Memorandum

#15-083

TO: WIC Regional Directors
WIC Local Agency Directors

FROM: Amanda Hovis, Director
Nutrition Education/Clinic Services Unit
Nutrition Services Section

DATE: July 21, 2015

SUBJECT: Texas WIC Risk Code and Health History/Participant Form Revisions

The United States Department of Agriculture (USDA) has updated three risk codes, 361-Depression, 381-Oral Health Conditions, and 460 Inappropriate Nutrition Practices for Infants. All Participant Forms and Health History Forms have been revised to reflect these changes. The implementation date for the revised forms and risk code assignments is **October 1, 2015**.

Revised materials include:

- Infant Participant Form (stock # WIC-36)
- Child Participant Form (stock # WIC-38)
- Pregnant Participant Form (stock # WIC-39)
- Breastfeeding Participant Form (stock # WIC-40)
- Postpartum Participant Form (stock # WIC-41)
- Diet/Health History for Infants (stock # WIC-42)
- Health History for Children (stock # WIC-44)
- Health History for Pregnant/Breastfeeding and Postpartum Women (stock # WIC-45)

In preparation for implementing these revised materials, please begin to deplete your current inventory of these forms. In the event that your agency has to use outdated forms after the October 1, 2015 implementation date, you will still be in compliance as the changes are very minor and will not affect the certification process. All revised materials will be stocked at Business Ink with a revision date of October 2015 and will be available to order. To ensure that we have adequate stock, we recommend that Local Agencies do not order more than a two month supply at one time. Please order and begin using new forms by the end of December 2015 and recycle or discard the old forms at that time.
Brief descriptions of the Risk Code revisions are outlined below and the three risk codes are attached to this memo.

- <u>361 Depression</u>: All sections of the risk code write-up are revised and updated. Children have been removed from this risk criterion which is reflected on the Child Participant form as well as in the Texas WIN system.

- 381 Oral Health Conditions (formerly titled Dental Problems): The title of this risk was revised to more accurately reflect the conditions included in this criterion. All sections of the risk write-up are revised and updated.
- 460 Inappropriate Nutrition Practices for Infants: Only section #9, "Routinely using inappropriate sanitation in preparation, handling, and storage of expressed human milk or formula," is revised and updated. Of note, a threshold for the amount of time human milk can be safely stored in the refrigerator has been deleted as a risk criterion. There is a lack of consensus among professional entities (e.g. American Academy of Pediatrics and Academy of Breastfeeding Medicine) about the length of time human milk can be safely stored in the refrigerator. Thus, it is not possible at this time to set a clear cut-off to determine WIC nutrition risk. Please see the *Justification* section of this criterion for more information.

Brief descriptions of changes made to the Participant Forms include:

- Infant Participant Form (stock # WIC-36): 135 Inadequate Growth to match risk code definition. 381 Oral Health Conditions to match revised risk code.
- Child Participant Form (stock # WIC-38): 381 Oral Health Conditions to match revised risk code.
- Pregnant Participant Form (stock # WIC-39): Added question "Current pregnancy multifetal? Yes/No" to assist staff in health history assessment.
- Breastfeeding Participant Form (stock # WIC-40): 133 High Gestational Weight Gain clarified to indicate guidelines listed on participant form relate to singleton pregnancy only, for multifetal pregnancies staff must see risk code for proper assignment. 361 Depression revised to include postpartum depression. 381 Oral Health Conditions to match revised risk code. 902 Woman with Limited Ability to Make Feeding Decisions and/or Prepare Food updated to remove postpartum depression.
- Postpartum Participant Form (stock # WIC-41): 133 High Gestational Weight Gain clarified to indicate guidelines listed on participant form relate to singleton pregnancy only, for multifetal pregnancies staff must see risk code for proper assignment. 361 Depression revised to include postpartum depression. 381 Oral Health Conditions to match revised risk code. 902 Woman with Limited Ability to Make Feeding Decisions and/or Prepare Food updated to remove postpartum depression.

Brief descriptions of changes made to the Health History Forms include:

- Diet/Health History for Infants (stock # WIC-42) question added about Oral Health Conditions to correspond with risk code update.
- Health History for Children (stock # WIC-44) question revised about Oral Health Conditions to correspond with risk code update.
- Health History for Pregnant/Breastfeeding and Postpartum Women (stock # WIC-45) question revised about Oral Health Conditions to correspond with risk code update.

In order to implement the updated risk codes by October 1, 2015, the risk code table in Texas WIN must be downloaded to clinics on Wednesday, September 30, 2015 with end-of-day processing. If the updated risk code table has not been updated by Thursday, October 1, 2015 morning, please have staff call the WIC Service Desk (Help Desk) at 1-800-650-1328.

