<td>III, IV, V or VI</td>
</tr>
</tbody>
</table>

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.
References


332 Short Interpregnancy Interval

Definition/Cut-off Value

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

<table>
<thead>
<tr>
<th>Category</th>
<th>Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>Current pregnancy</td>
</tr>
<tr>
<td>Breastfeeding/Non-Breastfeeding Women</td>
<td>Most recent pregnancy</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Category</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>I</td>
</tr>
<tr>
<td>Breastfeeding Women</td>
<td>I</td>
</tr>
<tr>
<td>Non-Breastfeeding Women</td>
<td>III, IV, V, or VI</td>
</tr>
</tbody>
</table>

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).

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.
  
Encouraging folic acid supplementation. [http://www.cdc.gov/features/folicacidbenefits/](http://www.cdc.gov/features/folicacidbenefits/)


References


**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)
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 for the following:

<table>
<thead>
<tr>
<th>Category</th>
<th>Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>Current pregnancy</td>
</tr>
<tr>
<td>Non-Breastfeeding Women</td>
<td>Most recent pregnancy</td>
</tr>
</tbody>
</table>

Participant Category and Priority Level

<table>
<thead>
<tr>
<th>Category</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>I</td>
</tr>
<tr>
<td>Breastfeeding Women</td>
<td>I</td>
</tr>
<tr>
<td>Non-Breastfeeding Women</td>
<td>III, IV, V or VI</td>
</tr>
</tbody>
</table>

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.

References

334 Lack of or Inadequate Prenatal Care

Definition/Cut-off Value

Prenatal care beginning after the 1st trimester (after 13th week), or based on an Inadequate Prenatal Care Index published in a peer reviewed article such as the one by Kessner et al. (4).

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

<table>
<thead>
<tr>
<th>Weeks Gestation</th>
<th>Number of Prenatal Visits (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 - 21</td>
<td>0 or unknown</td>
</tr>
<tr>
<td>22 - 29</td>
<td>1 or less</td>
</tr>
<tr>
<td>30 - 31</td>
<td>2 or less</td>
</tr>
<tr>
<td>32 - 33</td>
<td>3 or less</td>
</tr>
<tr>
<td>34 or more</td>
<td>4 or less</td>
</tr>
</tbody>
</table>

Participant Category and Priority Level

<table>
<thead>
<tr>
<th>Category</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>I</td>
</tr>
</tbody>
</table>

Justification

Women who do not receive early and adequate prenatal care are more likely to deliver premature, growth retarded, or low birth weight infants (3). The Kessner Index can be used to assess the adequacy of prenatal care for a woman with an uncomplicated pregnancy. Women with medical or obstetric problems, as well as younger adolescents, may need closer management; the frequency of prenatal visits should be determined by the severity of identified problems (1). Several studies have reported significant health and nutrition benefits for pregnant women enrolled in the WIC Program (3).

References

Clarification

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

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

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

<table>
<thead>
<tr>
<th>Category</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>I</td>
</tr>
<tr>
<td>Breastfeeding Women</td>
<td>I</td>
</tr>
<tr>
<td>Non-Breastfeeding Women</td>
<td>III, IV, V or VI</td>
</tr>
</tbody>
</table>

Justification

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

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

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

References

Additional References


Fetal Growth Restriction (FGR) 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 $< 10^{th}$ percentile for gestational age.

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

<table>
<thead>
<tr>
<th>Category</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>I</td>
</tr>
</tbody>
</table>

### Justification

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

### References


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.
337 History of Birth of a Large for Gestational Age Infant

Definition/Cut-off Value

History of birth of a large for gestational age infant is defined as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>Any history of giving birth to an infant weighing greater than or equal to 9 lbs. (4000 grams).</td>
</tr>
<tr>
<td>Breastfeeding/Non-Breastfeeding Women</td>
<td>Most recent pregnancy, or history of giving birth to an infant weighing greater than or equal to 9 lbs. (4000 grams).</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
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<tr>
<td>Breastfeeding Women</td>
<td>I</td>
</tr>
<tr>
<td>Non-Breastfeeding Women</td>
<td>III, IV, V or VI</td>
</tr>
</tbody>
</table>

Justification

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

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

References

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.
338 Pregnant Woman Currently Breastfeeding

Definition/Cut-off Value

Pregnant woman who is currently breastfeeding.

Participant Category and Priority Level

<table>
<thead>
<tr>
<th>Category</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>I</td>
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</tbody>
</table>

Justification

Generally, it is considered safe for most women to continue breastfeeding while pregnant and can be sustained for as long as mutually desired by the mother and child (1). The assignment of this risk is not intended to discourage women from continuing breastfeeding during pregnancy, but rather to highlight the need to review the mother’s medical history and diet along with her breastfeeding goals.

Incidence rates of breastfeeding while pregnant among U.S. mothers have not been reported recently. The National Health and Nutrition Examination Survey (NHANES) III indicated that between 1988 and 1994 only 5% of North American breastfeeding women were pregnant (2).

Research on breastfeeding during pregnancy, especially among U.S. populations, is very limited; however, some studies have examined the relationship that this practice has on birth outcomes, such as preterm delivery, miscarriage, and birth weight. During breastfeeding, stimulation of the nipples causes the secretion of the hormone oxytocin, which can result in contractions of the uterus (3). It has been suggested that these contractions may induce labor and therefore increase the risk of delivering prematurely in some women; however, this is not a concern for the typical low risk pregnancy (1, 4, 5). In a small retrospective study of 57 U.S. mothers with an unknown previous pregnancy outcome, most did not notice any uterine contractions specific to breastfeeding. The women that did notice uterine contractions specific to breastfeeding gave birth to healthy babies (6).

Studies of pregnancy-breastfeeding overlap among women with a history of preterm delivery or miscarriage are presently lacking in the scientific literature. As a result, these women should be encouraged to talk with their health care provider about their breastfeeding goals and report any uterine contractions (1). For more information on premature delivery, see risk #142 Preterm or Early Term Delivery or risk #311 History of Preterm or Early Term Delivery.

Several studies of pregnancy-breastfeeding overlap have been conducted with women without a history of preterm labor or miscarriage, and no statistically significant increased risk of premature delivery were reported (7, 8). One retrospective study compared the outcomes of pregnancies in mothers with no history of premature delivery or miscarriage that had one full-term infant and continued breastfeeding during pregnancy to a control group of comparable age and pregnancy history that stopped breastfeeding at least three months before becoming pregnant. Fewer pregnancies (7.3%) in the breastfeeding group resulted in spontaneous abortion than the control group (8.4%) (7). In a systematic review of all of the relevant literature published between 1990 and 2015, none of the studies reviewed reported significant differences in the numbers of premature births between pregnant mothers who breastfed and non-breastfeeding pregnant mothers, even when breastfeeding duration, the number of feedings, or birth interval were...
controlled for (9). These results provide evidence for continued support of breastfeeding during pregnancy for mothers with no previous history of preterm labor or miscarriage.

Several studies have also examined the effect of breastfeeding during pregnancy on the birth weight of the infant. These studies reported similar mean birth weights between infants born to mothers who breastfed during pregnancy and those who did not. (5, 8, 10, 11)

When a woman is pregnant or breastfeeding, she has a higher need for certain vitamins and minerals and may have greater caloric needs as well. The same is true for a woman who is pregnant while breastfeeding. It is important to note that caloric needs must be individualized based on current weight, physical activity, and recommended maternal weight gain for weight status (i.e., underweight, normal weight, overweight, or obese). For more information about maternal weight gain, see risk #131 Low Maternal Weight Gain or risk #133 High Maternal Weight Gain.

**Implications for WIC Nutrition Services**

WIC staff can support pregnant women who are breastfeeding by:

- Considering personal feelings about breastfeeding while pregnant as well as personal breastfeeding goals with the currently breastfed child.
- Referring mothers who have a history of premature labor or miscarriage and those who are concerned about uterine contractions to their health care providers.
- Providing nutrition education that supports an overall healthy diet, including:
  - Limiting calories from added sugars and saturated fats.
  - Choosing a variety of fruits and vegetables, whole grains, and fat-free or low-fat dairy products.
  - Eating protein-rich foods such as poultry, fish, beans, eggs, nuts, and lean meats. Pregnant women, including those who are breastfeeding, should avoid eating shark, swordfish, king mackerel, or tilefish due to concern for high levels of mercury. White (albacore) tuna should be limited to no more than 6 ounces per week (12).
  - Drinking plenty of fluids. During breastfeeding, fluid needs may increase, and mothers may notice that they are thirstier than usual. Women should drink enough water and other fluids to quench their thirst. A common suggestion is to drink a glass of water with every breastfeeding session (13).
- Monitoring weight status throughout the pregnancy to ensure appropriate weight gain.
- Providing tips for reducing nipple soreness or breast tenderness if women report these concerns. Hormonal changes during pregnancy lead to nipple soreness and breast tenderness in some women (3).
- Informing women that the older child that is breastfeeding may notice some changes in the human milk and wean on his/her own. Although human milk continues to be nutritionally sound throughout pregnancy, the composition of it may change, which might change the way the milk tastes. For some women, their milk production may also decrease as their pregnancy progresses. These factors can lead the breastfeeding child to wean on his/her own before the baby is born. (1)
- Issuing Food Package VII to the mother until her older infant turns one, as long as she is partially (mostly) breastfeeding.
• Providing anticipatory guidance on tandem nursing, which is the practice of breastfeeding two or more children of different ages at the same time. This may ease the older child’s adjustment to the new baby, address the mother’s own desire to maintain closeness with the older child, and even make child care easier in some cases as both children are fed and comforted on the breast. This may also allow the mother and children to fulfill the American Academy of Pediatrics’ recommendation to continue breastfeeding for as long as mutually desired by the mother and child (14).

References


339 History of Birth with Nutrition Related Congenital or Birth Defect

Definition/Cut-off Value

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

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<tr>
<td>Pregnant Women</td>
<td>Any history of birth with nutrition-related congenital or birth defect.</td>
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<tr>
<td>Breastfeeding/Non-Breastfeeding</td>
<td>Most recent pregnancy.</td>
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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

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Justification

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

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

References


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.
341 Nutrient Deficiency or Disease

**Definition/Cut-off Value**

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

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

**Participant Category and Priority Level**

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**Justification**

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

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

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

- **RDA** - Indicates the average daily intake of particular nutrients to meet the requirements of 97-98% of healthy people.
- **AI** - Established to assume adequate intake when there is insufficient evidence to develop an RDA.
• EAR - The average daily intake of a nutrient that is thought to meet the needs of 50% of healthy individuals. EARs are used to assess the adequacy of nutrient intakes among populations rather than the individual.

• UL - The highest nutrient intake that is considered to be safe and does not lead to adverse health effects in the general population (2).

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

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

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

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

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

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

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

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

- Individuals who have intakes below the established RDA, AI, or EAR for the nutrient.
- Individuals who experience food insecurity.
- Individuals who are experiencing homelessness.
- Women who have a short interpregnancy interval.
- Individuals who have recently left their previous country of residence.
- People with a gastrointestinal disease that can limit absorption of nutrients (i.e. celiac disease or Crohn’s disease) or individuals with a history of gastrointestinal surgery (including gastric bypass). For example, individuals who have had a portion of their stomach removed or their distal ileum removed during a weight-loss or other surgery are at a greater risk of developing a vitamin B12 deficiency (13).
- Individuals with other medical conditions that influence nutrient status (i.e. cystic fibrosis, renal disease, genetic disorders).
- Individuals on medications that are known to interact with the absorption or excretion of certain vitamins and minerals.
- People with substance use disorders (including alcohol) may be more likely to have deficiencies due to poor intake and/or the effects of the substance. People who have high intakes of alcohol are at greater risk of developing a magnesium deficiency (14, 15).
- People who smoke are more likely to have a vitamin C deficiency due to the increase in oxidative stress.

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

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

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Function</th>
<th>Signs and Symptoms of Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A</td>
<td>Involved in immune function, vision, cell growth and cell communication.</td>
<td>Night blindness and xerophthalmia (16).</td>
</tr>
<tr>
<td>Vitamin B6</td>
<td>Involved in greater than 100 enzyme reactions in the body and involved in protein metabolism.</td>
<td>Microcytic anemia, scaling of the lips and cracks in the corners of the mouth, swollen tongue, depression, and confusion (17).</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>Involved in red blood cell formation, neurological function, and DNA synthesis.</td>
<td>Megablastic anemia, fatigue, weakness, constipation, loss of appetite, and weight loss (13).</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>Involved in the formation of collagen, certain neurotransmitters, and protein synthesis.</td>
<td>Development of scurvy which would include: fatigue, inflammation of the gums, and weakened connective tissue (14).</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>Promotes calcium absorption and proper bone formation, involved in cell growth, immune function, and reduces inflammation.</td>
<td>Development of rickets in children or osteomalacia in adults, and fatigue (18).</td>
</tr>
<tr>
<td>Calcium</td>
<td>Involved in muscle function, nerve transmission, and proper bone formation.</td>
<td>Development of osteoporosis (19).</td>
</tr>
<tr>
<td>Folate</td>
<td>Involved in the synthesis of RNA and DNA and is required for cell division and the prevention of Neural Tube Defects.</td>
<td>Megabolistic anemia (20).</td>
</tr>
<tr>
<td>Iodine</td>
<td>A component of thyroid hormones that regulate protein synthesis, metabolism, and enzyme activity.</td>
<td>Stunted growth and neurodevelopmental deficits (7).</td>
</tr>
<tr>
<td>Iron</td>
<td>A component of hemoglobin and therefore important in the transfer of oxygen from the lungs to organs, and involved in the synthesis of hormones as well as normal growth and development.</td>
<td>Microcytic, hypochromic anemia; impaired cognitive function, poor body temperature regulation, depressed immune function, and spoon-like shape of nails (9).</td>
</tr>
<tr>
<td>Magnesium</td>
<td>Involved in more than 300 enzyme</td>
<td>Loss of appetite, fatigue, weakness, nausea,</td>
</tr>
<tr>
<td>Nutrient</td>
<td>Function</td>
<td>Signs and Symptoms of Deficiency</td>
</tr>
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</tr>
<tr>
<td>Magnesium (continued)</td>
<td>reactions, protein synthesis, muscle function, nerve function, blood sugar control, and blood pressure control.</td>
<td>vomiting, numbness, tingling, muscle cramps, seizures, personality changes, and abnormal heart rhythms (15).</td>
</tr>
<tr>
<td>Zinc</td>
<td>Involved in cell metabolism, enzyme activity, immune function, protein synthesis, wound healing, DNA synthesis, and cell division.</td>
<td>Stunted growth, depressed immune function, hair loss, eye and skin lesions, delayed wound healing, and taste alterations (21).</td>
</tr>
</tbody>
</table>

**Implications for WIC Nutrition Services**

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

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

**References**


Clarification

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

Definition/Cut-off Value

Disease(s) and/or condition(s) that interfere with the intake or absorption of nutrients. The diseases and/or conditions include, but are not limited to:

<table>
<thead>
<tr>
<th>Gastrointestinal Disorders</th>
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<tbody>
<tr>
<td>Gastroesophageal reflux disease (GERD)</td>
</tr>
<tr>
<td>Peptic ulcer</td>
</tr>
<tr>
<td>Post-bariatric surgery</td>
</tr>
<tr>
<td>Short bowel syndrome</td>
</tr>
<tr>
<td>Inflammatory bowel disease, including ulcerative colitis or Crohn’s disease</td>
</tr>
<tr>
<td>Liver disease</td>
</tr>
<tr>
<td>Pancreatitis</td>
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<tr>
<td>Biliary tract disease</td>
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Presence of gastrointestinal disorders 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.

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Justification

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

Gastroesophageal Reflux Disease (GERD)

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

**Peptic Ulcer**

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

**Post-bariatric Surgery**

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

**Short Bowel Syndrome (SBS)**

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

**Inflammatory Bowel Disease (IBD)**

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

**Liver Disease**

Since the liver plays an essential role in the metabolic processes of nutrients, liver disorders have far-reaching effects on nutritional status. Acute liver injury is often associated with anorexia, nausea and vomiting. Therefore, inadequate nutritional intakes are common. Decreased bile salt secretion is associated with the malabsorption 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.

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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.
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, 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.

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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).

References


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.
344 Thyroid Disorders

Definition/Cut-Off Value

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

<table>
<thead>
<tr>
<th>Thyroid Dysfunction</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperthyroidism</td>
<td>Excessive thyroid hormone production (most commonly known as Graves’ disease and toxic multinodular goiter).</td>
</tr>
<tr>
<td>Hypothyroidism</td>
<td>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.</td>
</tr>
<tr>
<td>Congenital Hyperthyroidism</td>
<td>Excessive thyroid hormone levels at birth, either transient (due to maternal Grave’s disease) or persistent (due to genetic mutation).</td>
</tr>
<tr>
<td>Congenital Hypothyroidism</td>
<td>Infants born with an under active thyroid gland and presumed to have had hypothyroidism in-utero.</td>
</tr>
<tr>
<td>Postpartum Thyroiditis</td>
<td>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.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Category</th>
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<tr>
<td>Pregnant Women</td>
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<td>Children</td>
<td>III</td>
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</table>
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 thiocyanate found in tobacco smoke inhibits iodine transport (9).