If you have any questions or require additional information, please contact Tiffany Brown, WIC Certification Specialist Program Coordinator, at Tiffany.Brown@dshs.state.tx.us or (512)341-4587.
Note: *Risk Codes 361, 381 and 460 (all revised 10/2015) are attached to this Memo.*

Depression – (P, B, N)

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/ Priority Level

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

Justification

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

Pregnancy and Depression

Depression is common during pregnancy. Between 14 and 23 percent of pregnant women will experience depressive symptoms (5, 6). Several studies have found that depression risk is highest during the last trimester of pregnancy (4). Women who experience depression during pregnancy are found to be less likely to seek prenatal care (3). They may also suffer from episodes of nausea/vomiting or initiate/increase the use of drugs,

alcohol and nicotine (4). Pregnant women with depression may be at risk for preeclampsia, preterm delivery or delivery of low birth weight infants and have higher perinatal mortality rates (5, 6).

Pregnant Adolescents

In the United States, 10 percent of women become pregnant during adolescence (7). The prevalence of teen pregnancy is highest among African and Native Americans, lower socioeconomic groups, and those living in stressful family environments. The prevalence rate of depression among pregnant adolescents is between 16 and 44 percent, which is almost twice as high as among their adult counterparts and non-pregnant adolescents (7).

Adolescence is a stage of rapid metabolic, hormonal, physiological and developmental changes. Depressive symptoms are likely to emerge when the physiologic and psychological changes that occur during pregnancy are superimposed upon normal developmental change. (8)

Teens who are under stress, lack social and/or family support, experience significant loss, or who have attention, learning or conduct disorders are at greater risk for developing clinical depression (9). Depression in young people often occurs with mental disorders, substance abuse disorders, or physical illnesses, such as diabetes (10). Pregnant adolescents with depressive symptoms are more likely to delay or refuse prenatal care and have subsequent, short interval pregnancies (within 24 months), both of which have shown to result in poor pregnancy outcomes (11, 12).

Antidepressant Use in Pregnancy

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

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

mood swings and problems with anxiety. Therefore, it is imperative that prenatal women discuss the risks and benefits of antidepressant therapy with their health care provider.

Postpartum Depression and Related Mood Disorders

Postpartum depression was historically hypothesized to be caused by low estrogen and progesterone levels immediately following birth, however, this hypothesis has been found to have limited scientific support (17). Emerging studies have found that reproductive hormones have an indirect relationship on depression because of the influence on stress hormones, immune markers or sleep quality. The incidence of postpartum depression in new mothers can range from approximately 12 to 25 percent, to up to 35 percent or more in some high-risk groups. High risk groups include: women of low income, younger age, low education level and histories of stressful life events or traumatic experiences. Some studies have higher percentage rates for depression because they include both subjects with diagnosed major depression and those with depressive symptoms, thus accounting for the wide range in rates. (4)

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

Inflammation and Depression

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

Breastfeeding and Depression

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

Implications for WIC Nutrition Services

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

• Reinforce and support the treatments and therapies prescribed by the participant's health care provider.

• Make referrals to the primary health care provider and/or to other appropriate mental health and social service programs. A 2010 brief from the Urban Institute (http://www.urban.org/publications/412199.html), recognized the WIC Program as a viable access point to identify and refer mothers with depressive symptoms (20). To learn more about mental health resources in your area please access the U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration's website. http://store.samhsa.gov/mhlocator or http://www.samhsa.gov/prevention/.

• Provide follow-up to ensure that the woman is receiving the necessary mental health treatment.

• Encourage food choices that promote nutritional well-being (to include good sources of Omega-3's for their anti-inflammatory properties).

• Educate about the increased risk of depressive symptoms during the third trimester of pregnancy as well as the prevalence, risks and signs of postpartum depression.

• Provide adequate breastfeeding education, assessment and support (e.g., peer counseling) to women with existing depression; both prenatally and in the postpartum period.

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

Clarification/

Before assigning this risk code, be sure depression is documented on the

Guidelines

health history form.

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.

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Oral Health Conditions – (P, B, N, I, C)

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/ Priority Level

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

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)

See Attachment for **Table 1.** Cariogenic Potential of Children's Foods and Snacks

Women

Maternal periodontal disease and dental caries may impact pregnancy outcome, and the offspring's risk of developing early and severe dental caries. Periodontal disease and caries may also increase the women's risk of atherosclerosis, rheumatoid arthritis and diabetes. These oral health problems are highly prevalent in women of childbearing age, particularly among low-income women and members of racial and ethnic minority groups. Socioeconomic factors, lack of resources to pay for care, barriers to access care, lack of public understanding of the importance of oral health and effective self-care practices all represent underlying reasons cited for observed inadequacies in oral health. (6)

Maternal periodontal disease, a chronic infection of the gingiva (gums) and supporting tooth structures, has been associated with preterm birth, low birthweight and development of preeclampsia (6, 7). Studies indicate that periodontal infection can result in placental-fetal exposure and, when coupled with a fetal inflammatory

response, can lead to preterm delivery (7). Additionally, in a cohort of 164 young, minority, pregnant and postpartum women, the preterm/low birthweight rate was 5.4% lower among women who received periodontal treatment than those who did not receive treatment (7). In a case-control study, researchers found that preeclamptic patients were 3.5 times more likely to have periodontal disease than normotensive patients (6). (See nutrition risk criterion #304 *History of Preeclampsia* for more information.)