References


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


Additional References

Hashimoto’s Thyroiditis online reference:
http://www.medicinenet.com/hashimotos_thyroiditis/article.htm

Clarification

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

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

Definition/Cut-off Value

Hypertension is defined as high blood pressure which may eventually cause health problems and includes chronic hypertension during pregnancy, preeclampsia, eclampsia, chronic hypertension with superimposed preeclampsia, and gestational hypertension (1, 2, 3).

Prehypertension is defined as being at high risk for developing hypertension, based on blood pressure levels.

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

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Justification

Hypertension (HTN), commonly referred to as high blood pressure, occurs when the force of blood against artery walls is high enough that it may eventually cause health problems. Hypertension is measured in terms of both systolic blood pressure (pressure in blood vessels when the heart contracts) and diastolic blood pressure (pressure in blood vessels when the heart rests between contractions). Two main factors in the body increase levels of blood pressure – a higher volume of blood being pumped by the heart and narrower arteries. Untreated HTN leads to many degenerative diseases, including congestive heart failure, end-stage renal disease, and peripheral vascular disease. People with HTN are often asymptomatic; diagnosis is based on measuring levels of blood pressure. (1)

Blood pressure levels in adults are typically classified as follows, with the first number representing systolic blood pressure and the second number diastolic blood pressure (2, 3):

- Normal blood pressure: <120/<80 mmHg (millimeters of mercury)
- Prehypertension: consistent readings of 120-139/80-89 mmHg
- Hypertension: consistent readings of ≥140/≥90 mmHg

About 75 million adults in the United States (1 in every 3) have HTN, and about the same number have prehypertension. Unfortunately, only half of adults in the United States with HTN have their blood pressure under control, and HTN leads to at least 410,000 deaths in the United States annually. (2)
Hypertension is considered either primary/essential (there is no identifiable cause) or secondary (there is an identifiable cause). Some identifiable causes include sleep apnea, kidney problems, diabetes, some tumors, thyroid problems, inflammation, and blood vessel defects. In addition, several medications (e.g., some birth control, cold medicines, decongestants, pain relievers) as well as illegal substances can significantly raise blood pressure. (1)

Risk factors for HTN include the following (1, 2):

- Age (Risk increases with age.)
- Race/ethnicity (In the United States, people of African descent experience disproportionately higher rates of HTN compared to other races/ethnicities. Causes for this racial disparity in rates of HTN are complex and multifactorial [4, 5].)
- Family history
- Overweight or obesity (This causes more blood to be pumped by the heart.)
- Physical inactivity (This is associated with a higher heart rate, which increases the force of blood against arteries.)
- Tobacco use (This increases blood pressure during use. Chemicals in tobacco also lead to narrowing of arteries.)
- Second-hand exposure to tobacco smoke
- Excessive sodium intake (This causes fluid retention, which increases blood pressure.)
- Inadequate potassium intake (This causes an excessive amount of sodium in the blood.)
- Excessive alcohol intake (This can damage the heart over time.)
- Stress
- Prehypertension
- Pregnancy
- Male gender

Hypertension is a serious condition that can lead to a variety of health problems, including the following (1, 3):

- Cardiac pathologies, including heart attack, stroke, aneurysm, and heart failure
- Metabolic syndrome
- Chronic kidney disease
- Eye damage and vision loss
- Memory/understanding problems and dementia
- Gestational diabetes, preeclampsia, and perinatal mortality

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

Lifestyle changes to manage HTN and prehypertension include the following:
- Have blood pressure checked at least yearly or as recommended by one’s healthcare provider. For those at risk of HTN, regular monitoring of blood pressure is crucial. Blood pressure levels greater than 180/120 mmHg are extremely dangerous and require immediate medical attention (3).

- Consume a diet consistent with the Dietary Guidelines for Americans or follow the Dietary Approaches to Stop Hypertension (DASH) eating plan. Details regarding the DASH eating plan can be found on the National Heart, Lung, and Blood Institute’s website, www.nhlbi.nih.gov/health-topics/dash-eating-plan.

- Engage in regular physical activity.

- Achieve and maintain a healthy weight.

- Limit alcohol and avoid any use of tobacco, marijuana or illegal substances.

If lifestyle changes alone do not sufficiently reduce blood pressure, medications may be prescribed. These include angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor blockers (ARBs), calcium channel blockers, and/or diuretics (3).

**Pregnant Women**

Hypertension occurs in 6-8% of all pregnancies in the United States. Any HTN during pregnancy can lead to preeclampsia, eclampsia, stroke, pregnancy induction, and/or placental abruption. Because HTN during pregnancy can tighten the mother’s blood vessels (including those in the umbilical cord), it can reduce oxygen and nutrients to the infant, potentially causing prematurity, low birth weight, and fetal growth restriction. (6)

Hypertensive disorders of pregnancy are categorized as follows:

- **Chronic Hypertension during Pregnancy:**
  - Definition: Hypertension is present before pregnancy or is diagnosed before 20 weeks gestation (6, 7).
  - It increases the risk of developing more severe HTN during pregnancy, gestational diabetes, and perinatal mortality. In infants, it may lead to fetal growth restriction and, additionally, exposure to antihypertensive medications may cause fetal growth restriction and malformation. (7)
  - Treatment includes frequent, regular monitoring of blood pressure. It is typically suggested that women with well-controlled blood pressure who exercised regularly before pregnancy continue moderate physical activity during pregnancy, unless contraindicated. Women should check with their healthcare provider for individualized guidance. (7)

- **Preeclampsia:**
  - Definition: Onset of hypertension during pregnancy, typically with proteinuria, and usually after 20 weeks gestation. For some women, proteinuria does not occur; for these women, preeclampsia is diagnosed as hypertension with thrombocytopenia, impaired liver function, renal insufficiency, pulmonary edema, and/or cerebral or visual disturbances. (7)
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- The most common type of hypertensive disorder during pregnancy, preeclampsia occurs in 3.4% of pregnancies in the United States and is associated with one maternal death per 100,000 live births in developed countries (7, 8). Worldwide, it leads to the death of over 60,000 women annually (9).

- Risk factors include history of preeclampsia, chronic HTN, chronic kidney disease, history of thrombocytopenia, in vitro fertilization, diabetes, auto-immune disorders (such as lupus), uterine artery notching, family history of preeclampsia, obesity, polycystic ovarian syndrome, giving birth for the first time, multifetal pregnancy, pregnancy interval greater than 10 years, and being older than 40 years (6, 7, 9, 10, 11). Low dietary and serum calcium levels are also associated with preeclampsia (9).

- Clinical signs include any of the following: proteinuria, low blood platelet count, abnormal kidney or liver function, and fluid in the lungs. Symptoms can include sudden weight gain, swelling of face or hands, upper abdominal pain, difficulty breathing, changes in vision (including seeing spots), severe headache, nausea, and/or vomiting. (7)

- For pregnant women, preeclampsia can lead to pulmonary edema (fluid build-up in the lungs), heart attack, stroke, acute respiratory distress syndrome (difficulty breathing due to fluid leaking into the lungs), coagulopathy (blood unable to clot), severe renal failure, retinal injury, liver rupture, placental abruption, hemolysis (breakdown of red blood cells), caesarean delivery, and/or death. Women with preeclampsia are at greater risk for postpartum depression, future HTN, heart attack, stroke, congestive heart failure, and metabolic disease; these risks increase with repeated incidence of preeclampsia and with preterm delivery (7, 8, 10, 12). The infant of a woman with preeclampsia is at greater risk for caesarean delivery, preterm birth, low birth weight, small for gestational age, and/or stillbirth (8, 12). For the children of mothers who had preeclampsia, they are at heightened risk of bronchopulmonary dysplasia (form of chronic lung disease), cerebral palsy, cardiovascular dysfunction, learning disabilities, and lower IQ (10, 12).

- Currently, there is inconclusive evidence on preventative measures for preeclampsia in future pregnancies. However, when dietary calcium is inadequate, research indicates adequate dietary calcium or supplementation (1.5-2 grams/day) may help prevent preeclampsia (7, 8, 9, 13). Dietary folate and folic acid supplementation during pregnancy has also been associated with lower risk of preeclampsia (12, 14).

- Treatment for preeclampsia depends on severity and other individual factors. For women with preeclampsia without severe features (hypertension with proteinuria after 20 weeks gestation), the American College of Obstetricians and Gynecologists (ACOG) currently suggests that strict bed rest not be routinely prescribed (although there may be situations in which different levels of rest, including bed rest and hospitalization, may be indicated) (7). For women with severe preeclampsia, treatment should occur in an inpatient setting, and ACOG recommends early delivery of the infant to prevent additional harm to the mother and infant (7, 10). The only known cure for preeclampsia during pregnancy is the delivery of the infant and placenta (10, 12).
It is important to note that postpartum preeclampsia can occur, regardless of whether it was present during pregnancy. It is usually diagnosed within 48 hours of delivery but can occur up to 6 weeks postpartum. Thus, women during this period should monitor for preeclampsia symptoms and contact their healthcare provider immediately if they occur. (6, 7)

**Chronic Hypertension with Superimposed Preeclampsia:**

- Definition: Hypertension is present before pregnancy, and preeclampsia develops during pregnancy. It is classified as either “with severe features” (hypertension with proteinuria before 20 weeks gestation with organ problems) or “without severe features” (hypertension with proteinuria after 20 weeks gestation). (6, 7)

**Eclampsia:**

- Definition: Eclampsia is the presence of new-onset grand mal seizures in a woman with preeclampsia. Eclampsia can occur before, during, or after labor. It may be preceded by severe headaches, blurred vision, sensitivity to light, abdominal pain, hyperreflexia (over-reactive reflexes), and altered mental status. (7)

- Eclampsia is a critical situation and can lead to maternal death. Treatment typically includes parenteral magnesium sulfate in an inpatient setting. Once the mother’s condition is stabilized, ACOG recommends the delivery of the infant. Treatment with magnesium sulfate may also be continued after delivery, if needed. (7)

- Please note that due to the critical nature of eclampsia and its treatment in an inpatient setting, women with eclampsia are not encountered within a WIC setting.

**Gestational Hypertension:**

- Definition: Onset of hypertension during pregnancy, usually after 20 weeks gestation, and without proteinuria. It usually resolves after delivery but does increase the risk of developing chronic HTN. (6)

The term “pregnancy-induced hypertension” includes preeclampsia, eclampsia and gestational hypertension. Please note that a low-sodium diet and/or weight loss is not recommended as treatment for HTN during pregnancy.

**Breastfeeding**

A systematic study done by the Agency for Healthcare Research and Quality found that there is an inverse relationship between duration of breastfeeding and HTN: the longer a woman breastfeeding, the less risk she has for developing HTN (15). Similarly, women with hypertension should be encouraged to breastfeed, unless contraindicated (16). If postpartum women require antihypertensive medications, medications should be chosen that are compatible with breastfeeding, if possible. It is thus very important for the mother to discuss her breastfeeding status and goals with her healthcare provider to determine the best infant feeding and medication plan.

**Children**

Hypertension among children is a serious condition and may eventually lead to hypertension and chronic disease in adulthood. The definition of HTN is based on the normative distribution of blood pressure in healthy children. In 2017, the American Academy of Pediatrics (AAP) updated their pediatric HTN
diagnostic tools to account for the sex, age and height of the child. For more information about the definition and classification of HTN in children see the AAP Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents: https://pediatrics.aappublications.org/content/140/3/e20171904.

Early detection of high blood pressure in children is crucial for preventing future health concerns. Thus, the AAP recommends that blood pressure be measured annually once children are three years old. For children under three years of age, healthcare providers should measure blood pressure at every visit if the child has a risk factor for developing HTN. (17)

The prevalence of HTN among children and adolescents in the United States is around 3.5%. About 2-4% U.S. children and adolescents experience persistently elevated blood pressure. Higher rates are experienced by boys and among Hispanic and non-Hispanic African American children compared to white children. (17)

For most children with HTN, there is no specific, identifiable cause (thus, it is considered primary HTN). Some children, however, do experience HTN as a direct result of medications, kidney disease, endocrine disorders, or congenital heart defects. Risk factors for elevated blood pressure and HTN among children include the following (17):

- Family history of HTN, including maternal HTN during pregnancy
- Overweight and obesity (including high weight-for-length in infants)
- History of prematurity, low birth weight, and/or small for gestational age
- High sodium intake

Hypertension during childhood has implications for both current and long-term health. Health outcomes of HTN occurring in children may include the following (17):

- Dyslipidemia and cardiovascular damage
- Learning disabilities, impaired neurocognition and executive functioning
- In adulthood: HTN, metabolic syndrome, and cardiovascular disease

For the management of HTN in children, the AAP recommends the following lifestyle changes:

- Achieve and maintain a healthy weight-for-length or BMI (body mass index).
- Follow an age-appropriate DASH-type eating plan.
- Participate in moderate to vigorous physical activity at least 3-5 days per week, 30-60 minutes per session.
- Get adequate sleep (more than 7 hours a night).

For more information about HTN among children, please see the Centers for Disease Control and Prevention’s website High Blood Pressure during Childhood and Adolescence at: https://www.cdc.gov/bloodpressure/youth.htm.

Implications for WIC Nutrition Services

The WIC Program provides support to participants with hypertension/prehypertension by offering fruits, vegetables, whole grains, legumes, low-fat dairy, and fish, which are important components of the
DASH eating plan. WIC nutrition staff also offer nutrition education and counseling as well as referrals to smoking cessation and substance use treatment if needed, which are critical to the management of hypertension/prehypertension. In addition, WIC staff can assist participants by:

For Pregnant Women with Hypertension:

- Asking probing questions to determine the type of hypertension they have been diagnosed with during pregnancy.
- Encouraging them to start prenatal care as soon as possible and to attend all health care appointments. Health status and blood pressure should be monitored frequently by healthcare provider. The healthcare provider may also recommend regular self-monitoring of blood pressure.
- Informing them of the symptoms of preeclampsia and of the importance of contacting their healthcare provider immediately if they occur. Also, inform them that preeclampsia can occur postpartum.
- Counseling them on healthy weight gain, prenatal vitamin use, and a nutritious diet, including adequate calcium intake. For women with low calcium intake, refer them to their healthcare provider to discuss whether a calcium supplement is appropriate. Please note that a low-sodium diet and/or weight loss is not recommended as treatment for HTN during pregnancy.
- Encouraging them to discuss individualized physical activity recommendations with their healthcare provider.
- Informing them that hypertension during pregnancy increases their risk of future HTN, cardiovascular disease, and stroke.
- Providing information on avoiding any use of alcohol, tobacco, marijuana or illegal substances, as well as offering substance use referrals. The WIC Substance Use Prevention Manual is available for additional guidance and referral resources (https://wicworks.fns.usda.gov/resources/wic-substance-use-prevention-guide).
- Referring to local home visiting programs for health monitoring and support, if available.

For Postpartum Women with Hypertension:

- Asking probing questions to determine the type of hypertension they experienced during pregnancy and are now experiencing.
- Informing them of the symptoms of postpartum preeclampsia and of the importance of contacting their healthcare provider immediately if they occur.
- Providing breastfeeding promotion and support, unless contraindicated. Encourage women to discuss their breastfeeding status and goals with their healthcare provider, especially if medications are prescribed.
- Encouraging them to attend all health care appointments, including their 4-6 week postpartum visit; to develop a plan for future pregnancies; to discuss health conditions and medication needs with their healthcare provider; and to have their BMI, blood pressure, lipids, and fasting glucose assessed yearly (3).
• Counseling them on achieving and maintaining a healthy weight, physical activity, following a diet consistent with the Dietary Guidelines for Americans or the DASH diet.

• Providing information on avoiding any use of alcohol, tobacco, marijuana or illegal substances, as well as offering substance use referrals. The WIC Substance Use Prevention Manual is available for additional guidance and referral resources ([https://wicworks.fns.usda.gov/resources/wic-substance-use-prevention-guide](https://wicworks.fns.usda.gov/resources/wic-substance-use-prevention-guide)).

• Referring them to their healthcare provider to discuss whether a calcium or folic acid supplement is appropriate, if intake of these nutrients seems inadequate.

• Referring to local home visiting programs for health monitoring and support, if available.

For Children with Hypertension:

• Encouraging caregivers to take children to all health care appointments.

• Counseling caregivers on: healthy pediatric weight gain and, for children with high weight-for-length or obesity, discussing strategies for achieving and maintaining a healthy weight; age-specific, DASH-type eating habits; and the importance of adequate sleep and physical activity in children.