Fluoride and Fluorosis

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

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

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

Dental Care and Anxiety

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

learning to understand the causes of dental fear, have techniques to assess the level of fear and have modified treatments to accommodate patients with high anxiety levels. (12)

Oral Health Problems and Special Health Care Needs

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

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

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

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

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

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

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

*Delayed Tooth Eruption (DTE) is the emergence of a tooth into the oral cavity at a time that deviates significantly from norms

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

Dentate Status, Diet Quality and General Health

By the time individuals reach adulthood, the human mouth has progressed from 20 primary teeth to 32 permanent (adult) teeth (2). The extent to which tooth loss can adversely affect nutritional status is not completely known. However, diet quality tends to decline as the degree of dental impairment increases. Studies have shown that intake of vitamin A, fiber, calcium and other key nutrients decline as the number of teeth decline. In The Health Professionals study, participants without teeth had diets that contained fewer vegetables, less carotene and fiber, and more cholesterol, saturated fat, and calories than persons with 25 teeth or more (15). Despite the trend toward increased tooth retention throughout adult life in developed countries, 11% of adults aged 25 and older have lost all of their natural teeth. This number increases to 30% for people over age 65 and is even higher in those living in poverty. Loss of teeth is not a normal result of the aging process; the major cause of tooth loss is extractions resulting from dental caries and/or periodontal disease. (15)

Implications for WIC Nutrition Services

To help prevent oral health problems from developing and ensure the best possible health and developmental outcomes, WIC staff can encourage participants and caregivers to:

Diet

• Breastfeed infants during the first year of life and beyond as mutually desired.

• Avoid having an infant/child sleep with a bottle. Any bottle taken to bed should contain only water. (See Risks *470.3* and *460.2*)

• 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 *470.2*)

• 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 *460.11*).

• Check if the public water systems have added fluoride at: http://apps.nccd.cdc.gov/MWF/Index.asp.

• Access the following website for more information about fluoride: http://www.cdc.gov/fluoridation/safety.htm.

Referrals

• Establish a dental home within 6 months of eruption of the first tooth and no later than 12 months of age. (3)

• See a dentist for examinations (every 6 months) and/or restoration of all active decay as soon as possible. (WIC staff should provide dental referrals as necessary.)

Oral Health Resources/Handouts

• Summary of Pediatric Oral Health Anticipatory Guidance: http://www.aafp.org/afp/2004/1201/p2113.html#afp20041201p2113-t2.

• Table: Oral health and dietary management for mothers and children (see page 3 of pdf.) http://www.sciencedirect.com/science/article/pii/S0002822398000443.

• Oral Health Care During Pregnancy: A National Consensus Statement: http://www.mchoralhealth.org/materials/consensus_statement.html

• *Your Baby's Teeth:* http://www.aafp.org/afp/2004/1201/p2121.html.

• *Two Healthy Smiles: Tips to Keep You and Your Baby Healthy:* http://www.mchoralhealth.org/PDFs/pregnancybrochure.pdf.

• *Tips for Good Oral Health Care During Pregnancy:* http://www.mchoralhealth.org/PDFs/OralHealthPregnancyHandout.pdf.

• *A Healthy Smile for Your Baby* (English): http://www.mchoralhealth.org/PDFs/babybrochure.pdf.

• *A Healthy Smile for Your Baby* (Spanish): http://www.mchoralhealth.org/PDFs/babybrochure_sp.pdf.

Clarification/ *Guidelines*

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

WIC staff does not have the authority to diagnose any conditions. Although some clinic staff are trained to identify potential dental problems, staff shall refer to a dentist as appropriate.

Assign this risk code to participants diagnosed with gingivitis. Documentation of the oral health condition shall be documented on the health history form.

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Table 1. Cariogenic Potential of Children's Foods and Snacks

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

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

**Sticky candy and/or slowly eaten candy are extremely cariogenic.
Adapted from: Faine, MP. Nutrition and oral health. In: Proceedings of Promoting Oral Health of Children with Neurodevelopmental Disabilities and Other Special Health Care Needs. May 4-5, 2001. Seattle, WA.