References


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.
346 Renal Disease

Definition/Cut-off Value

Any renal disease including pyelonephritis and persistent proteinuria, but excluding urinary tract infections (UTI) involving the bladder. Presence of condition, 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

<table>
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<tr>
<td>Children</td>
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</table>

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.

References


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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 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.

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* Some cancer treatments may contraindicate breastfeeding.

Justification

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

References


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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:

<table>
<thead>
<tr>
<th>Central Nervous System Disorders</th>
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<tbody>
<tr>
<td>Epilepsy</td>
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<tr>
<td>Cerebral palsy (CP)</td>
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<tr>
<td>Neutral tube defects (NTDs), such as spina bifida</td>
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<tr>
<td>Parkinson’s disease</td>
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<tr>
<td>Multiple sclerosis (MS)</td>
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</table>

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.

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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, adynia, 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 B₁₂ 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.

References


Clarification

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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. May include, but is not limited to, cleft lip or palate, Down’s syndrome, thalassemia major, sickle cell anemia (not sickle cell trait), and muscular dystrophy.

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.

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</table>

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 (5). 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 (5).

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.

References


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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:

<table>
<thead>
<tr>
<th>Inborn Errors of Metabolism*</th>
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<tbody>
<tr>
<td>Amino Acid Disorders</td>
<td>Urea Cycle Disorders</td>
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<tr>
<td>Organic Acid Metabolism Disorders</td>
<td>Carbohydrate Disorders</td>
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<tr>
<td>Fatty Acid Oxidation Disorders</td>
<td>Peroxisomal Disorders</td>
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<tr>
<td>Lysosomal Storage Diseases</td>
<td>Mitochondrial Disorders</td>
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</tbody>
</table>

*For information about additional IEM, please see Clarification.

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</table>

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 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.

References


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.

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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.
352a Infectious Diseases - Acute

Definition/Cut-off Value

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

<table>
<thead>
<tr>
<th>Most Common Acute Infectious Diseases</th>
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<tbody>
<tr>
<td>Hepatitis A</td>
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<td>Listeriosis</td>
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<td>Hepatitis E</td>
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<tr>
<td>Pneumonia</td>
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<tr>
<td>Meningitis (Bacterial/Viral)</td>
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<tr>
<td>Bronchitis (3 episodes in last 6 months)</td>
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<tr>
<td>Parasitic Infections</td>
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The infectious disease must be present within the past six months, and diagnosed, documented, or reported by a physician or someone working under a physician’s orders, or as self-reported by applicant/participant/caregiver. See Clarification for more information about self-reporting a diagnosis.

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Justification

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

VIRAL HEPATITIS

Hepatitis is inflammation of the liver. It is most often caused by viruses, but can also be caused by excessive alcohol consumption, toxins, and medicines such as acetaminophen, as well as other medical conditions.
linked to liver inflammation (4). Viral hepatitis is caused by a series of viruses labeled A, B, C, D, and E – with A, B, and C being the most common forms in the United States. Viral hepatitis A and E are the only forms that are acute and do not become chronic, whereas B, C, and D can both be acute and chronic in nature (5). (For more information on chronic infectious diseases see Risk #352b Infectious Diseases – Chronic.) Regardless of the type of hepatitis, infected individuals with signs of the infection will typically experience anorexia, nausea, vomiting, diarrhea, jaundice, epigastria pain, tiredness, and weakness, all of which affect one’s diet and health (5). In addition, darker urine and pale stools may be present in infected individuals. It is important to note that viral hepatitis is the leading cause of liver cancer and the most frequent need for liver transplants in the United States (6).

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

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

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

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

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

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

**MENINGITIS**

Characterized by an inflammation of the protective membranes known as the meninges, meningitis is typically caused by an infection of the fluid surrounding the brain and the spinal cord. Most commonly meningitis is caused by a bacterial or viral infection, but it can also result as a response to physical injury, cancer, or certain drugs. Due to the severity of meningitis and resulting treatment differing depending on the cause, it is important to correctly diagnose the agent responsible for the disease. (11)
Bacterial Meningitis: While most people with meningitis typically recover, bacterial meningitis is typically severe and can result in serious complications, including brain damage, hearing loss, or learning disabilities. The leading causes of bacterial meningitis in the United States include Haemophilus influenzae, Streptococcus pneumoniae, Listeria monocytogenes, and Neisseria meningitidis. The causes of meningitis vary by age group. In adults, including pregnant women, it is most commonly caused by Streptococcus pneumoniae, Neisseria meningitidis, and Listeria monocytogenes. The cause in newborns is most typically Group B Streptococcus, E. coli, and Listeria. Infants and children most commonly develop meningitis in response to Streptococcus pneumoniae, Neisseria meningitidis, and Haemophilus influenzae type b. (12)

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

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

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

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

Viral Meningitis: Viral meningitis is the most common type of meningitis and is often less severe than bacterial caused cases. In the United States it is most commonly caused by non-polio enteroviruses, as well as others including the mumps, herpes, measles, influenza, and arboviruses. While few people infected with these viruses develop meningitis, the risk is especially high from summer to fall. Children younger than five and people with weakened immune systems are at higher risk of developing the disease, with infants younger that one month old and people with weakened immune systems more likely to develop severe illness. (14)
Transmission of a virus that can lead to meningitis may occur due to close contact with a person who has viral meningitis, however it is unlikely meningitis will develop. Symptoms in infants include fever, irritability, poor eating, sleepiness or trouble waking, and lethargy. Adults most commonly experience fever, headache, stiff neck, light sensitivity, sleepiness or trouble waking, nausea, vomiting, lack of appetite, and lethargy. As with bacterial meningitis, diagnosis requires lab tests to confirm the illness. (14)

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

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

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

**LISTERIOSIS**

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

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

**PNEUMONIA**

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

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

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

**BRONCHITIS**

Acute bronchitis is diagnosed by a healthcare provider based on the signs and symptoms present in the patient. It is a condition that occurs when the airways in the lungs swell and produce mucus, resulting in a cough. Bronchitis typically occurs after a chest cold and is usually caused by a virus, with the most common being: Respiratory syncytial virus (RSV), Adenovirus, Influenza viruses, and parainfluenza. Symptoms include, but are not limited to coughing that produces mucus; soreness in the chest; fatigue; headache; body aches; fever; and sore throat. Most symptoms of acute bronchitis resolve on their own after two weeks, but the cough may last up to eight weeks in some cases. In severe cases, such as a fever above 100.4 degrees Fahrenheit, patients should seek assistance from a health care provider. (22)

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

**PARASITIC INFECTIONS**

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

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

**Implications for WIC Nutrition Services**

WIC can improve the management of acute infectious diseases through WIC foods, nutrition education, counseling, and referrals to community resources. The table below provides additional WIC nutrition services recommendations specific to the disease state that can help improve the health outcomes of participants with acute infectious diseases:
<table>
<thead>
<tr>
<th>Infection Type</th>
<th>Recommendations</th>
</tr>
</thead>
</table>
| All Types of Infections | - Encourage sufficient calorie intake to ameliorate accelerated nutrient utilization.  
                          | - Recommend the *Dietary Guidelines* to ensure healthy eating patterns.           
                          | - Provide suggestions to address poor appetite.                                 |
|                         | - Provide education on safe food handling and storage practices.                 |
| All Types of Hepatitis  | - Recommend testing to pregnant women and high risk individuals.                |
|                         | - Encourage abstinence from alcohol.                                            |
|                         | - Provide information on high calorie, high protein and moderate fat diets.     |
|                         | - Recommend high calorie consumption at breakfast as nausea is less common in the morning.|
|                         | - Recommend, in consultation with health care provider, consumption of high calorie and protein liquid formula between meals to boost calorie intake. |
|                         | - Encourage a bland diet with extra fluids depending on the severity of nausea and vomiting.|
| Hepatitis A             | - Encourage the Hepatitis A vaccine for all children, previously unvaccinated adolescents through the age of 18, and high-risk adults. |
|                         | - Promote breastfeeding as being safe, but to avoid breastfeeding when nipples are cracked and bleeding — at which time, mothers should pump and discard milk to maintain supply. |
|                         | - Discourage the practice of pre-chewing food for infants, as blood may be present. |
| Hepatitis E             | - Avoid contaminated water.                                                     |
| Meningitis              | - Encourage vaccinations for both bacteria and viruses known to cause meningitis. |
|                         | - Provide education on proper food handling and storage practices.             |
|                         | - Recommend use of manufacturer’s instruction for the preparation of infant formula. |
|                         | - Provide education on good hygiene practices.                                |
| Listeriosis             | - Recommend alternatives to raw milk and dairy products.                      |
|                         | - Emphasize importance of safe food handling, preparation and storage practices.|
| Pneumonia               | - Recommend referral to a healthcare provider to administer appropriate antimicrobial or antiviral treatment. |
| Bronchitis              | - Provide education on symptom relief and proper pain-medication practices for children. |
|                         | - Recommend smoking cessation.                                                |
|                         | - Provide education on good hygiene practices.                                 |
|                         | - Encourage appropriate vaccinations.                                          |
| Parasitic Infections    | - Recommend appropriate measures be taken when coming into contact with potential environmental contaminants, e.g., use of gloves when working with soil and covering sandboxes when not in use. |
|                         | - Provide education on proper food handling and storage practices.             |
|                         | - Provide education on good hygiene practices.                                 |
References


**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.
**352b Infectious Diseases - Chronic**

**Definition/Cut-off Value**

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

<table>
<thead>
<tr>
<th>Chronic Infectious Diseases*</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV</td>
</tr>
<tr>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>Hepatitis B</td>
</tr>
<tr>
<td>AIDS</td>
</tr>
<tr>
<td>Acquired Immunodeficiency Syndrome</td>
</tr>
<tr>
<td>Hepatitis C</td>
</tr>
<tr>
<td>Hepatitis D</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Category</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>I</td>
</tr>
<tr>
<td>Breastfeeding Women</td>
<td>I</td>
</tr>
<tr>
<td>Non-Breastfeeding Women</td>
<td>III, IV, V, or VI</td>
</tr>
<tr>
<td>Infants</td>
<td>I</td>
</tr>
<tr>
<td>Children</td>
<td>III</td>
</tr>
</tbody>
</table>

**Justification**

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

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

The Human Immunodeficiency Virus (HIV) is a chronic virus that reduces an individual’s ability to fight off infections and diseases (4). HIV destroys white blood cells found in the immune system, also known as CD4...
(cluster of differentiation) or T cells (T lymphocytes) (5). HIV is transmitted only through blood, semen, preseminal fluid, rectal fluids, vaginal fluids, and breast milk from an HIV-infected person (6). HIV can lead to Acquired Immunodeficiency Syndrome (AIDS) if left untreated (4). Individuals who are aware of their HIV status and are undergoing antiretroviral therapy (ART) to stop the replication of the virus, can typically live decades – while those unaware of their status or are not on ART, can usually remain in this stage about ten years before progressing to the AIDS stage. Some individuals may progress to the AIDS stage sooner than 10 years. During the time period a person progresses from HIV to AIDS, the immune system becomes extremely weakened and can no longer protect against other infections or opportunistic illnesses** - which are infections generally not detrimental to healthy individuals, but can be life-threatening in people infected with HIV. A person with AIDS and an opportunistic illness that goes untreated has a life expectancy of approximately one year (4).

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

An early diagnosis in pregnant women can reduce the transmission of HIV in babies to 2%, if the expectant mother (8):

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

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

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

- Individuals in an HIV discordant relationship in which one partner is HIV positive and the other partner is HIV negative.
- Heterosexual women who do not regularly use condoms with sex partners of unknown HIV status.
- Women who share injectable drug paraphernalia or were in treatment for injectable drug use in the past six months.


**HIV/AIDS and Nutrition:** Dietary needs for an HIV positive individual are determined by the presence of symptoms (11, 12). **Symptomatic** individuals experiencing unintended weight loss, or wasting, and are dealing with: 1) poor food intake due to medication side effects, sore mouth, or mental health issues; 2)
altered metabolism due to disease progression; or 3) nutrient malabsorption caused by gastrointestinal problems resulting from medications or just the presence of the virus. In symptomatic participants, the main goals are to: 1) increase or maintain a normal body weight; 2) retain or increase lean body mass; and 3) ensure adequate intake of macro- and micronutrients. In most cases, these individuals usually require diets higher in protein and potentially a multivitamin, as vitamins A, B\textsubscript{6}, C, and E are lower in symptomatic people. In instances when wasting cannot be alleviated through regular dietary means, enteral and parenteral nutrition therapy may be necessary. For asymptomatic individuals or those with a stable weight, the goals should focus on adequate intake of nutrients to prevent wasting – and if food intake is low, these individuals could potentially include a multivitamin or mineral supplement to avoid deficiencies (11, 12).

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

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

**HIV/AIDS and Food Safety:** Participants living with HIV are more susceptible to contracting a food-borne illness due to weakened immune systems and therefore should be encouraged to: store and prepare foods safely; check expiration dates; and avoid raw or semi raw foods, such as meat, non-pasteurized dairy, and soft cheeses (11, 12). Infants born to HIV positive mothers, regardless of their HIV status, should drink ready-to-feed or liquid concentrate infant formula as powdered infant formula is not sterile and may not be microbiological safe (14).

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

**Implications for WIC Nutrition Services**

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

**HIV/AIDS**

The table below summarizes the WIC Nutrition Services that can help improve the health and birth outcomes of participants with HIV/AIDS.
<table>
<thead>
<tr>
<th>ALL CATEGORIES</th>
<th>WIC Nutrition Services Recommendations for HIV/AIDS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NUTRITION AND HEALTH TIPS TO MANAGE HIV/AIDS SYMPTOMS</strong> (12, 17, 18, 19)</td>
<td></td>
</tr>
<tr>
<td>• Use MyPlate as the guide for dietary needs.</td>
<td></td>
</tr>
<tr>
<td>• Consult health care providers when using supplements and herbs to avoid adverse reactions or medication interactions that could reduce effectiveness.</td>
<td></td>
</tr>
<tr>
<td>• Eat small, frequent meals when gastrointestinal problems are present or persistent.</td>
<td></td>
</tr>
<tr>
<td>• Eat soft foods with manageable textures at tolerable temperatures when oral lesions and dental problems are present (i.e. mashed potatoes, scrambled/boiled eggs, bananas, non-citrus juices, puddings, custards, milk, cooked vegetables, rice, oatmeal, non-fizzy drinks, cottage cheese, non-spicy foods).</td>
<td></td>
</tr>
<tr>
<td>• Add canned tuna, beans, cheese, peanut butter, dried milk for inexpensive extra protein.</td>
<td></td>
</tr>
<tr>
<td>• Add moderate amounts of concentrated sources of calories to diet when needed (e.g., butter, cream cheese, gravies, whole milk, ice cream).</td>
<td></td>
</tr>
<tr>
<td>• Consume nutritious, high caloric foods when appetite is normal or has returned.</td>
<td></td>
</tr>
<tr>
<td>• Drink adequate water to stay hydrated, replace fluid loss from diarrhea and vomiting, and help medications move through the body.</td>
<td></td>
</tr>
<tr>
<td>• Consume foods high in fiber or fiber supplements to slow digestion if foods are moving too quickly through the body.</td>
<td></td>
</tr>
<tr>
<td>• Eat yogurt or foods with Lactobacillus acidophilus culture to help with bacterial over-growth resulting from prolonged use of antibiotics.</td>
<td></td>
</tr>
<tr>
<td>• Avoid caffeinated beverages to prevent dehydration.</td>
<td></td>
</tr>
<tr>
<td>• Avoid or reduce sugar-free foods with sorbitol as diarrhea may be exacerbated.</td>
<td></td>
</tr>
<tr>
<td>• Consult with health care provider about use of complete oral nutritional supplements to help nutritional status.</td>
<td></td>
</tr>
<tr>
<td>• Avoid alcohol and illegal drugs for overall good health and to help protect the liver.</td>
<td></td>
</tr>
<tr>
<td>• Use pancreatic enzymes when medically prescribed to help with digestion.</td>
<td></td>
</tr>
<tr>
<td>• Prepare and store food safely.</td>
<td></td>
</tr>
<tr>
<td>• Avoid expired and moldy foods or foods with rotten spots.</td>
<td></td>
</tr>
<tr>
<td>• Participate in weight-bearing exercises to strengthen and maintain bones.</td>
<td></td>
</tr>
<tr>
<td>• Refer HIV-affected families to other community resources for food, housing, and medical resources to improve compliance with HIV treatment.</td>
<td></td>
</tr>
</tbody>
</table>

<p>| WOMEN | |
| • Encourage all women to be tested to prevent mother-to-child HIV transmission through delivery and breastfeeding (7). Women who are considered high risk, such as those with sexually transmitted infections, multiple partners, or have substance abuse issues, are encouraged to be retested during late gestation, preferably before 36 weeks (9). Note: HIV testing is not a standard medical test administered to pregnant women in many states, in addition, pregnant women can opt-out in those states in which HIV testing is part of the standard test. Therefore, WIC can impact the spread of HIV/AIDS by making referrals to participants for early and late gestation testing, given that some populations served by WIC are most at risk for contracting HIV (7). |</p>
<table>
<thead>
<tr>
<th>Participant Category</th>
<th>WIC Nutrition Services Recommendations for HIV/AIDS</th>
</tr>
</thead>
</table>
| WOMEN (Continued)    | • Advise infected pregnant women to consume a diet adequate in nutrients, achieve appropriate weight gain, and discuss taking a multivitamin with their health care provider (11).  
                      • Educate mothers with HIV/AIDS to avoid breastfeeding. This is especially important for recent immigrants and refugees from developing nations, as the recommendations are different in developing countries (15). In some developing countries, breastfeeding is encouraged due to the lack of available clean water to prepare infant formula and other sanitation problems.  
                      • More information about women and HIV can be found at:  
| INFANTS              | • Inform mothers/caregivers that formula feeding is the standard for infants born to HIV positive mothers in the United States as breastfeeding is not recommended – especially to the immigrant and refugee population (13).  
                      • Ensure that liquid concentrate, or ready-to-feed infant formula, prescribed with medical documentation, is provided to HIV-exposed infants or babies born to HIV positive mothers, even if the infant has tested negative for HIV. Powdered infant formula is not sterile and therefore may not be microbiologically safe for immune-compromised participants (14).  
                      • Discourage giving pre-chewed food, regardless of HIV status, as the individual’s HIV status, who is pre-chewing the food is unknown (6).  
                      • More information about infants and HIV can be found at:  
| CHILDREN             | • Discourage giving pre-chewed food, regardless of HIV status, as the individual’s HIV status, who is pre-chewing the food is unknown (6)  
                      • More information about children and HIV can be found at:  

**VIRAL HEPATITIS**

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

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

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

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

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

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

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

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

**Implications for WIC Nutrition Services**

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

The table below summarizes the WIC Nutrition Services recommendations that can help improve the health outcomes of participants with Hepatitis.