Inappropriate Nutrition Practices for Infants

Definition/ cut-off value	**Routine use of feeding practices that may result in impaired nutrient status, disease, or health problems. These practices, with examples, are outlined below. Refer to "Justification and References" for this criterion.**

Participant Category/ Priority Level	**Category**	**Priority**
	Infants	IV

Inappropriate Nutrition Practices for Infants	**Examples of Inappropriate Nutrition Practices (including but not limited to)**
1. Routinely using a substitute(s) for breast milk or for FDA approved iron-fortified formula as the primary nutrient source during the first year of life.	Examples of substitutes: ▪ Low iron formula without iron supplementation; ▪ Cow's milk, goat's milk, or sheep's milk (whole, reduced fat, low-fat, skim), canned evaporated or sweetened condensed milk; and ▪ Imitation or substitute milks (such as rice- or soy-based beverages, non-dairy creamer), or other "homemade concoctions."
2. Routinely using nursing bottles or cups improperly.	▪ Using a bottle to feed fruit juice. ▪ Feeding any sugar-containing fluids, such as soda/soft drinks, gelatin water, corn syrup solutions, sweetened tea. ▪ Allowing the infant to fall asleep or be put to bed with a bottle at naps or bedtime. ▪ Allowing the infant to use the bottle without restriction (e.g., walking around with a bottle) or as a pacifier. ▪ Propping the bottle when feeding. ▪ Allowing an infant to carry around and drink throughout the day from a covered or training cup. ▪ Adding any food (cereal or other solid foods) to the infant's bottle.

3. Routinely offering complementary foods* or other substances that are inappropriate in type or timing. *Complementary foods are any foods or beverages other than breast milk or infant formula.	Examples of inappropriate complementary foods: ▪ Adding sweet agents such as sugar, honey, or syrups to any beverage (including water) or prepared food, or used on a pacifier; and ▪ Any food other than breast milk or iron-fortified infant formula before 4 months of age.
4. Routinely using feeding practices that disregard the developmental needs or stage of the infant.	▪ Inability to recognize, insensitivity to, or disregarding the infant's cues for hunger and satiety (e.g., forcing an infant to eat a certain type and/or amount of food or beverage or ignoring an infant's hunger cues). ▪ Feeding foods of inappropriate consistency, size, or shape that put infants at risk of choking. ▪ Not supporting an infant's need for growing independence with self-feeding (e.g., solely spoon-feeding an infant who is able and ready to finger-feed and/or try self-feeding with appropriate utensils). ▪ Feeding an infant foods with inappropriate textures based on his/her developmental stage (e.g., feeding primarily pureed or liquid foods when the infant is ready and capable of eating mashed, chopped or appropriate finger foods).
5. Feeding foods to an infant that could be contaminated with harmful microorganisms or toxins.	Examples of potentially harmful foods: ▪ Unpasteurized fruit or vegetable juice; ▪ Unpasteurized dairy products or soft cheeses such as feta, Brie, Camembert, blue-veined, and Mexican-style cheese; ▪ Honey (added to liquids or solid foods, used in cooking, as part of processed foods, on a pacifier, etc.); ▪ Raw or undercooked meat, fish, poultry, or eggs; ▪ Raw vegetable sprouts (alfalfa, clover, bean, and radish); and ▪ Deli meats, hot dogs, and processed meats (avoid unless heated until steaming hot).
6. Routinely feeding inappropriately diluted formula.	▪ Failure to follow manufacturer's dilution instructions (to include stretching formula for household economic reasons). ▪ Failure to follow specific instructions accompanying a prescription.

7. Routinely limiting the frequency of nursing of the exclusively breastfed infant when breast milk is the sole source of nutrients.	Examples of inappropriate frequency of nursing: ▪ Scheduled feedings instead of demand feedings; ▪ Less than 8 feedings in 24 hours if less than 2 months of age; and ▪ Less than 6 feedings in 24 hours if between 2 and 6 months of age.
8. Routinely feeding a diet very low in calories and/or essential nutrients.	Examples: ▪ Vegan diet; ▪ Macrobiotic diet; and ▪ Other diets very low in calories and/or essential nutrients.
9. Routinely using inappropriate sanitation in preparation, handling, and storage of expressed human milk or formula.	Examples of inappropriate sanitation: Limited or no access to a: • Safe water supply (documented by appropriate officials e.g., municipal or health department authorities); • Heat source for sterilization; and/or • Refrigerator or freezer for storage. Failure to prepare, handle, and store bottles, storage containers or breast pumps properly; examples include: Human Milk • Thawing in a microwave • Refreezing • Adding freshly expressed unrefrigerated human milk to frozen human milk • Adding refrigerated human milk to frozen human milk in an amount that is greater than the amount of frozen human milk • Feeding thawed human milk more than 24 hours after it was thawed • Saving human milk from a used bottled for another feeding • Failure to clean breast pump per manufacturer's instruction Formula • Storing at room temperature for more than 1 hour • Failure to store prepared formula per manufacturer's instructions • Using formula in a bottle one hour after the start of a feeding • Saving formula from a used bottle for another feeding • Failure to clean baby bottle properly
10. Feeding dietary supplements with potentially harmful	Examples of dietary supplements, which when fed in excess of recommended dosage, may be toxic or have harmful consequences:

consequences.	▪ Single or multi-vitamins; ▪ Mineral supplements; and ▪ Herbal or botanical supplements/remedies/teas.
11. Routinely not providing dietary supplements recognized as essential by national public health policy when an infant's diet alone cannot meet nutrient requirements.	▪ Infants who are 6 months of age or older who are ingesting less than 0.25 mg of fluoride daily when the water supply contains less than 0.3 ppm fluoride. ▪ Infants who are exclusively breastfed, or are ingesting less than 1 liter (or 1 quart) per day of vitamin D-fortified formula, and are not taking a supplement of 400 IU of vitamin D.