<table>
<thead>
<tr>
<th>Types of Hepatitis</th>
<th>WIC Nutrition Services Recommendations for Chronic Hepatitis (24, 25)</th>
</tr>
</thead>
</table>
| All Types         | • Recommend testing to pregnant women and high risk individuals.  
                    • Encourage abstinence from alcohol.  
                    • Provide information on high calorie, high protein and moderate fat diets.  
                    • Recommend high calorie consumption at breakfast to mitigate nausea. (Typically nausea is less common in the morning.)  
                    • Recommend, in consultation with health care provider, consumption of high calorie and protein liquid formula between meals to boost calorie intake.  
                    • Encourage a bland diet with extra fluids depending on the severity of nausea and vomiting. |
| Hepatitis B       | • Encourage the Hepatitis B vaccine for all newborns, previously unvaccinated adolescents through the age of 18, and high-risk adults.  
                    • Promote breastfeeding as being safe, but to avoid breastfeeding when nipples are cracked and bleeding – at which time, mothers should pump and discard milk to maintain supply.  
                    • Discourage the practice of pre-chewing food for infants, as blood may be present. |
| Hepatitis C       | • Promote breastfeeding as being safe, but to avoid breastfeeding when nipples are cracked and bleeding – at which time, mothers should pump and discard milk to maintain supply. |
| Hepatitis D       | • Recommend Hepatitis B vaccine. |

References


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.
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

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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, wheezing 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:
- 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.

**References**


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)
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

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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>
<thead>
<tr>
<th>Table 1. Nutritional Implications and Symptoms of CD</th>
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<tbody>
<tr>
<td><strong>Common in Children</strong></td>
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<tr>
<td><strong>Digestive Symptoms</strong> - more common in infants and children, may include:</td>
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<tr>
<td>• vomiting</td>
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<tr>
<td>• chronic diarrhea</td>
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<td>• constipation</td>
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<tr>
<td>• abdominal bloating and pain</td>
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<tr>
<td>• pale, foul-smelling, or fatty stool</td>
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<tr>
<td><strong>Other Symptoms</strong>:</td>
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<tr>
<td>• delayed puberty</td>
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<tr>
<td>• dental enamel abnormalities of the permanent teeth</td>
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<tr>
<td>• failure to thrive (delayed growth and short stature)</td>
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<tr>
<td>• weight loss</td>
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<tr>
<td>• irritability</td>
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<tr>
<td><strong>Common in Adults</strong></td>
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<tr>
<td><strong>Digestive Symptoms</strong> - same as above, less common in adults</td>
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<tr>
<td><strong>Other Symptoms</strong> - adults may instead have one or more of the following:</td>
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<td>• unexplained iron-deficiency anemia</td>
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<td>• other vitamin and mineral deficiencies (A, D, E, K, calcium)</td>
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<td>• lactose intolerance</td>
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<td>• fatigue</td>
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<tr>
<td>• bone or joint pain</td>
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<tr>
<td>• arthritis</td>
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<tr>
<td>• depression or anxiety</td>
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<td>• tingling numbness in the hands and feet</td>
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<td>• seizures</td>
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<td>• missed menstrual periods</td>
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<tr>
<td>• infertility (men and women) or recurrent miscarriage</td>
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<tr>
<td>• canker sores inside the mouth</td>
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<tr>
<td>• itchy skin rash—dermatitis herpetiformis</td>
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<td>• elevated liver enzymes</td>
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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:
06/2012


- Provide referrals as appropriate.

**References**


**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)
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.

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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).

References


Additional Reference


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.
356 Hypoglycemia

Definition/Cut-off Value

Presence of hypoglycemia 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.

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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).

References


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.
**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, absorption, distribution, metabolism, or excretion, to an extent that nutritional status is compromised.

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**Justification**

There are two general concerns with regard to interactions between nutrients and medications: the impact the nutrient has on the medication and the impact the medication has on nutritional status. Although nutrients can dramatically impact the effectiveness of medications, the focus of this risk is on the impact that medications may have on an individual’s nutritional status. The interactions that may occur between medications and nutrients can be physical, chemical, physiologic, and/or pathophysiologic (1).

Over-the-counter and prescription medications may impact nutritional status directly or indirectly. Direct impacts of medications on nutritional status include changes to the following:

- The absorption and the distribution of the nutrient.
- The metabolism of the nutrient.
- The rate at which the nutrient is excreted.

These direct impacts of medications may be severe enough to lead to nutrient deficiency and/or nutrient toxicity, which can then impact bodily systems such as bone formation, immune system function, and energy metabolism. (2)

Indirect impacts of medications on nutritional status include the following:

- Changes to appetite
- Changes to taste and smell
- A dry or sore mouth
- Epigastric distress, nausea, vomiting, diarrhea, and/or constipation
These indirect medication related side-effects can impact the amount and/or variety of foods consumed by the individual and may lead to weight changes and/or the development of nutrient deficiency diseases. Some medications that are known to cause the indirect side-effects listed above include pain medications, such as oxycodone and hydrocodone, and medications to treat cancer. (2)

Research on the overall incidence and prevalence of nutrient and drug interactions remains limited. The following table provides a summary of medications that are commonly used and their associated potential impacts on nutritional status. For a comprehensive list of food and medication interactions, WIC programs should reference resources such as the Physician’s Desk Reference or the most current Food Medication Interactions guide. Additional information on medications can also be found online at: https://medlineplus.gov/druginformation.html.

<table>
<thead>
<tr>
<th>Medication</th>
<th>Medication Purpose</th>
<th>Impact on Nutritional Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amiloride (Midamor)</td>
<td>Diuretic</td>
<td>May cause loss of appetite, nausea diarrhea, and vomiting (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May reduce magnesium excretion (4)</td>
</tr>
<tr>
<td>Calcium Carbonate (Tums)</td>
<td>Antacid</td>
<td>May cause vomiting, constipation, and loss of appetite (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May decrease the absorption of iron, zinc, magnesium, and fluoride (2)</td>
</tr>
<tr>
<td>Chlorthalidone (Hygroton)</td>
<td>Diuretic</td>
<td>May cause upset stomach, vomiting, diarrhea, and loss of appetite (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increases excretion of zinc (5)</td>
</tr>
<tr>
<td>Ciprofloxacin (Cipro)</td>
<td>Antibiotic</td>
<td>May cause nausea, vomiting, stomach pain, and diarrhea</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decreases the absorption of zinc (5)</td>
</tr>
<tr>
<td>Furosemide (Lasix)</td>
<td>Diuretic</td>
<td>May cause constipation and diarrhea (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May increase magnesium excretion with chronic use (4)</td>
</tr>
<tr>
<td>Lansoprazole (Prevacid) and Omeprazole (Prilosec)</td>
<td>Proton pump inhibitors</td>
<td>May cause constipation, nausea and diarrhea (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May reduce iron absorption and lead to suboptimal iron repletion with supplements (6)</td>
</tr>
<tr>
<td>Levothyroxine (Synthroid, Levothroid, Levoxly)</td>
<td>Thyroid hormone</td>
<td>May cause diarrhea and vomiting (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May decrease appetite and weight (2)</td>
</tr>
<tr>
<td>Metformin</td>
<td>Antihyperglycemic</td>
<td>May cause diarrhea, indigestion, and constipation (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May decrease appetite (2)</td>
</tr>
<tr>
<td>Medication</td>
<td>Medication Purpose</td>
<td>Impact on Nutritional Status</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Methadone</td>
<td>Analgesic (Opioid)</td>
<td>May decrease the absorption of folate and vitamin B12 (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May cause weight gain (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May cause dry mouth, nausea, vomiting, and constipation (2)</td>
</tr>
<tr>
<td>Ondansetron (Zofran)</td>
<td>Antiemetic, Antinauseant</td>
<td>May cause constipation (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In rare cases may decrease potassium levels (2)</td>
</tr>
<tr>
<td>Phenobarbital</td>
<td>Antiepileptic</td>
<td>May cause nausea and vomiting (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May decrease vitamin D and vitamin K level (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decreases calcium absorption (7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May decrease folate levels (8)</td>
</tr>
<tr>
<td>Prednisone</td>
<td>Corticosteroid</td>
<td>May deplete calcium and lead to osteoporosis (9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Calcium and vitamin D supplement recommended with long-term use (2)</td>
</tr>
<tr>
<td>Rantidine (Zantac)</td>
<td>Antiulcer, AntiGERD, Antisecretory</td>
<td>May cause constipation, diarrhea, nausea and vomiting (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May decrease iron and vitamin B12 absorption (2)</td>
</tr>
<tr>
<td>Sertraline (Zoloft)</td>
<td>Antidepressant</td>
<td>May cause nausea, diarrhea, constipation and vomiting (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May lead to anorexia and decreased weight (2)</td>
</tr>
<tr>
<td>Sulfasalazine</td>
<td>Ulcerative Colitis Treatment</td>
<td>May cause diarrhea, loss of appetite and vomiting (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decreases folate absorption (8)</td>
</tr>
</tbody>
</table>

**Breastfeeding and Medication Use**

Breastfeeding is important for promoting the health of both the mother and infant. Medication use in the postpartum period, however, can sometimes pose some challenges to breastfeeding. While many medications are safe to use while breastfeeding, some are not compatible with breastfeeding or should be used with caution. If breastfeeding women require medication, then medications should be chosen that are not contraindicated with breastfeeding, if possible. It is thus very important for the mother to discuss her breastfeeding status and goals with her healthcare provider to determine the best infant feeding and medication plan. Information and recommendations on the use of specific medications while breastfeeding...
can be found at the National Institutes of Health’s LactMed Drugs and Lactation Database (https://toxnet.nlm.nih.gov/newtoxnet/lactmed.htm) and in the most recent version of Hale’s Medication and Mothers’ Milk. Note that while these resources provide useful information, WIC staff need to refer women to their healthcare provider to discuss the safety of taking specific medications while breastfeeding. For additional guidance on breastfeeding and medication use, please refer to the Food and Nutrition Service’s WIC Breastfeeding Policy and Guidance, specifically section 1.4, “When Mothers Should Avoid Breastfeeding” (https://fns-prod.azureedge.net/sites/default/files/wic/WIC-Breastfeeding-Policy-and-Guidance.pdf).

Implications for WIC Nutrition Services

For participants who are currently taking a medication with known nutrient interactions, WIC staff can:

- Refer the participant/caregiver to their healthcare provider or pharmacist to discuss the potential nutrient related side-effects and weight fluctuation of medications they take.
- Encourage improved intake of whole grains, legumes, dairy, lean protein, fruits, and vegetables, as appropriate.
- Inform the participant/caregiver of foods or beverages that provide nutrients that may be impacted by the medication.
- Provide education on nutrient-dense foods (when appropriate), meal frequency, portion sizes, and fluid intake when medications induce poor appetite, nausea, or vomiting.
- Provide education on fiber and fluid intake and physical activity to manage constipation related side-effects.
- Provide education on fluid intake, moist foods, and dental care when medications cause a dry mouth.
- Refer women who are either breastfeeding or planning on breastfeeding to their health care provider to determine the best infant feeding and medication plan.

Additional Resources for WIC Staff:

- For information on food and medication interactions:
  - Physician’s Desk Reference (most recent edition)
  - Food Medication Interactions (most recent edition)
  - National Institute of Health’s Medline Plus Database on Drugs, Herbs and Supplements (https://medlineplus.gov/druginformation.html)
- For information and recommendations on the use of medications while breastfeeding:
  - Hale’s Medication and Mothers’ Milk (most recent edition)
References


Clarification

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

- Self-induced vomiting
- Purgative abuse
- Alternating periods of starvation
- Use of drugs such as appetite suppressants, thyroid preparations or diuretics
- Self-induced marked weight loss

Presence of 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

<table>
<thead>
<tr>
<th>Category</th>
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<tbody>
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<td>Pregnant Women</td>
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<td>Non-Breastfeeding Women</td>
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</tbody>
</table>

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.

References


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.
359 Recent Major Surgery, Physical Trauma, Burns

Definition/Cut-off Value

Major surgery (including cesarean sections), physical trauma or burns severe enough to compromise nutritional status.

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

Participant Category and Priority Level

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<tr>
<td>Infants</td>
<td>I</td>
</tr>
<tr>
<td>Children</td>
<td>III</td>
</tr>
</tbody>
</table>

Justification

The body's response to injuries such as major surgeries, physical trauma, or burn may adversely affect nutrient requirements needed for recovery, leading to malnutrition. The catabolic response to these injuries causes a hypermetabolic state in the body. This alteration in metabolism not only increases the individual’s calorie and protein needs, but they also increase the needs for certain vitamins, minerals, fatty acids, and amino acids. (1)

Proper wound healing is essential in the recovery of surgeries, physical trauma, and burns. Normal wound healing is a complex process and involves three phases: inflammation, proliferation, and remodeling (1, 2). Each phase of wound healing involves growth factors, other biologically active molecules, and specific vitamins and minerals such as Vitamin A, Vitamin C, and Zinc. The process of wound healing does not always follow the three stages sequentially and can sometimes move forward or regress based on nutrition status and response to treatment (3, 4). Even after a wound is closed, the individual's metabolic rate and need for additional nutrition can remain high (5).

Factors that can prevent proper wound healing or can increase the time needed for a wound to heal include (2, 6):
- Malnutrition prior to the surgery, injury or burn
- Infections
- Diabetes
- Poor blood flow
- Obesity
- Age
- Heavy alcohol use
- Stress
- Medications
- Smoking

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

**Major Surgery and Wound Healing**

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

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

**Nutritional Considerations for Major Surgery/Wound Healing**

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

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

### Physical Trauma

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

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

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Role in Wound Healing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arginine</td>
<td>Involved in secretion of growth hormone (12)</td>
</tr>
<tr>
<td>Omega-3 fatty acids</td>
<td>Reduces wound infections (12)</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>Collagen synthesis (2)</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>Immune function and cellular communication (15)</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>Antioxidant (16)</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>Modulates cell growth, Neuromuscular and immune function, Reduces inflammation (17)</td>
</tr>
<tr>
<td>Magnesium</td>
<td>Co-factor for enzymes involved in protein and collagen synthesis (2)</td>
</tr>
<tr>
<td>Copper</td>
<td>Co-factor for cross-linking of collagen (2)</td>
</tr>
<tr>
<td>Zinc</td>
<td>Involved in RNA and DNA polymerase (2)</td>
</tr>
<tr>
<td>Iron</td>
<td>Aids in the synthesis of some growth hormones and connective tissue (18)</td>
</tr>
</tbody>
</table>
For some individuals, intakes above the RDA may be recommended by their medical provider to assist in bone healing; however, some nutrients including fluoride, sodium, and vitamin A may negatively impact bone health when intake is above the recommended level (19).