Justification

1. **Routinely using a substitute(s) for breast milk or for FDA approved iron-fortified formula as the primary nutrient source during the first year of life.** During the first year of life, breastfeeding is the preferred method of infant feeding. The American Academy of Pediatrics (AAP) recommends breast milk for the first 12 months of life because of its acknowledged benefits to infant nutrition, gastrointestinal function, host defense, and psychological well-being (1). For infants fed infant formula, iron-fortified formula is generally recommended as a substitute for breastfeeding (1- 4). Rapid growth and increased physical activity significantly increase the need for iron and utilizes iron stores (1). Body stores are insufficient to meet the increased iron needs making it necessary for the infant to receive a dependable source of iron to prevent iron deficiency anemia (1). Iron deficiency anemia is associated with cognitive and psychomotor impairments that may be irreversible, and with decreased immune function, apathy, short attention span, and irritability (1, 5). Feeding of low-iron infant formula can compromise an infant's iron stores and lead to iron deficiency anemia. Cow's milk has insufficient and inappropriate amounts of nutrients and can cause occult blood loss that can lead to iron deficiency, stress on the kidneys from a high renal solute load, and allergic reactions (1, 3, 5-8). Sweetened condensed milk has an abundance of sugar that displaces other nutrients or causes over consumption of calories (9). Homemade formulas prepared with canned evaporated milk do not contain optimal kinds and amounts of nutrients infants need (1, 5, 8, 9). Goat's milk, sheep's milk, imitation milks, and substitute milks do not contain nutrients in amounts appropriate for infants (1, 3, 5, 10, 11).

2. **Routinely using nursing bottles or cups improperly.** Dental caries is a major health problem in U.S. preschool children, especially in low-income populations (12). Eating and feeding habits that affect tooth decay and are started during infancy may continue into early childhood. Most implicated in this rampant disease process is prolonged use of baby bottles during the day or night, containing fermentable sugars, (e.g., fruit juice, soda, and other sweetened drinks), pacifiers dipped

Justification (cont.)

in sweet agents such as sugar, honey or syrups, or other high frequency sugar exposures (13). The AAP and the American Academy of Pedodontics recommend that juice should be offered to infants in a cup, not a bottle, and that infants not be put to bed with a bottle in their mouth (14, 15). While sleeping with a bottle in his or her mouth, an infant's swallowing and salivary flow decreases, thus creating a pooling of liquid around the teeth (16). The practice of allowing infants to carry or drink from a bottle or training cup of juice for periods throughout the day leads to excessive exposure of the teeth to carbohydrate, which promotes the development of dental caries (14).

Allowing infants to sleep with a nursing bottle containing fermentable carbohydrates or to use it unsupervised during waking hours provides an almost constant supply of carbohydrates and sugars (1). This leads to rapid demineralization of tooth enamel and an increase in the risk of dental caries due to prolonged contact between cariogenic bacteria on the susceptible tooth surface and the sugars in the consumed liquid (1, 17). The sugars in the liquid pool around the infant's teeth and gums feed the bacteria there and decay is the result (18). The process may start before the teeth are even fully erupted. Upper incisors (upper front teeth) are particularly vulnerable; the lower incisors are generally protected by the tongue (18). The damage begins as white lesions and progresses to brown or black discoloration typical of caries (18). When early childhood caries is severe, the decayed crowns may break off and the permanent teeth developing below may be damaged (18). Undiagnosed dental caries and other oral pain may contribute to feeding problems and failure to thrive in young children (18).

Unrestricted use of a bottle, containing fermentable carbohydrates, is a risk because the more times a child consumes solid or liquid food, the higher the caries risk (1). Cariogenic snacks eaten between meals place the toddler most at risk for caries development; this includes the habit of continually sipping from cups (or bottles) containing cariogenic liquids (juice, milk, soda, or sweetened liquid) (18).

Justification (cont.)

If inappropriate use of the bottle persists, the child is at risk of toothaches, costly dental treatment, loss of primary teeth, and developmental lags on eating and chewing. If this continues beyond the usual weaning period, there is a risk of decay to permanent teeth.

Propping the bottle deprives infants of vital human contact and nurturing which makes them feel secure. It can cause: ear infections because of fluid entering the middle ear and not draining properly; choking from liquid flowing into the lungs; and tooth decay from prolonged exposure to carbohydrate-containing liquids (19).