**Burns**

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

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

**Nutritional Considerations for Burns**

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

**Implications for WIC Nutrition Services**

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

- Assuring that vitamin and mineral intakes meet the RDAs (unless amounts that exceed the RDAs are recommended by their medical provider).
- Assuring that energy and protein intake preserve lean muscle mass and body weight.
- Recommending a participant speak with their medical provider about a multivitamin supplement when diet alone cannot meet the RDAs for vitamins and minerals.
- Referring to community resources for smoking cessation, support groups, food assistance, and safe living environments (in cases of physical abuse).
- Referring to a lactation educator if women experience difficulty breastfeeding following a cesarean section.
References


19. Angelo G (Oregon State University, Linus Pauling Institute, Corvallis, OR). Micronutrient Information Center; 2012 Aug.


Additional Reference:

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. This includes, but is not limited to:

<table>
<thead>
<tr>
<th>Medical Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Juvenile Rheumatoid Arthritis (JRA)</td>
</tr>
<tr>
<td>Lupus Erythematosus</td>
</tr>
<tr>
<td>Cardio Respiratory Diseases</td>
</tr>
<tr>
<td>Heart Disease</td>
</tr>
<tr>
<td>Cystic Fibrosis</td>
</tr>
<tr>
<td>Persistent Asthma (moderate or severe)</td>
</tr>
<tr>
<td>requiring daily medication</td>
</tr>
</tbody>
</table>

Presence of medical condition(s) 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

<table>
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<tr>
<th>Category</th>
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</tr>
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<tbody>
<tr>
<td>Pregnant Women</td>
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<td>Infants</td>
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</tr>
</tbody>
</table>

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.

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 birthweight 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.

References

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.
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

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</table>

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](http://store.samhsa.gov/mhlocator) or [http://www.samhsa.gov/prevention/](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](http://store.samhsa.gov/mhlocator).

**References**


Additional References


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 antidepressants.
Guidance for Screening and Referring Women with or At Risk for Depression

Purpose

This guidance is intended to increase WIC staff awareness and knowledge in assisting participants diagnosed with or who are at risk for depression. (For additional information about women diagnosed with depression, please see nutrition risk criterion #361 Depression). It clarifies the WIC practitioner’s role in maternal depression and provides training resources. In addition, this guidance identifies focus areas of breastfeeding promotion and support, and nutrition education related to maternal depression. Working within the scope of the Program, State and local WIC agencies, in coordination with mental health services, can screen and refer participants to maximize participant benefit from WIC nutrition services to achieve positive health outcomes.

Justification

Support for WIC involvement in assisting women with depression was outlined in the Institute of Medicine’s (IOM’s) 1996 Report: WIC Nutrition Risk Criteria: A Scientific Assessment. The IOM reported that appetite changes were a distinguishing feature of depression and that the combination of nutrition education and access to nutritious foods may lessen the effects of these changes. Additionally, the report noted that WIC’s focus on medical referrals and social support could benefit WIC mothers with diagnosed depression by minimizing the isolation many experience. (1)

According to the World Health Organization (WHO), mental, neurological and substance abuse disorders are major contributors to morbidity and mortality (2). Both globally and in the United States, psychological disorders are chronically under-diagnosed and undertreated. Gender disparities in psychological disorders have been found to be significant with women suffering from certain disorders, namely depression, disproportionately to men (3). In addition, poverty increases the risk of depression. WIC eligible women may be more vulnerable to the onset of depression or have an increase in the severity of their mental illness (4, 5). 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 (6). There have been reported rates of subclinical and clinical depression for women in WIC at twice the prevalence for U.S. women overall (7). An analysis of the Pregnancy Risk Assessment Monitoring System (PRAMS) data found that 20% of women enrolled in WIC reported high postpartum depressive symptoms; and subgroups of women with other risk factors had rates as high as 40% (8). Available data suggest that these mothers suffer from a high burden of untreated mental health disorders (8-10).

The Academy of Nutrition and Dietetics, Women’s Health Dietetic Practice Group Fall 2009 publication (11), identified the dietitian as the mental health “gatekeeper” and outlined ways nutrition professionals and mental health care specialists can collaborate for the participant’s well-being. Nutritionists routinely consider and research participant medical comorbidities, i.e., chronic diseases such as diabetes, heart disease and obesity, in order to provide comprehensive care (11). It is equally important for WIC nutrition staff (including paraprofessionals trained as WIC Competent Professional Authorities) to consider a participant’s mental health in order to provide quality nutrition services, especially since chronic diseases often coexist with depression (12, 13).

Evidence suggests that depression can interfere with parenting, potentially leading to problems in physical health and well-being, psychomotor and cognitive development, and increased risk for developing depression or other mental health disorders in children of depressed parents (3, 14). Chronic maternal depression, related to the timing and duration of depression (i.e., third trimester through first postpartum year) may amplify these negative impacts. Premature infants may be even more susceptible to effects of maternal depression. Existing nutrition assistance programs such as WIC and SNAP which serve large numbers of low-income women and families are logical points of contact to link women to mental health services (4). While the diagnosis and treatment of
depression are outside the scope of the WIC Program, WIC staff (with appropriate training) are well positioned to identify pregnant and postpartum women who may benefit from initial screening for maternal depression and subsequent referral to mental health services (15,11).

Enhancing WIC’s Role in Maternal Depression

WIC’s nutrition assessment process and referral services lend themselves well to identifying and linking women with or at risk of depression to appropriate services. Listed below are necessary components of a State and/or local agency process to enhance WIC screening and referral services for maternal depression.

Raising Staff Awareness

It is important for staff to be aware of the prevalence and impact on health outcomes of maternal depression among the WIC target population (see Justification Section). As such, mental health status is an important component of a complete nutrition assessment. According to the Value Enhanced Nutrition Assessment (VENA) Guidance, many variables such as an individual’s knowledge, lifestyle practices, environment and health status impact food consumption and ultimately his/her health outcomes (15). Addressing depression as part of a complete nutrition assessment for prenatal and postpartum women will lead to a more participant-centered nutrition intervention. WIC nutrition risk criterion #361 Depression should only be assigned if a health care provider has provided documentation or if the participant self-reports that she has been diagnosed with depression. However, through the nutrition assessment process, WIC also has the opportunity to identify women at risk for depression who may benefit from additional screening and referral for mental health services. Therefore, in keeping with the intent of the VENA Guidance, the role of WIC staff is not to diagnose or treat depression, but to screen and offer referrals, as appropriate, to assist participants in achieving positive health outcomes.

Establishing Partnerships with Mental Health Providers

Prior to development and implementation of a State and/or local agency screening and referral process to address maternal depression, partnerships with mental health providers and social service agencies at the State and/or local level must be established. A solid network of community partners to collaborate with on screening and referral protocols provides WIC staff with both the knowledge of community resources services available and the confidence in implementing policies to connect participants to needed assistance. Examples of successful collaborations and mental health resources are included in the Staff Training, Screening and Referral sections below.

Staff Training

Once a network of community partners are identified and engaged, comprehensive staff training must be developed. Training at a minimum should include a basic overview of maternal depression and its potential health effects for mother and child, description and use of selected screening tools, and specific procedures for referral and follow up. Below is a list of available free staff training resources on depression currently used by State WIC Programs or other sister programs, i.e., Head Start:

- The Contra Costa Health Services have developed extensive resources and staff training materials as part of its Perinatal Depression Screening, Education and Referral Project.
- A 2009 depression training module developed by the New Hampshire Breastfeeding Task Force is supportive of breastfeeding. Several State and local WIC programs have used this module to train staff: http://www.nhbreastfeedingtaskforce.org/pdf/breastfeeding_depression.pdf
- Two webinars, specifically designed for WIC staff in 2012, were developed by Oregon WIC in collaboration with its Maternal Child Health Program. The webinars are considered to be an effective...
way to utilize the skills of both programs. After final evaluation, materials will be available on-line at: http://public.health.oregon.gov/HealthyPeopleFamilies/wic/Pages/training.aspx.

• A self-study training course is available at http://fampod.org. Originally developed for use by Head Start, it is also available to the general public.

• Additional materials relevant to WIC staff, developed for Head Start, can be found at: http://www.ecmhc.org/maternal-depression/index.html.

Screening

There are simple and effective screening tools that can be incorporated into the WIC nutrition assessment process. Examples of highly sensitive screening tools include the Edinburgh Postnatal Depression Scale (permission required to copy), Postpartum Depression Screening Scale, and Patient Health Questionnaires (PHQ). These tools and their corresponding instructions can be found at http://brightfutures.aap.org/tool_and_resource_kit.html (16).

Results from recent research suggest that a preliminary screen during the WIC nutrition assessment, with a targeted referral to the health care provider or local mental health services for further evaluation and interventions, if necessary, is a critical step in early identification and treatment of depression (17). In a recent community-based research study conducted in a WIC program in Washington DC, nutritionists used the PHQ-2 questionnaire to screen clients for depression (17). Women who screened positive were referred for a more in-depth screen (using the PHQ-9) conducted by staff at the Federally Qualified Health Center—which was co-located with the WIC program. WIC State agencies can use strategies and lessons learned from this and similar projects to develop their own screening and referral protocols.

Referral

Depression screening and subsequent referral are linked. One cannot occur without the other. Effective and timely referral to local health and mental health resources is the last component of a comprehensive process to address maternal depression. For the participant, it may also be the component with the greatest impact. Local staff responsible for identification and provision of referrals should not only be aware of the available community resources, but also be well-versed in what participants can expect from that service when referred. This requires ongoing local maintenance of relationships between WIC and local health and mental health resources. Referral to the health care provider for further evaluation and treatment (if necessary), is also an important referral resource for WIC staff. As outlined in the VENA Guidance (15) the effective use of the referral benefit, i.e., linkages to referred services, the identification and provision of referrals, and timely follow-up to “close the loop” allows for the continuity of care.

States and localities have a variety of programs that address perinatal depression and/or mental health. There are home-based programs, public health department sponsored services, and private providers available through self- or third-party referral. The following are web-based resources for State and local agencies to locate reliable services:

• The Substance Abuse and Mental Health Services Administration (SAMHSA) Mental Health Treatment Locator is found at http://www.samhsa.gov/ and provides comprehensive information on mental health resources and/or facilities. This website provides informational materials about different mental health conditions. The SAMHSA’s National Helpline is also available 24-hour-a-day, 365-day-a-year to provide referrals to local support networks and resources for individuals dealing with mental health issues or substance abuse problems at 1-800-662-HELP (4357).
• **MentalHealth.gov** provides one-stop access to U.S. government mental health information and resources from the [Centers for Disease Control and Prevention](https://www.cdc.gov), [FindYouthInfo.gov](https://www.findyouthinfo.gov), [MedlinePlus](https://medlineplus.gov) and [National Institutes of Health, National Institute of Mental Health (NIMH)](https://www.nimh.nih.gov) and [SAMHSA](https://www.samhsa.gov). Resources are available for the general public, health and emergency preparedness professionals, policy makers, government and business leaders, school systems and local communities.

• **Mental Health America**’s website can be used to help individuals locate mental health treatment services, including affordable treatment for those without insurance, in their community. This website also includes links to other sites that provide specialized treatment referrals for specific illnesses and information about the specific illness.

**Core WIC Nutrition Services That Support Women with or At Risk for Depression**

*The following is provided for informational or awareness purposes only and does not suggest that WIC staff prescribe treatment for depression.*

**Breastfeeding Education and Support**

WIC promotes breastfeeding as the optimal infant feeding method. The collective impact of prenatal and postpartum breastfeeding promotion and support from WIC nutrition professionals and peer counselors can assist the breastfeeding mother in avoiding breastfeeding complications which may lead to early cessation. Successful breastfeeding can potentially provide some protection from the development of depression (6, 18). Breastfeeding difficulties, especially nipple pain, are a risk factor for depression and need to be addressed promptly. A systematic review in 2009 found depression (or depressive symptoms) may play a role in increased breastfeeding difficulties and decreased duration with depressed mothers being more likely to stop breastfeeding earlier than their non-depressed counterparts (18). This same review found breastfeeding mothers’ rates of depression are lower than their non-breastfeeding counterparts.

Breastfeeding may impact maternal mental health and influence infant outcomes in several ways:

• **Breastfeeding is protective of maternal mood.** Breastfeeding reduces the stress responses commonly found in the post-partum period (6). The hormones associated with lactation, oxytocin and prolactin have both antidepressant and anxiolytic (anti-anxiety) effects.

• **Breastfeeding mothers may experience more restful sleep.** It is well documented that new mothers experience sleep disturbances, independent of their feeding choices. This lack of sleep can lead directly to an increase in inflammation and increase in maternal stress, which can lead to depression in the early postpartum period. Several small studies showed that breastfeeding mothers actually get more sleep than their bottle/formula-feeding counterparts (6). One population-based study found that exclusively breastfeeding mothers experienced less disrupted sleep than those who supplemented with formula (19). A discussion about infant sleep patterns and expectations for parental sleep in the early post-partum period can assist mothers in setting goals for duration of breastfeeding and management of stress that accompanies new motherhood.

• **Breastfeeding benefits for infants are well documented.** A 2010 Urban Institute brief found that WIC mothers make use of well-baby visits with their health care providers but rarely adhere to AAP recommendations for breastfeeding (4). The authors suggest important messages are not being received or that these mothers face obstacles to breastfeeding, which may be even more likely if the mother is depressed (4). Awareness of a mother’s mental health status can assist the WIC nutrition professional in providing individualized breastfeeding support. Depressed mothers should be encouraged to continue breastfeeding as it can protect infants from the harmful effects of maternal depression. Additionally, if breastfeeding is going well, it may assist in a mother’s recovery from depression. (6)
Nutrition Education

The following are focus areas for WIC nutrition education that may be beneficial to women diagnosed with or at risk for depression:

• A diet rich in Omega-3 fatty acids. Research shows high rates of fish consumption correlate with low rates of mental illness (20). Rich sources of Omega-3 fatty acids are found in cold water fatty fish, and some plant sources. The imbalance between Omega-6 and Omega-3 fatty acids in today’s western diets may be impacting the general health of the population. A recommended ratio of Omega-6 to Omega-3 fatty acids is 2:1. In the typical American diet the ratio is approximately 15:1. These two types of fatty acids assist the body in making hormones. Hormones constructed with Omega-3 fatty acids may be beneficial in mitigating depression as they are anti-inflammatory. Conversely, Omega-6 fatty acids are pro-inflammatory. (20) (See Risk Criterion #361 Depression for more information on inflammation and the link to maternal depression.) Common sources of Omega-6 fatty acids include palm and soybean oils. The two Omega-3 essential fatty acids of interest in depression research are eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). DHA can prevent depression in new mothers while EPA is a useful treatment by itself or with medications and/or DHA (6).

Seafood in limited amounts can be part of a healthy diet for women who are pregnant or breastfeeding. Women should be encouraged to consume fish as recommended in the Dietary Guidelines for Americans, available from: http://www.choosemyplate.gov/pregnancy-breastfeeding/eating-fish.html (21). Although fish may contain contaminants (e.g., mercury) the benefits of limited fish consumption outweigh the concerns associated with the contaminants (22, 23). Women may also want to consult with their health care provider about dietary supplements of Omega-3 fatty acids. Dietary supplements should only be consumed if the health care provider agrees that the supplements would be beneficial to the mother.

• Physical activity. Various studies have demonstrated that exercise is anti-inflammatory and boosts mood. Routine exercise helps individuals with depression lower inflammation over time and is a positive coping strategy for stress. Exercise can help boost mood in the short term, but it is the cumulative impact of regular exercise that can stave off depression significantly (6). More information about physical activity during pregnancy and the postpartum period can be obtained at: http://www.health.gov/paguidelines/guidelines/chapter7.aspx.

• Consumption of adequate nutrients. Research has identified likely links between nutrient deficiency and mood for folate, vitamin B-12, vitamin D, calcium, iron, selenium, zinc, and Omega-3 fatty acids (23-29). A recent review article investigating the link between diet adequacy and perinatal depression found that nutrient inadequacies of pregnant women who consume a typical western diet might be much more common than researchers and clinicians realize (23). Several studies reported inadequate intakes of Omega-3 fatty acids, folate, B vitamins, iron and calcium in pregnant women. The authors conclude that depletion of nutrient reserves throughout pregnancy can increase a woman’s risk for maternal depression and recommend future research targeting the effect of nutrient status on maternal mental health. (24-26)

Promoting adequate consumption of nutrients through foods as well as adequate water intake may be a low risk and cost effective way to prevent or mitigate maternal depression (30). It would be prudent for the WIC nutritionist to highlight the link between nutritional factors and mental health when counseling women who are or are at risk of depression.
Summary

Given the prevalence of depression among low-income mothers, there is an opportunity for WIC to play an important role in addressing maternal depression. With increased staff awareness and collaboration with mental health providers, WIC staff can assist mothers diagnosed with depression or at risk of depression. Therefore, it is appropriate for State and/or local WIC agencies to explore and/or create collaborative efforts with social/mental health services. A healthy mother who is not experiencing depression is likely to utilize her WIC benefits to their maximum potential, initiate and continue to breastfeed her infant (and do so exclusively), and in turn achieve positive health outcomes. (18)

References


Additional References


362 Developmental, Sensory or Motor Disabilities Interfering with the Ability to Eat

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. Disabilities include but are not limited to:

<table>
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<tr>
<th>Disability</th>
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<td>Minimal brain function</td>
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<td>Head trauma</td>
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<td>Feeding problems due to a developmental disability such as pervasive development disorder (PDD) which includes autism</td>
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<td>Brain damage</td>
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<td>Birth injury</td>
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<td>Other disabilities</td>
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Participant Category and Priority Level

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<th>Category</th>
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<tr>
<td>Pregnant Women</td>
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<tr>
<td>Breastfeeding Women</td>
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<tr>
<td>Non-Breastfeeding Women</td>
<td>III, IV, V or VI</td>
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<td>Infants</td>
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<td>Children</td>
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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: 1) have 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) require 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:
• Difficulty with transition to textures, especially during infancy;
• Increased sensory sensitivity; restricted intake due to color, texture, and/or temperature of foods;
• Decreased selection of foods over time;
• Difficulty accepting new foods; difficulty with administration of multivitamin/mineral supplementation and difficulty with changes in mealtime environment.

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

References


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 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

<table>
<thead>
<tr>
<th>Category</th>
<th>Priority</th>
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<tr>
<td>Breastfeeding Women</td>
<td>I</td>
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<tr>
<td>Non-Breastfeeding Women</td>
<td>III, IV, V or VI</td>
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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.

References


Additional Reference


Clarification

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

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

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

Impaired glucose tolerance (IGT) is defined as a 75-g oral glucose tolerance test (OGTT) with 2-h plasma glucose values of 140-199 mg/dl (7.8-11.0 mmol/l).
The cumulative incidence of diabetes over 5-6 years was low (4-5%) in those individuals with normal fasting and normal 2-h OGTT values, intermediate (20-34%) in those with IFG and normal 2-h OGTT or IGT and a normal FPG, and highest (38-65%) in those with combined IFG and IGT (4).

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

**Table 1. Criteria and Methods for Testing for Pre-Diabetes and Diabetes in Asymptomatic Adults**

1. Testing should be considered in all adults who are overweight (BMI > 25*) and have additional risk factors:
   - Physical inactivity
   - First-degree relative with diabetes
   - Members of a high-risk ethnic population (e.g., African American, Latino, Native American, Asian American, Pacific Islander)
   - Women who delivered a baby weighing > 9 lb or were diagnosed with gestational diabetes mellitus
   - Hypertension (blood pressure > 140/90 mmHg or on therapy for hypertension)
   - HDL cholesterol level < 35 mg/dl and/or a triglyceride level > 250 mg/dl
   - Women with polycystic ovarian syndrome (PCOS)
   - IGT or IFG on previous testing
   - Other clinical conditions associated with insulin resistance (e.g., severe obesity and acanthosis nigricans)
   - History of CVD

2. In the absence of the above criteria, testing for pre-diabetes and diabetes should begin at age 45 years.

3. If results are normal, testing should be repeated at least at 3-year intervals, with consideration of more frequent testing depending on initial results and risk status.

4. To test for pre-diabetes or diabetes, either an FPG test or 2-hour oral glucose tolerance (OGTT; 75-g glucose load), or both, is appropriate.

5. An OGTT may be considered in patients with impaired fasting glucose (IFG) to better define the risk of diabetes.

6. In those identified with pre-diabetes, identify and if appropriate, treat other CVD risk factors.

*At-risk BMI may be lower in some ethnic groups.*
371 Maternal Smoking

Definition/Cut-off Value

Any smoking of tobacco products, i.e., cigarettes, pipes, or cigars.

Participant Category and Priority Level

<table>
<thead>
<tr>
<th>Category</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>I</td>
</tr>
<tr>
<td>Breastfeeding Women</td>
<td>I</td>
</tr>
<tr>
<td>Postpartum Women</td>
<td>III, IV, V, VI, VII</td>
</tr>
</tbody>
</table>

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.

References

372 Alcohol and Substance Use

Definition/Cut-off Value

For Pregnant Women:

- Any alcohol use.
- Any illegal substance use and/or abuse of prescription medications.
- Any marijuana use in any form.

For Breastfeeding and Non-Breastfeeding Postpartum Women:

- Alcohol Use (1):
  - High Risk Drinking: Routine consumption of >8 drinks per week or >4 drinks on any day.
  - Binge Drinking: Routine consumption of ≥4 drinks within 2 hours.

  Note: A serving or standard sized drink is: 12 oz. beer; 5 oz. wine; or 1½ fluid ounces 80 proof distilled spirits (e.g., gin, rum, vodka, whiskey, cordials or liqueurs).
- Any illegal substance use and/or abuse of prescription medications.
- Any marijuana use in any form (breastfeeding women only).

Participant Category and Priority Level

<table>
<thead>
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<th>Category</th>
<th>Priority</th>
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</thead>
<tbody>
<tr>
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<td>Breastfeeding Women</td>
<td>I</td>
</tr>
<tr>
<td>Non-Breastfeeding Women</td>
<td>III, IV, V or VI</td>
</tr>
</tbody>
</table>

Justification

Substance use and misuse during pregnancy and postpartum may have physical and mental health consequences ranging from mild to serious (2). The use of alcohol, marijuana, illegal drugs and misuse of prescription drugs can threaten both maternal and fetal health. Misuses of prescription drugs include using medications as follows: for nonmedical reasons, prescribed for someone else, more often than the prescribed frequency, in larger-than-prescribed doses, and/or over a longer time than prescribed (3).

Substance use is known to lead to vitamin and mineral deficiencies that threaten physical and mental health, damage vital organs and the nervous system, and decrease immunity. Malnutrition occurs when the substance replaces other dietary nutrients or as a result from improper nutrient metabolism, absorption, utilization, or excretion even though the diet may be adequate. Harmful lifestyles are often associated with addiction, such as poor eating patterns, lack of exercise, and changes in sleep patterns. These compounding factors result in an increased risk of long-term health problems, including metabolic syndrome, diabetes, hypertension, weight problems, and eating disorders. People with substance addiction may suffer from calorie and protein malnutrition. In one study over 90% were underweight and 70% had
vitamin D deficiency and low levels of vitamin C. Another study showed that 50% were deficient either in iron or vitamins (vitamins A, C, and E being the most common). (4)

Substance use can impact the family and parenting in a number of ways, and may be linked with poor parenting practices, child neglect, and abuse due to (2):

- Impairments (both physical and mental) caused by alcohol or other drugs.
- Domestic violence, which may be a result of substance use.
- Expenditure of often limited resources on purchasing alcohol or other drugs.
- Frequent arrests, incarceration, and court dates.
- Time spent seeking out manufacturing or using alcohol or other drugs.
- Estrangement from primary family and related support.

While substance use has long been a public health concern, there is growing recognition that the United States is facing an epidemic due to an increase in opioid misuse, use disorders, and overdose, and that disparities exist between men and women with regard to both prescription opioid and heroin use (5). Although between 1999 and 2014 men were more likely than women to die of opioid overdoses, the gap in mortality has been closing (6). Between 1999 and 2010, overdose deaths from prescription pain killers increased more than 400% among women, compared to an increase of 237% among men (7). Although nonmedical use of prescription opioids among women has generally been decreasing since then, heroin use among women has been increasing, and at a faster rate among women than among men (8, 9, 10). For example, between 2002 and 2013, heroin use among women increased 100% compared to an increase of 50% among men (5).

Predictors of substance use among women of child bearing age include (2, 11, 12):

- Early Substance Use – Tobacco or marijuana use at an early age (12-18 years of age) is a risk factor for continued use as an adult.
- Prepregnancy Substance Use – Alcohol and drug use prior to pregnancy is a predictor of continued use during pregnancy.
- Demographic Characteristics – Use and substance choice vary by demographic group:
  - Native Americans and African Americans.
  - African American women and economically disadvantaged women are more likely to use illicit substances, particularly cocaine.
  - White women and women with higher education levels are more likely to use alcohol.
- Trauma – Substance use is increased among women who:
  - Were raised by parents who abused substances.
  - Have experienced physical and/or sexual abuse.
  - Have experienced intimate partner violence.
- Mental Health – Women with a diagnosis of substance use or chemical dependency may have one or more psychiatric disorders.
Alcohol and Substance Use during Pregnancy

Maternal substance use during and after pregnancy can have a long-term impact on both the mother and her child and can impact many areas of life such as: (2, 13, 14)

- Obstetrical and Prenatal Complications - Substance use (and withdrawal from them) during pregnancy may cause constriction of uterine blood vessels leading to insufficient blood flow to the placenta, separation of the placenta from the uterus, maternal hypertension, maternal hemorrhage, and/or premature labor. These complications may in turn increase risk of fetal loss, premature birth and still birth.

- Personal Health and Safety – Substance use is associated with increased likelihood of death by illness, accident or suicide; intimate partner violence; sexually transmitted diseases and unintended pregnancy. Although 31% to 47% of U.S. pregnancies are unintended, the proportion of unintended pregnancies for women with opioid use disorder was higher than 85%, according to recent research.

- Societal Impacts - Substance use is associated with an unstable family structure, separation and divorce, and potential for involvement of Child Protective Services (CPS). The Child Abuse Prevention and Treatment Act [42 U.S.C. § 5106a(b)] requires States to have policies and procedures in place to notify CPS agencies of substance-exposed newborns and to establish a plan of safe care for newborns identified as being affected by illegal substance abuse or having withdrawal symptoms resulting from prenatal drug exposure. For more information about State-specific requirements please see: https://www.childwelfare.gov/topics/systemwide/laws-policies/state/.

- Impact on Children - Children who are exposed to alcohol and other substances prior to birth can experience long-term cognitive, behavioral, social and emotional developmental consequences.

Based on data collected by the Substance Abuse and Mental Health Services Administration (SAMHSA), in 2012-2013 alcohol use among pregnant women aged 15-44 was 9.4%; 2.3% reported binge drinking and 0.4% reported heavy drinking. These rates were lower than the rates for non-pregnant women in the same age group (55.4%, 24.6% and 5.3% respectively). Alcohol use in 2012-2013 was lower among pregnant women aged 15 to 44 during the second and third trimesters than during the first trimester (5.0% and 4.4% vs. 19.0%). (3)

Nutritional needs during pregnancy are 10 to 30 percent greater than normal (15). Alcohol can disrupt body functions by causing nutrient deficiencies of vitamins and minerals (4). Alcohol inhibits fat absorption and thereby impairs absorption of vitamins A, E, and D which are normally absorbed along with dietary fats. Deficiencies of minerals such as calcium, magnesium, iron, and zinc are common in people who misuse alcohol, although alcohol itself does not seem to affect the absorption of these minerals (4).

There is no safe consumption of alcohol during pregnancy. Exposure to alcohol in utero can damage the developing fetus at any stage and is the leading preventable cause of birth defects and intellectual and neurodevelopmental disabilities (16, 17). Not only can nutritional deficiencies of a mother who misuses alcohol adversely affect the nutrition of the fetus, but alcohol itself can also restrict nutrient flow to the fetus. These prenatal factors can result in the infant being born with a Fetal Alcohol Spectrum Disorder (FASD). Fetal Alcohol Syndrome (FAS) is the most severe type of FASD. Fetal Alcohol Syndrome can affect children in different ways. A child with FAS might have abnormal facial features, growth and central
nervous system problems as well as problems with learning, memory, attention span, communication, vision, or hearing (18). (See risk 382 - *Fetal Alcohol Syndrome* for more information.)

In 2012 and 2013 illicit drug use (to include marijuana use) among pregnant women aged 15 to 44 was 5.4%. This was lower than the rate among women in this age group who were not pregnant (11.4%). Illicit drug use in 2012-2013 was lower among pregnant women aged 15 to 44 during the third trimester than during the first and second trimesters (2.4% vs. 9.0% and 4.8%). (3)

Marijuana is the illicit drug used most frequently by women of child-bearing age (19). There is no known safe amount of marijuana use during pregnancy. Marijuana contains tetrahydrocannabinol (THC), which is the chemical in marijuana that makes one feel “high”. Marijuana may be ingested in the form of marijuana edibles (cookies, brownies, candy, etc.) or inhaled when smoked. When inhaled, the smoke goes in to the lungs and immediately passes through the membranes and enters the bloodstream (2). THC can pass from the mother to the unborn child through the placenta if marijuana is ingested or inhaled during pregnancy. Children who are exposed to THC prior to birth can experience decreased academic ability, cognitive function and ability to remain attentive (20). Although some states have legalized marijuana for a variety of medical conditions upon a doctor’s recommendation, as well as for recreational use, marijuana has been shown to have negative effects on brain development. Therefore, it is recommended that pregnant and breastfeeding women not use marijuana (2).

National Surveys on Drug Use and Health done by SAMHSA indicate that an annual average of about 21,000 pregnant women aged 15 to 44 misused opioids in the past month (21). The percentage of women misusing opioids in the past month was lower among pregnant women aged 15 to 44 than among non-pregnant women in that age range (0.9% vs. 2.6%) (21). Opiates and synthetic narcotics (e.g., heroin, oxycodone, Vicodin, Narco, Percocet, morphine, dilaudid) have serious health risks associated with their use including endocarditis; coma or sudden death from overdose; risk of HIV; and, if injected, viral hepatitis and other infections (2). A mother’s use of these substances during pregnancy can lead to neonatal abstinence syndrome (NAS), which is a series of withdrawal symptoms experienced by an infant after birth due to intrauterine exposure to substances. Prenatal exposure to opioids increases the risk of low birth weight, stillbirth and sudden infant death syndrome (see risk 383 - *Neonatal Abstinence Syndrome* for more information).

For a summary of the effects of alcohol, marijuana, opioids and more information about the effects of other specific drugs during pregnancy, see table on page 5.

**Alcohol and Substance Use during Breastfeeding**

The breastfeeding mother should minimize alcohol use and avoid the use of other substances since most maternally ingested substances are transferred to human milk, though the concentration and potential danger to the breastfed baby is affected by interaction among a variety of factors. The American Academy of Pediatrics (AAP) recommends that the ingestion of beverages containing alcohol be minimized and limited to occasional intake for breastfeeding women. The following are recommendations for breastfeeding women who choose to drink (2, 22, 23, 24):

- Consult with health care provider before consuming alcohol.
- Do so only if breastfeeding is well established, consistent and predictable (no earlier than 3 months postpartum).
- Minimize ingestion of alcoholic beverages and limit it to occasional intake.
- Consume only a single alcoholic drink and wait at least 4 hours before breastfeeding or expressing milk to ensure the alcohol is not present in the milk.

- Breastfeed the infant or express human milk before consuming the alcohol.

Due to the lipophilic nature of THC found in marijuana, it is tremendously fat-soluble and therefore is readily transferred to human milk. Marijuana can impact the neurobehavioral development of the infant, and the AAP considers it to be a contraindication to breastfeeding. (2, 22, 23)

The maternal use of illegal substances and the misuse of prescription medicine is a contraindication to breastfeeding. However, according to the AAP, appropriate maternal use of prescribed medication is not a categorical contraindication to breastfeeding. For situations in which the mother is undergoing pharmacologic therapy, breastfeeding must balance the benefits to infants and mother against the potential risk of substance exposure to the infant. For example, research has shown that adequately nourished narcotic-dependent mothers should be encouraged to breastfeed if they are enrolled in a supervised medication-assisted treatment program and have negative toxicology screens for HIV and illicit drugs. (22) (See risk 383 - Neonatal Abstinence Syndrome for more information.)