Adding solid food to a nursing bottle results in force-feeding, inappropriately increases the energy and nutrient composition of the formula, deprives the infant of experiences important in the development of feeding behavior, and could cause an infant to choke (1, 10, 20, 21).

3. **Routinely offering complementary foods or other substances that are inappropriate in type or timing.** Infants, especially those living in poverty, are at high risk for developing early childhood caries (12). Most implicated in this rampant disease process is prolonged use of baby bottles during the day or night, containing fermentable sugars, (e.g., fruit juice, soda, and other sweetened drinks), pacifiers dipped in sweet agents such as sugar, honey or syrups, or other high frequency sugar exposures (13).

   Feeding solid foods too early (i.e., before 4 to 6 months of age) by, for example, adding dilute cereal or other solid foods to bottles deprives infants of the opportunity to learn to feed themselves (3, 10, 20, 22). The major objection to the introduction of beikost before age 4 months of age is based on the possibility that it may interfere with establishing sound eating habits and may contribute to overfeeding (5, 23). Before 4 months of age, the infant possesses an extrusion reflex that enables him/her to swallow only liquid foods (1, 12, 24). The extrusion reflex is toned down at four months (20). Breastmilk or iron-fortified

Justification (cont.)

infant formula is all the infant needs. Gastric secretions, digestive capacity, renal capacity and enzymatic secretions are low, which makes digestion of solids inefficient and potentially harmful (5, 20, 23, 24). Furthermore, there is the potential for antigens to be developed against solid foods, due to the undigested proteins that may permeate the gut, however, the potential for developing allergic reactions may primarily be in infants with a strong family history of atopy (5, 23). If solid foods are introduced before the infant is developmentally ready, breastmilk or iron-fortified formula necessary for optimum growth is displaced (1, 20, 24). Around 4 months of age, the infant is developmentally ready for solid foods when (1, 5, 20, 23, 24): the infant is better able to express certain feeding cues such as turning head to indicate satiation; oral and gross motor skills begin to develop that help the infant to take solid foods; the extrusion reflex disappears; and the infant begins to sit upright and maintain balance.

Offering juice before solid foods are introduced into the diet could risk having juice replace breastmilk or infant formula in the diet (14). This can result in reduced intake of protein, fat, vitamins, and minerals such as iron, calcium, and zinc (25). It is prudent to give juice only to infants who can drink from a cup (14).

4. **Routinely using feeding practices that disregard the developmental needs or stage of the infant.** Infants held to rigid feeding schedules are often underfed or overfed. Caregivers insensitive to signs of hunger and satiety, or who over manage feeding may inappropriately restrict or encourage excessive intake. Findings show that these practices may promote negative or unpleasant associations with eating that may continue into later life, and may also contribute to obesity. Infrequent breastfeeding can result in lactation insufficiency and infant failure-to-thrive. Infants should be fed foods with a texture appropriate to their developmental level. (3, 5, 10, 12, 20, 22)

Justification (cont.)

5. **Feeding foods to an infant that could be contaminated with harmful microorganisms or toxins.** Only pasteurized juice is safe for infants, children, and adolescents (14). Pasteurized fruit juices are free of microorganisms (14). Unpasteurized juice may contain pathogens, such as Escherichia coli, Salmonella, and Cryptosporidium organisms (14, 26). These organisms can cause serious disease, such as hemolytic-uremic syndrome, and should never be fed to infants and children (14). Unpasteurized juice must contain a warning on the label that the product may contain harmful bacteria (14, 27). Infants or young children should not eat raw or unpasteurized milk or cheeses (1)—unpasteurized dairy products could contain harmful bacteria, such as Brucella species, that could cause young children to contract a dangerous food borne illness. The AAP also recommends that young children should not eat soft cheeses such as feta, Brie, Camembert, blue-veined, and Mexican-style cheese—these foods could contain Listeria bacteria (hard cheeses, processed cheeses, cream cheese, cottage cheese, and yogurt need not be avoided) (1).

   Honey has been implicated as the primary food source of *Clostridium botulinum* during infancy. These spores are extremely resistant to heat, including pasteurization, and are not destroyed by present methods of processing honey. Botulism in infancy is caused by ingestion of the spores, which germinate into the toxin in the lumen of the bowel (9, 10, 20, 28, 29).

   Infants or young children should not eat raw or undercooked meat or poultry, raw fish or shellfish, including oysters, clams, mussels, and scallops (1)—these foods may contain harmful bacteria or parasites that could cause children to contract a dangerous food borne illness.

   According to the AAP, to prevent food-born illness, the foods listed below should not be fed to infants or young children. (1) All of the foods have been implicated in selected outbreaks of

Justification (cont.)

food-borne illness, including in children. Background information regarding foods that could be contaminated with harmful microorganisms is also included below:

- Raw vegetable sprouts (alfalfa, clover, bean, and radish)--Sprouts can cause potentially dangerous Salmonella and E. coli O157 infection. Sprouts grown under clean conditions in the home also present a risk because bacteria may be present in seed. Cook sprouts to significantly reduce the risk of illness (30).
- Deli meats, hot dogs, and processed meats (avoid unless heated until steaming hot) --These foods have been found to be contaminated with *Listeria monocytogenes*; if adequately cooked, this bacteria is destroyed.

6. **Routinely feeding inappropriately diluted formula.** Over-dilution can result in water intoxication resulting in hyponatremia; irritability; coma; inadequate nutrient intake; failure to thrive; poor growth (1, 3, 5, 10, 20, 31). Underdilution of formula increases calories, protein, and solutes presented to the kidney for excretion, and can result in hypernatremia, tetany, and obesity (3, 5, 10, 20, 31).

   Dehydration and metabolic acidosis can occur with under-dilution of formula (3, 5, 10, 31). Powdered formulas vary in density so manufacturer's scoops are formula specific to assure correct dilution (5, 20). One clue for staff to identify incorrect formula preparation is to determine if the parent/caregiver is using the correct manufacturer's scoop to prepare the formula.

7. **Routinely limiting the frequency of nursing of the exclusively breastfed infant when breast milk is the sole source of nutrients.** Exclusive breastfeeding provides ideal nutrition to an infant and is sufficient to support optimal growth and development in the first 6 months of life (4). Frequent breastfeeding is critical to the establishment and maintenance of an adequate milk supply for the infant (4, 32 to 36). Inadequate frequency of breastfeeding may lead to lactation failure in the

Justification (cont.)

mother and dehydration, poor weight gain, diarrhea, and vomiting, illness, and malnourishment in the infant (4, 34, 37-42). Exclusive breastfeeding protects infants from early exposure to contaminated foods and liquids (40). In addition, infants, who receive breastmilk more than infant formulas, have a lower risk of being overweight in childhood and adolescence (43, 44).

8. **Routinely feeding a diet very low in calories and/or essential nutrients.** Highly restrictive diets prevent adequate intake of nutrients, interfere with growth and development, and may lead to other adverse physiological effects (3). Infants older than 6 months are potentially at the greatest risk for overt deficiency states related to inappropriate restrictions of the diet, although deficiencies of vitamins B12 and essential fatty acids may appear earlier (1, 45, 46). Infants are particularly vulnerable during the weaning period if fed a macrobiotic diet and may experience psychomotor delay in some instances (1, 47, 48). Well-balanced vegetarian diets with dairy products and eggs are generally associated with good health. However, strict vegan diets may be inadequate in calories, vitamin B12, vitamin D, calcium, iron, protein and essential amino acids needed for growth and development (49). The more limited the diet, the greater the health risk. Given the health and nutrition risks associated with highly restrictive diets, WIC can help the parent to assure that the infant consumes an adequate diet to optimize health during critical periods of growth as well as for the long term.

9. **Routinely using inappropriate sanitation in preparation, handling, and storage of expressed human milk or formula.** Lack of sanitation in the preparation, handling and storage of expressed human milk or formula may cause gastrointestinal infection. The water used to prepare concentrated or powdered infant formula and prepare bottles and nipples (for formula and human milk) must be safe for consumption. Water contaminated with toxic substances (such as nitrates, lead, or pesticides) poses a hazard to an infant's health and should NOT be used (9). In addition, a heat source is necessary to sterilize bottles and other items used in the storage of both human milk and formula.

Adequate refrigeration (40 Degrees Fahrenheit or below) is necessary to safely store human milk and prepared formula (9).

Human Milk

Published guidelines on the handling and storage of human milk may differ among pediatric nutrition authorities (1, 9, 50-53). However, there is consensus on the following human milk feeding, handling, and storage practices that are considered inappropriate and unsafe (9, 50, 54-56):

- Thawing frozen human milk in the microwave oven
- Refreezing human milk
- Adding freshly expressed unrefrigerated human milk to already frozen milk in a storage container*
- Feeding previously frozen human milk thawed in the refrigerator that has been refrigerated for more than 24 hours
- Saving human milk from a used bottle for another use at another feeding
- Failure to clean a breast pump per manufacturer's instruction

* The appropriate and safe practice is to add chilled freshly expressed human milk, in an amount that is smaller than the milk that has been frozen for no longer than 24 hours.

As stated above, there are variations in human milk storage guidelines among recognized entities, e.g., AAP and Academy of Breastfeeding Medicine (ABM) (1, 53). The ABM guidelines have longer refrigerated storage time than AAP and are cited for several organizations (1, 53). However, the ABM guidelines are for healthy term infants, and while they may be appropriate for a large percentage of the general population, the WIC population is considered an "at risk population". Therefore, it is not possible at this time to identify a clear cut-off to determine unsafe refrigeration limits for WIC risk determination.