The following table is a summary of effects of specific drugs on the mother, birth outcomes and breastfeeding (2). For more information, please see the Substance Use and Prevention Manual: Screening, Education and Referral Resource Guide for Local WIC Agencies: https://wicworks.fns.usda.gov/resources/wic-substance-use-prevention-guide.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Effects on Mother</th>
<th>Effects on Birth Outcomes</th>
<th>Effects on Baby*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>• Impaired judgment, reflexes, memory, and coordination</td>
<td>• Miscarriage</td>
<td>• Reduced growth</td>
</tr>
<tr>
<td></td>
<td>• Heart and liver damage</td>
<td>• Stillbirth</td>
<td>• Reduced milk consumption</td>
</tr>
<tr>
<td></td>
<td>• Pancreatitis</td>
<td>• Low birth weight</td>
<td>• Delayed motor development</td>
</tr>
<tr>
<td></td>
<td>• Peptic ulcers</td>
<td>• Preterm delivery</td>
<td>• Altered postnatal growth, sleep patterns, and/or psychomotor patterns</td>
</tr>
<tr>
<td></td>
<td>• Malnutrition</td>
<td>• Increased incidence of fetal distress at delivery</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Alteration of menstrual cycle</td>
<td>• Sudden Infant Death Syndrome</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fetal Alcohol Spectrum Disorders</td>
<td></td>
</tr>
<tr>
<td>Marijuana</td>
<td>• Increased blood pressure</td>
<td>• Visual abnormalities</td>
<td>• Poor sucking</td>
</tr>
<tr>
<td></td>
<td>• Increased heart rate</td>
<td>• Ocular hypertelorism (widely spaced eyes)</td>
<td>• Sedation</td>
</tr>
<tr>
<td></td>
<td>• Rapid pulse</td>
<td>• Severe epicanthus (skin folds at the corner of the upper eyelids)</td>
<td>• Reduced muscle tone</td>
</tr>
<tr>
<td></td>
<td>• Anxiety sensory distortions</td>
<td></td>
<td>• Delayed growth</td>
</tr>
<tr>
<td>Amphetamines (e.g., methamphetamine and dextroamphetamine)</td>
<td></td>
<td></td>
<td>• Delayed motor development</td>
</tr>
<tr>
<td></td>
<td>• Irritability and confusion</td>
<td>• Premature delivery</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Decreased appetite</td>
<td>• Low birth weight</td>
<td>• Poor sleep patterns</td>
</tr>
<tr>
<td></td>
<td>• Convulsions</td>
<td>• Small for gestational age</td>
<td>• Irritability</td>
</tr>
<tr>
<td></td>
<td>• Stroke</td>
<td></td>
<td>• Extreme agitation</td>
</tr>
<tr>
<td></td>
<td>• Heart failure</td>
<td></td>
<td>• Hallucinations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Seizures</td>
</tr>
<tr>
<td>Cocaine and Crack</td>
<td>• Increased heart rate</td>
<td>• Preterm delivery</td>
<td>• Vomiting</td>
</tr>
<tr>
<td></td>
<td>• Increased blood</td>
<td>• Reduced head</td>
<td>• Diarrhea</td>
</tr>
</tbody>
</table>

The following table is a summary of effects of specific drugs on the mother, birth outcomes and breastfeeding (2). For more information, please see the Substance Use and Prevention Manual: Screening, Education and Referral Resource Guide for Local WIC Agencies: https://wicworks.fns.usda.gov/resources/wic-substance-use-prevention-guide.
### Clinical/Health/Medical: Alcohol and Substance Use

<table>
<thead>
<tr>
<th>Substance</th>
<th>Effects on Mother</th>
<th>Effects on Birth Outcomes</th>
<th>Effects on Baby*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cocaine and Crack (continued)</td>
<td>pressure • Sudden death from cardiac arrhythmia or respiratory arrest • Irritability • Separation of the placenta from the uterus prior to delivery</td>
<td>circumference • Increased risk of spontaneous abortion • Increased risk of seizures • Neurological abnormalities</td>
<td>• High blood pressure • Seizures • Choking • Irritability • Neurobehavioral problems</td>
</tr>
<tr>
<td>Opiates &amp; Synthetic Narcotics (e.g., heroin, morphine, codeine, oxycodone, and hydrocodone)</td>
<td>• Endocarditis • Decreased appetite • Respiratory depression • Coma or sudden death from overdose</td>
<td>• Low birth weight • Still birth • Neonatal Abstinence Syndrome • Sudden Infant Death Syndrome</td>
<td>• Irritability • Extreme agitation • Seizures • Poor sleep patterns • Hallucinations</td>
</tr>
<tr>
<td>Sedative – Hypnotics (e.g., benzodiazepines, barbiturates, and sleep medications)</td>
<td>• Apprehensiveness • Convulsions • Dilated pupils • Respiratory depression • Confusion • Slurred speech</td>
<td>• Increased risk of fetal malformations</td>
<td>• Restlessness • Tremor • Apnea • Diarrhea • Vomiting • Poor feeding</td>
</tr>
</tbody>
</table>

*The effect of substances on the baby should be carefully considered when providing support to breastfeeding dyads as these effects may be barriers to successful breastfeeding.*

**Implications for WIC Nutrition Services**

Through established linkages and coordination with local resources, WIC staff are required to refer participants suspected of substance use, and those who disclose substance use, to existing assessment agencies for professional evaluation and treatment, as appropriate. In addition to providing referrals and coordinating/facilitating services, WIC’s role in preventing substance abuse is to educate women participants, parents, and caretakers of participating infants and children about substance use–related problems with the intended effects of increasing participants’ access to information about the dangers of substance use and abuse during pregnancy and breastfeeding as well as postpartum. WIC also provides supplemental foods that are rich in the nutrients lost from alcohol and substance misuse. WIC staff can assist participants by:

- Providing referrals (and follow-up on the referral) for professional assessment and treatment. Do not advise a woman who uses narcotics to stop use on her own. This step should be taken only under the supervision of a physician or treatment specialist.
- Encouraging women to improve their lifestyle and health habits during pregnancy and postpartum, since the concern for fetal health and/or the desire to be a good role model can be a powerful motivator to reduce or stop substance use (25).
- Emphasizing the importance of substance abuse treatment during the postpartum period to safeguard the health of the mother and reduce the risk in subsequent pregnancies.
• Recommending the Dietary Guidelines for Americans to address nutrition deficiencies associated with substance use.

• Providing breastfeeding promotion and support to women enrolled in supervised medication-assisted treatment programs.

• Recommending that the ingestion of beverages containing alcohol be minimized and limited to occasional intake for breastfeeding women. Provide instruction to wait at least 4 hours after consuming one alcoholic drink before breastfeeding or expressing milk. (If the appropriate amount of time has elapsed the woman may breastfeed or express her milk – it is not necessary to pump and discard the milk.)

• Referring to community resources for alcohol and substance use support groups.

References


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

<table>
<thead>
<tr>
<th>Category</th>
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</tr>
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<tbody>
<tr>
<td>Pregnant Women</td>
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</tr>
<tr>
<td>Breastfeeding Women</td>
<td>I</td>
</tr>
<tr>
<td>Non-Breastfeeding Women</td>
<td>III, IV, V or VI</td>
</tr>
<tr>
<td>Infants</td>
<td>I</td>
</tr>
<tr>
<td>Children</td>
<td>III</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Noncariogenic</th>
<th>Low Cariogenicity</th>
<th>High Cariogenicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheese</td>
<td>Flavored Milk</td>
<td>Breakfast Bars</td>
</tr>
<tr>
<td>Chicken</td>
<td>Fresh fruits</td>
<td>Cake</td>
</tr>
<tr>
<td>Cottage Cheese</td>
<td>Whole grain products</td>
<td>Candies**</td>
</tr>
<tr>
<td>Eggs</td>
<td></td>
<td>Cookies</td>
</tr>
<tr>
<td>Flavored Club Soda</td>
<td></td>
<td>Doughnuts</td>
</tr>
<tr>
<td>Nuts and seeds*</td>
<td></td>
<td>Granola bars</td>
</tr>
<tr>
<td>Plain Cow’s Milk (unflavored)</td>
<td></td>
<td>Pretzels</td>
</tr>
<tr>
<td>Plain Yogurt</td>
<td></td>
<td>Raisins and other dried fruits</td>
</tr>
<tr>
<td>Popcorn*</td>
<td></td>
<td>Soda crackers</td>
</tr>
<tr>
<td>Seltzer</td>
<td></td>
<td>Sweetened beverages</td>
</tr>
<tr>
<td>Vegetables</td>
<td></td>
<td>(including fruit juice)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sweetened dry cereals</td>
</tr>
</tbody>
</table>

*Not appropriate for infants and toddlers due to potential choking problems.

**Sticky candy and/or slowly eaten candy are extremely cariogenic.


Women

Maternal periodontal disease and dental caries may impact pregnancy outcome, and the offspring’s risk of developing early and severe dental caries. Periodontal disease and caries may also increase the women’s risk of atherosclerosis, rheumatoid arthritis and diabetes. These oral health problems are highly prevalent in women of childbearing age, particularly among low-income women and members of racial and ethnic minority groups. Socioeconomic factors, lack of resources to pay for care, barriers to access care, lack of public understanding of the importance of oral health and effective self-care practices all represent underlying reasons cited for observed inadequacies in oral health. (6)
Maternal periodontal disease, a chronic infection of the gingiva (gums) and supporting tooth structures, has been associated with preterm birth, low birthweight and development of preeclampsia (6, 7). Studies indicate that periodontal infection can result in placental-fetal exposure and, when coupled with a fetal inflammatory response, can lead to preterm delivery (7). Additionally, in a cohort of 164 young, minority, pregnant and postpartum women, the preterm/low birthweight rate was 5.4% lower among women who received periodontal treatment than those who did not receive treatment (7). In a case-control study, researchers found that preeclamptic patients were 3.5 times more likely to have periodontal disease than normotensive patients (6). (See nutrition risk criterion #304 History of Preeclampsia for more information.)

**Fluoride and Fluorosis**

Use of fluorides for the prevention and control of caries is documented to be both safe and highly effective. Fluoride, a naturally occurring substance, has several caries-protective mechanisms of action, including enamel remineralization and altering bacterial metabolism to help prevent caries. Excessive intake of fluoride can cause dental fluorosis which is a change in the appearance of the tooth’s enamel. In the U.S., fluorosis appears mostly in the very mild or mild form - as barely visible lacy white markings or spots. The severe form of dental fluorosis, staining and pitting of the tooth surface, is rare in the U.S. The CDC reports that 32% of American children have some form of dental fluorosis, with 2.45% of children having the moderate to severe stages. (8, 9, 10, 11)

Parents and caregivers may have questions and concerns about fluoride content in water supplies and in infant formula. Fluoridated water can be found in communities that supplement tap water with fluoride and it may also be found in well water. The CDC’s My Water’s Fluoride website: [http://apps.nccd.cdc.gov/MWF/Index.asp](http://apps.nccd.cdc.gov/MWF/Index.asp), allows consumers in currently participating States to learn the fluoridation status of their water system.

All formula, including powdered, concentrate and ready-to-feed, contain fluoride, but most infant formula manufacturers ensure low levels of fluoride (8). WIC State and local agencies should refer caregivers of formula fed infants with questions regarding the use of fluoridated vs. non-fluoridated water to prepare infant formula to the infants’ health care provider.

**Dental Care and Anxiety**

It is reported that 50% of the U.S. population does not seek regular dental care. Of the entire U.S. population, 8-15% has dental phobias. Dental fear can be directly learned from previous painful or negative experiences or indirectly learned from family, friends and the media. Negative portrayal of dentistry by these sources adds to an individual’s anxiety. Anxiety and/or fear of dental procedures may prevent participants from seeking necessary dental care during high risk periods of the life cycle (e.g., pregnancy). Dental providers are learning to understand the causes of dental fear, have techniques to assess the level of fear and have modified treatments to accommodate patients with high anxiety levels. (12)

**Oral Health Problems and Special Health Care Needs**

The following special health care needs can increase the risk for oral health problems and can also make the overall effects of poor oral health more severe (13):

- **Prematurity and intrauterine malnutrition** - can have adverse effects on an individual’s oral health. A study of infants who weighed <2000g at birth indicated more porous dental enamel and subsurface lesions. Infants with very low birthweights (<1500g) are more apt to have enamel
defects of the primary teeth. Malnutrition in the first few months of life (when oral structures develop) can increase the risk for oral problems.

- **Gastroesophageal Reflux Disease (GERD)** - common among children with cerebral palsy, Down syndrome and other conditions. GERD can contribute to oral health problems. As acidic gastric contents are regurgitated, primary and permanent teeth can be eroded.

- **Failure to thrive and other problems with weight gain and growth** - frequent meals and snacks (which may contribute to caries development) may be needed to maintain an adequate energy intake, or if mealtime is longer than usual, the demineralization period may exceed remineralization. Delayed weaning and children sipping on a bottle throughout the day, could also contribute to oral health problems.

- **Craniofacial malformations** - individuals with these malformations are at higher risk of developing oral problems. For example, children with cleft lip/palate disorders have more decayed, missing, and filled teeth than children without.

- **Compromised immune function** - individuals with AIDS or those who take immunosuppressive medications are more susceptible to oral infections such as candidiasis, viral infections, dental caries, and periodontal disease.

- **Down syndrome (Trisomy 21)** - individuals with Down syndrome often have delayed dental development*, may be missing permanent teeth, and may have under-developed teeth or teeth with thin enamel. In addition, the potential for eating problems and GERD make oral care for individuals with Down’s especially important. (13)

*Delayed Tooth Eruption (DTE) is the emergence of a tooth into the oral cavity at a time that deviates significantly from norms established for different races, ethnicities, and sexes. Variation in the normal eruption of teeth is a common finding, but significant deviations from established norms should alert the clinician to further investigate the patient’s health and development. Eruption depends on genetics, growth of the jaw, muscular action and other factors. DTE is seen in children with certain genetic disorders, particularly Down syndrome, and in children with general developmental delays that involve the oral musculature. Whenever DTE is generalized, the child should be examined for systemic diseases affecting eruption, such as endocrine disorders, organ failures, metabolic disorders, drugs and inherited disorders. (14) Additional information about tooth eruption is available at: [http://www.ada.org/2930.aspx](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


References


**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 Spectrum Disorders

Definition/Cut-off Value

Fetal alcohol spectrum disorders (FASDs) are a group of conditions that can occur in a person whose mother consumed alcohol during pregnancy (1). FASDs is an overarching phrase that encompasses a range of possible diagnoses, including fetal alcohol syndrome (FAS), partial fetal alcohol syndrome (pFAS), alcohol-related birth defects (ARBD), alcohol-related neurodevelopmental disorder (ARND), and neurobehavioral disorder associated with prenatal alcohol exposure (ND-PAE) (2).

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

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<tr>
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<td>Infants</td>
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<td>Children</td>
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Justification

Prenatal exposure to alcohol can damage the developing fetus and is the leading preventable cause of birth defects and intellectual and neurodevelopmental disabilities (2). (See risk #372 Alcohol and Substance Use for more information.)

FASD is an umbrella term describing the range of effects that can occur in an individual whose mother consumed alcohol during pregnancy (2). These effects include physical, mental, behavioral, and/or learning disabilities with possible lifelong implications (1, 2). Often, a person with FASD has a mix of these conditions (1).

The term FASDs is not meant for use as a clinical diagnosis and encompasses all other diagnostic terms, such as fetal alcohol syndrome (FAS) (1, 2). FASDs refer to the whole range of effects that can occur in a person whose mother consumed alcohol during pregnancy. These conditions can affect each person in different ways and can range from mild to severe. A person with FASD might have any or a combination of the following conditions (1):

- Facial abnormalities, such as a smooth ridge between the nose and upper lip (this ridge is called the philtrum).
- Small head size, short stature, low body weight.
- Sleep and sucking problems as an infant.
• Hyperactive behavior, difficulty with attention, poor memory, difficulty in school (especially with math), learning disabilities, poor reasoning and judgment skills.

• Poor coordination, speech and language delays, intellectual disability or low IQ.

• Problems with the heart, kidneys, bones, vision, or hearing.

The severity of alcohol’s effects on a fetus primarily depends on the following (3, 4):

• Quantity – the amount of alcohol consumed by a pregnant woman per occasion.

• Frequency – the rate at which alcohol is consumed or is repeatedly consumed by the pregnant woman.

• Timing – the specific gestational age of the fetus when alcohol is consumed by the pregnant woman.

**Fetal Alcohol Spectrum Disorders Diagnoses**

Different terms are used to describe FASDs, depending on the type of symptoms.

**Fetal Alcohol Syndrome (FAS)** was the first form of FASD discovered and is the most well-known. It represents the most involved end of the FASD spectrum. A diagnosis of FAS requires evidence of prenatal alcohol exposure; evidence of central nervous system (CNS) abnormalities (structural or functional); a specific pattern of the following three facial abnormalities: narrow eye openings, a smooth area between the lip and the nose (vs. the normal ridge), and a thin upper lip; and growth deficits either prenatally, after birth, or both (1). Fetal Alcohol Syndrome can affect children in different ways. A child with FAS may have problems with learning, memory, attention span, communication, vision, and/or hearing (3). Also, people with FAS often have a hard time in school and trouble getting along with others (1).

The Centers for Disease Control and Prevention worked with a group of experts and organizations to review the research and issued guidelines for diagnosing FAS in 2004. The guidelines were developed for FAS only. Diagnosing FAS can be challenging due to other medical disorders, such as attention deficit/hyperactivity disorder (ADHD) and Williams syndrome, having similar symptoms and the lack of standard medical tests. (1)

**Partial FAS (pFAS)** involves prenatal alcohol exposure and includes some, but not all, of the characteristics of full FAS (3). A diagnosis of pFAS requires a confirmed history of prenatal alcohol exposure and CNS abnormalities at the same level as FAS. Individuals with pFAS sometimes have growth deficiency or one or more of the facial abnormalities associated with FAS. Individuals with pFAS have the same functional disabilities but may not have the physical appearance of an individual with FAS (5).