Another consideration when recommending length of storage time is its effect on protective properties in human milk. There is evidence that after 48 hours of refrigeration, human milk significantly loses important antibacterial and antioxidant properties (57). These properties of human milk are specifically important for the prevention of necrotizing enterocolitis, retinopathy, and bronchopulmonary dysplasia of premature

infants (57). Although some properties may be reduced with longer refrigerated storage, this does not diminish the overall superiority of human milk over formula, as formula does not contain these protective properties or many of the other benefits of human milk.

Participant circumstances (e.g., adequate refrigeration, safe water, heat source) as well as health of the infant need to be considered when recommending the length of time human milk may be stored in the refrigerator. Please see the WIC Works Resource System for handling and storage recommendations: http://www.nal.usda.gov/wicworks/WIC_Learning_Online/support/job_aids/safety.pdf. These recommendations are based on the AAP's guidelines for the safe handling and storage of human milk.

If the breastfeeding mother uses a breast pump, it is essential for her to fully understand the importance of and the specific manufacturer's instructions for cleaning the breast pump. Improper cleaning of breast pumps and pump parts can increase the risk of expressed human milk contamination (56).

Formula

Formula must be properly prepared in a sanitary manner to be safe for consumption. Furthermore, prepared infant formula is a perishable food, and must be handled and stored properly in order to be safe for consumption (3, 9, 20).

Most babies who are hospitalized for vomiting and diarrhea are bottle fed. This has often been attributed to the improper handling of formula rather than sensitivities to the formula. During the manufacturing process, powdered formulas can become contaminated with harmful bacteria. In rare cases, the contaminated powdered formulas may cause infections in preterm or immune compromised infants. To reduce the risk of infection in infants it is important that formulas be carefully prepared and handled. Instructions for the sanitary preparation of formulas can be obtained from the WIC Works Resource System at: http://www.nal.usda.gov/wicworks/WIC_Learning_Online/support/job_aids/formula.pdf and from the World Health Organization at: http://www.who.int/foodsafety/publications/micro/pif_guidelines.pdf. It is generally recommended to boil the water used for infant formula preparation during the first 3 months of life (9).

Caregivers should consider the safety of their water source and the health status of the infant in addition to consulting with their health care provider regarding whether to continue boiling the water when preparing infant formula for the infant older than 3 months.

Manufacturers' instructions vary, depending on the product, in the length of time it is considered safe to store prepared infant formula without refrigeration before bacterial growth accelerates to an extent that the infant is placed at risk (1, 9, 20). Published guidelines on the handling and storage of infant formula indicate that it is unsafe to use prepared formula which (1, 9):

- Has been held at room temperature longer than 1 hour or longer than recommended by the manufacturer
- Has been held in the refrigerator longer than the safe storage time indicated by the manufacturer
- Remains in a bottle one hour after the start of feeding
- Remains in a bottle from an earlier feeding
- Is fed using improperly cleaned baby bottles

10. **Feeding dietary supplements with potentially harmful consequences.** An infant consuming inappropriate or excessive amounts of single or multivitamin or mineral or herbal remedy not prescribed by a physician is at risk for a variety of adverse effects including harmful nutrient interactions, toxicity, and teratogenicity (1, 55). While some herbal teas may be safe, some have undesirable effects, particularly on infants who are fed herbal teas or who receive breast milk from mothers who have ingested herbal teas (56). Examples of teas with potentially harmful effects to children include: licorice, comfrey leaves, sassafras, senna, buckhorn bark, cinnamon, wormwood, woodruff, valerian, foxglove, pokeroot or pokeweed, periwinkle, nutmeg, catnip, hydrangea, juniper, Mormon tea, thorn apple, yohimbe bark, lobelia, oleander, Maté, kola nut or gotu cola, and chamomile (56-58). Like drugs, herbal or botanical preparations have chemical and biological activity, may have side effects, and may interact with certain medications--these interactions can cause problems and can even be dangerous (59). Botanical supplements are not necessarily safe because the safety of a botanical depends on many things, such as its chemical makeup, how it works in the body, how it is prepared, and the dose used (59).

Justification (cont.)

11. **Routinely not providing dietary supplements recognized as essential by national public health policy when an infant's diet alone cannot meet nutrient requirements.** Depending on an infant's specific needs and environmental circumstances, certain dietary supplements may be recommended by the infant's health care provider to ensure health. For example, fluoride supplements may be of benefit in reducing dental decay for children living in fluoride-deficient areas (1, 60). Further, to prevent rickets and vitamin D deficiency in healthy infants and children, the AA P recommends a supplement of 400 IU per day for the following (4, 61):

    1. All breastfed and partially breastfed infants unless they are weaned to at least 1 liter (or 1 quart) per day of vitamin D-fortified formula.

    2. All non-breastfed infants who are ingesting less than 1 liter (or 1 quart) per day of vitamin D-fortified formula.

Clarifications/ Guidelines

If an infant is consuming less than 1 quart (32 ounces) of fortified vitamin D-fortified formula per day, refer to healthcare provider. Encourage parent/guardian to speak to the healthcare provider about vitamin D supplementation.

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