**Alcohol-Related Neurodevelopmental Disorder (ARND)** requires evidence of both prenatal alcohol exposure and CNS abnormalities, which may be structural or functional. Functional abnormalities may involve a complex pattern of cognitive or behavioral problems that are not consistent with developmental level and that cannot be explained by factors other than prenatal alcohol exposure (e.g., family background, environment, and other toxicities). Facial abnormalities and growth deficits need not be present (3). People with ARND might have intellectual disabilities and problems with behavior and learning. They might do poorly in school and have difficulties with math, memory, attention, judgment, and impulse control (1).

**Alcohol-Related Birth Defects (ARBDD)** include problems with the heart, kidneys, bones, vision, or hearing. People with ARBDs might have a combination of these (1). ARBD is rarely seen alone but rather as a secondary disorder accompanying other FASD conditions (e.g., FAS and ARBD) (3).
Neurobehavioral Disorder Associated with Prenatal Alcohol Exposure (ND-PAE) was first included as a recognized condition in the Diagnostic and Statistical Manual 5 of the American Psychiatric Association (APA) in 2013. ND-PAE requires evidence of both prenatal alcohol exposure and CNS involvement, as indicated by impairments in the following three areas: cognition, self-regulation, and adaptive functioning. A child or youth with ND-PAE will have problems in three areas: 1) thinking and memory, where the child may have trouble planning or may forget material he or she has already learned; 2) behavior problems, such as severe tantrums, mood issues (for example, irritability), and difficulty shifting attention from one task to another; and 3) trouble with day-to-day living, which can include problems with bathing, dressing for the weather, and playing with other children. In addition to the child having problems in these three areas, the mother of the child must have consumed more than minimal levels of alcohol during pregnancy. The APA defines minimal levels of alcohol as more than 13 alcoholic drinks per month of pregnancy (that is, any 30-day period of pregnancy) or more than 2 alcoholic drinks in one sitting. (1, 3)

Prenatal Alcohol Exposure (PAE) may be associated with altered acquisition and distribution of body mass with increasing age. In a study conducted by Werts and colleagues, the exploratory data suggested that children with PAE may be at risk for nutritional deficiencies, which are influenced by inappropriate food preferences, disordered eating patterns, medication use, and the stressful dynamics surrounding food preparation and mealtime. PAE may be associated with female obesity, constant snacking, lack of satiety, constipation, and low vitamin D status. The obesity/overweight incidence for the female subjects was 50% (a rate substantially greater than the U.S. average of 31.3%), while the obesity/overweight incidence for the males was well below the U.S. average. The sample size was too small to determine whether obesity rates significantly differed between the sexes. (6)

Fetal Alcohol Effects (FAE) was previously used to describe intellectual disabilities and problems with behavior and learning in a person whose mother consumed alcohol during pregnancy. In 1996, the Institute of Medicine (IOM) replaced FAE with the terms alcohol-related neurodevelopmental disorder (ARND) and alcohol-related birth defects (ARBD). (1)

Growth and Development of Children with FASD

The estimated prevalence of FASD in populations of first-grade schoolchildren (~6.5-7.8 years old) is as high as 20-50 per 1,000 in the United States and some Western European countries. (7)

In a study conducted by Spohr and others, it was found that although the characteristic craniofacial malformations of FAS/FAE diminished over time, microcephaly, a poorly developed philtrum, a thin upper lip, and, to a lesser degree, short stature and underweight (in boys) persisted. In females, adult body weight increased. Although some catch-up growth occurred, a large proportion of the subjects had growth deficiency. (8)

Retrospective research demonstrated that children may be more affected by prenatal alcohol exposure based on the following variables regarding the mother (3, 4):

- Poor pre-pregnancy or prenatal nutrition
- Multiple pregnancies and births
- Lower-than-average pre-pregnancy or prenatal weight, height, and body mass index (BMI)
- Maternal smoking
- Maternal age (effect on child increases with mother’s age)
- Has family members or peers who drink heavily
One study indicated that, anecdotally, children with FASD are often “picky eaters”, some have autistic-like taste and texture sensitivities, and many have behavioral challenges such as rigidity and oppositionality. Children with FASD had lower intakes of saturated fats, vitamin D, and calcium. They may not meet the recommended intakes for several nutrients and have a dietary pattern that could benefit from improving intakes of dairy products, green leafy vegetables, vegetable oils, nuts, eggs, and fish. Most (>50%) did not meet the Adequate Intake for fiber, n-3 fatty acids, vitamin K, or choline, or the Recommended Dietary Allowance for vitamin D, vitamin E, or calcium. (9)

Another study indicated that children with FASD were more likely to have a past diagnosis of underweight. Mean BMI was significantly reduced for males but not females. Abnormal eating patterns are common in children with FASD and may contribute to their delayed growth and nutritional inadequacies. Children with FASD were significantly more likely to experience delayed acquisition of age-appropriate eating skills, compared with controls. The median age for solid foods introduction was significantly older for children with FASD as was their age at self-feeding. (10)

Breastfeeding may prevent or improve neurodevelopmental disorders for children with FASD and has been shown to improve IQ (11, 12). Infants with facial abnormalities may have breastfeeding challenges such as difficulty with latch, sucking, or swallowing; and individualized breastfeeding support will likely be needed (13). (See risk #372 Alcohol and Substance Use for more information regarding breastfeeding and alcohol use.)

There is no cure for FASDs, but research shows that early intervention treatment services can improve a child’s development. There are many types of treatment options, including medication to help with some symptoms, behavior and education therapy, parent training, and other alternative approaches. Certain protective factors can help reduce the effects of FASD and help people with these conditions reach their full potential. Protective factors include diagnosis before 6 years of age; loving, nurturing, and stable home environment during the school years; absence of violence; and involvement in special education and social services. (1)

**Adults with FASD**

FASDs last a lifetime. Research to date indicates that, compared to controls, adults with FASDs have increased behavioral problems; are perhaps less efficient and more distractible when completing tasks; have more difficulty paying attention, learning, memory, planning, and analyzing social situations; and feel less confident that they have sufficient resources to cope with their environment. Adults with FASDs have a high rate of psychiatric and personality disorders, problems with drugs and alcohol, and difficulties with the law. They are also less likely to obtain a degree, have stable employment, and live independently. Young adults with PAE have increased risks for mental health problems and secondary disabilities, which impacts their ability to live independently. (1, 14)

**Implications for WIC Nutrition Services**

When speaking with a biological mother of a child with an FASD, the American Academy of Pediatrics recommends the following (15):

- Building a rapport with the mother and allow her to express her emotions and concerns related to her child’s health and the demands of parenting a child with an FASD.
- Reaffirming the parent as a key part of the child’s care team.
• Keeping all lines of communication and advocacy open as the child’s care is coordinated through the medical home.

• Referring to the National Organization on Fetal Alcohol Syndrome’s Circle of Hope Birth Mother’s Network that can be contacted in person or online: https://www.nofas.org/circleofhope/.

WIC staff can assist parents/caregivers of infants and children with FASD by:

• Providing anthropometric monitoring to address underweight, delayed growth, nutritional inadequacies, or overweight issues and concerns.

• Providing individualized food packages tailored to meet the needs of participants.

• Providing nutrition information regarding how to improve the intake of dairy products, green leafy vegetables, vegetable oils, nuts, eggs and fish when appropriate as this may be beneficial (9).

• Providing nutrition guidance to help with making appropriate choices for healthy snacks and satiety.

• Providing suggestions for addressing age-appropriate feeding skills and behavioral and developmental issues associated with feeding.

• Encouraging physical activity as it improves glucose tolerance, muscle development, motor coordination, and may stimulate neurogenesis and synaptogenesis (10).

• Referring to their health care provider to discuss nutritional supplements and any growth and development concerns (3).

• Providing referrals to promote caregiver and infant/child feeding skills, including referrals to local home visiting programs, parenting programs, and early intervention services.

• Referring to their health care provider for breastfeeding support. These infants may need frequent growth monitoring and re-evaluation of their feeding capacity, so feeding plans will need to be adjusted accordingly. (13)

WIC staff can assist adult participants with FASD by (also see risk #902 Woman or Infant/Child of Primary Caregiver with Limited Ability to Make Appropriate Feeding Decisions and/or Prepare Food):

• Providing individualized nutrition education in an easy-to-understand format that is appropriate for the learning level of the participant/caregiver. Most education materials should be written for a 5th to 7th grade reading level. Be sensitive to the unique learning needs and style of the participant/caregiver, which may mean using food models, posters, and handouts.

• Providing referrals to promote parenting and infant/child feeding skills, including referrals to local home visiting programs, parenting programs, and early intervention services.

• Encouraging participants/caregivers to follow health care provider’s plan of care. Coordinate with health care providers as needed.

• Providing individualized food packages, tailored to meet the needs of participants. Some adults with FASD with a limited ability to make appropriate feeding decisions/prepare food may be unable to prepare powder or concentrated infant formula. Thus, for the safety of the infant, State WIC Agencies may allow ready-to-feed (RTF) WIC formulas to be issued when it is determined that the caregiver may have difficulty correctly diluting powder or concentrated formulas. Please refer
to your State WIC Agency’s specific policies regarding the issuance of RTF, as policies vary from state to state.

- Referring to their health care provider to discuss nutritional supplements for pregnant women (3).

References


Additional References and Resources


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.
383 Neonatal Abstinence Syndrome

Definition/Cut-off Value

Neonatal abstinence syndrome (NAS) is a drug withdrawal syndrome that occurs among drug-exposed (primarily opioid-exposed) infants as a result of the mother’s use of drugs during pregnancy (1). NAS is a combination of physiologic and neurologic symptoms that can be identified immediately after birth and can last up to 6 months after birth (2,3).

This condition must be present within the first 6 months of birth and diagnosed, documented, or reported by a physician or someone working under a physician’s orders, or as self-reported by the infant’s caregiver. See the clarification section for more information about self-reporting a diagnosis.

Participant Category and Priority Level

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Justification

Neonatal abstinence syndrome occurs when an infant is born dependent on prescription or illicit drugs the mother was taking during pregnancy. NAS is a combination of withdrawal symptoms that involve multiple bodily systems. It is most commonly associated with chronic opioid exposure during fetal development; however, can also result from chronic intrauterine exposure to other substances including: benzodiazepines, barbiturates, selective serotonin reuptake inhibitors and ethanol (3). Although these non-opioid substances can lead to NAS, these infants typically respond well to non-pharmacological methods of intervention (4).

Withdrawal in the newborn varies based on the type of substance, dose, and timing of exposure (4). Opioid is a general term for a variety of illicit and prescription drugs that decrease pain. Prescription opioid pain relievers include oxycodone, hydrocodone, codeine, morphine, and fentanyl. Opioids are water soluble and are, therefore, able to move easily across the placenta to the infant. This transfer of opioids increases as gestational age increases (3).

Heroin is an illegal opioid that is synthesized from morphine and can be injected, inhaled, or smoked. About 23% of individuals who use heroin become dependent (5). Furthermore, those who take any form of opioid, including prescription opioids as directed for chronic pain, can become addicted. Due to the risk of the transmission of infectious diseases such as Human Immunodeficiency Virus (HIV) and Hepatitis C, women who become pregnant while using illicit opioids, such as heroin, are often put on opioid maintenance therapy. Opioid maintenance therapy involves the prescribed use of either methadone or buprenorphine. These prescribed opioids can still lead to NAS; however, since they are not injected, they decrease the risk of the mother contracting blood borne infectious diseases. Opioid maintenance therapy can also help protect the fetus from repeated opioid withdrawal in utero (6).

The incidence of NAS has increased from 1.2 to 3.39 per 1,000 live births from 2000 to 2009 in the United States. This increased incidence is due to an increase in antepartum opioid use from 1.19 to 5.63 per 1,000 live births in the same period (7). In another study, it was reported that 5.9% of all women who were pregnant in 2012 reported some illicit drug use during pregnancy (4). Infants born with NAS are often
premature, have low birth weights, and are growth-restricted (see risks #142 Preterm or Early Term Delivery, #141 Low Birth Weight, and #151 Small for Gestational Age for more information about these conditions). (3) In addition to the concerns of exposure to substances in utero, additional factors, including social, nutritional, physical, and mental health problems can also contribute to the health status of the infant. An increased risk of certain birth defects has also been associated with early pregnancy opioid use (8). These birth defects include: spina bifida, hydrocephaly, glaucoma, gastroschisis, and heart defects (9).

Neonatal Abstinence Syndrome Symptoms

Symptoms of NAS generally involve the central nervous system, autonomic nervous system, and the gastrointestinal tract (3). The severity of the infant’s symptoms is commonly assessed using the Modified Finnegan Score Sheet. The Modified Finnegan Score Sheet consists of 21 symptoms that are associated with NAS. Following the determination of a baseline score, infants are assessed every 4 hours unless the severity of the symptoms requires more frequent monitoring (10). The following list includes symptoms associated with NAS (1, 6):

- Loud, high-pitched crying
- Sweating
- Yawning
- Sleep disturbances
- Feeding difficulties
- Poor weight gain
- Excessive sucking
- Regurgitation
- Diarrhea

Neonatal Abstinence Syndrome Treatment

Infants with NAS typically have longer hospital stays, can experience serious complications, and have costly treatment (2). The first treatment option for infants with NAS is to manage symptoms without medication by rooming in with the mother, encouraging skin-to-skin contact, swaddling, having a calm environment, avoiding overstimulation, and supporting breastfeeding (11). Infants who are at risk for NAS and who room-in with their mothers are not only at a lower risk of needing pharmacological treatment for NAS, but they also have a shortened hospital stay (12). If withdrawal is severe or if the initial treatment is not successful in managing symptoms of NAS, medications such as morphine, methadone, phenobarbital or clonidine may be used. An infant given these medications may have side effects that could include: slow or shallow breathing, slow heart rate, difficulty waking-up, excessive sleepiness, constipation, and fewer wet diapers (11).

Nutritional Considerations for Neonatal Abstinence Syndrome

The timing and type of feedings play an important role in the management of NAS symptoms. Infants with NAS may have impaired feeding behaviors such as excessive sucking, regurgitation, diarrhea and poor feeding that is characterized by fussiness, crying, and sleepiness (13, 14). Infants with NAS have higher caloric requirements due to their energy expenditure. This combined with the impaired feeding behaviors may result in difficulty with weight gain (14). The American Academy of Pediatrics (AAP) recommends
breastfeeding if not contraindicated (15). The AAP also recommends that infants with NAS be fed frequent small volumes of human milk or high calorie formula, as needed, in a quiet and calm environment, to aid the infant in tolerating feedings and improving digestion and to allow for adequate growth (11, 15).

The Academy of Breastfeeding Medicine recommends breastfeeding for women who are on a prescribed stable dose of methadone maintenance because the concentrations of methadone in human milk are low (16). Studies have indicated that, although the amount of methadone in human milk is dependent on the mother’s dose, the methadone transferred in human milk averages less than 2.8% of the maternal dose (17). Breastfeeding has been found to provide protection against the development of NAS symptoms and lessen the severity of symptoms, which would decrease the need for pharmacological intervention for the infant (18, 19, 20). The amount of methadone that is in human milk is small and therefore, it is thought that breastfeeding, and not the methadone in human milk, is responsible for its protective impact against NAS (18). Gradual weaning, when mutually desired by the mother and infant, is recommended for breastfeeding women who are being treated for opioid addiction. Gradual weaning (rather than an abrupt stop to breastfeeding) decreases the risk of the infant developing NAS (11, 17).

Implications for WIC Nutrition Services

NAS can be a difficult subject to talk about with WIC participants due to the stigma of addiction. In the WIC clinic, caregivers may not be forthcoming with the infant’s diagnosis of NAS and an addiction history of the mother may not be available at the initial assessment. WIC staff can assist caregivers by:

- Educating to recognize infant hunger cues.
- Reviewing feeding frequency and/or formula type and amount to help manage gastrointestinal symptoms of NAS.
- Providing growth monitoring to assess adequate weight gain.
- Encouraging supportive interventions to include:
  - Skin-to-skin contact
  - Swaddling
  - Quiet environment with little stimulation
- Encouraging breastfeeding unless medically contraindicated.
- Providing referrals for support services such as drug and alcohol counseling, parenting support, and medical evaluations.
- Encouraging mothers who are on medication-assisted therapy (e.g., methadone or buprenorphine) and who are breastfeeding, to speak with their health care provider if they have questions about the timing and dose of their medication.
- Educating mothers who are on medication-assisted therapy and who are breastfeeding on the importance of gradual weaning when mutually desired by the mother and infant.

References


Additional Reference:


Clarification

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