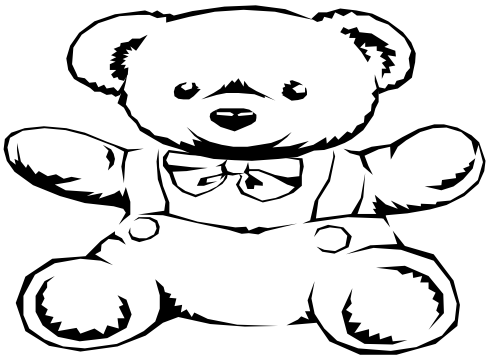
Level 2: WIC Certification Program

INFANT NUTRITION MODULE

FEEDING THE INFANT

FROM BIRTH TO 12 MONTHS



Colorado Department of Public Health & Environment
Nutrition Services/WIC Program

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WIC and Nutrition Services

WIC #545 (Rev. 5/2000)

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Infant Nutrition Module - Objectives

After completing this module, the learner will be able to:

1. Explain why breast milk is the best milk for infants in their first year of life and identify the benefits of breastfeeding.

2. Identify the brand names of infant formulas that are made from cow's milk and the brand names of infant formulas that are made from soybeans.

3. Identify how to dilute or mix the following forms of infant formula: concentrated, powdered, and ready-to-feed.

4. Explain why it is extremely important that concentrated and powdered infant formulas be mixed with the proper amounts of water.

5. Explain to a participant why sterilization and sanitation measures used during bottle preparation are very important.

6. Identify the types of milk that are acceptable to feed to an infant during the first year of life.

7. Answer a participant's basic questions about the feeding schedules of newborn infants--birth to 4 months old.

8. List the only three items which should be fed from a bottle.

9. State the importance of burping the breastfed and bottle-fed baby during and after feedings.

10. State when solid foods should be introduced in an infant's diet, and recognize the indicators of developmental readiness for introduction of solid foods.

11. Identify appropriate foods to feed to a 4 to 8 month old infant.

12. Recognize appropriate and inappropriate feeding practices for infants.

13. Identify appropriate foods to feed an 8 to 12 month old infant.

14. Name foods which should be avoided because they can cause an infant to choke.

15. Explain to a participant the process of weaning an infant from the breast or bottle to a cup.

16. Define "Early Childhood Caries" and list its causes.

17. Identify the foods that supply iron for an infant and explain how absorption of iron by the body can be increased.

Introduction

Growth during the first year of life is greater than at any other time after birth. An infant's birth weight will usually double by four to six months of age and triple by the first birthday. Good nutrition during this period of rapid growth is vital to ensure that the infant develops both physically and mentally to the fullest potential.

The age recommendations that have been made throughout this module on infant nutrition include the earliest recommended age for a given procedure–whether it's introducing solid foods, finger foods, or weaning from a bottle to a cup. All infants progress at their own rate and differences in developmental rates are to be expected. An infant who does not fall within the average age range for readiness to progress to the next feeding method is not necessarily an abnormal infant. If in doubt about a specific behavior or practice, the WIC RD or RN should be consulted.

The caregivers of infants enrolled in WIC receive nutritional assessment and follow up care. Some caregivers will need special nutrition counseling because of certain factors related to their infant's health and diet. It is extremely important that we understand the nutritional risks of infancy and how to identify them. This module will review educational points that may be necessary to discuss with caregivers and will highlight the infant related nutrition risk factors.

Part 1: Feeding the Infant from Birth to Twelve Months of Age

Nutrition for the Newborn: Birth to Four Months of Age

The goal of this section is to provide information about feeding infants during the first months of life. During the early months, most of the time spent between parents and caregivers and the infant is in feeding. For the infant who is growing properly, it is important that parents trust their infant to share control by feeding the infant on demand and letting him/her eat as much or as little as he/she wants. During these early months, nutritional needs can be entirely met with breast milk or iron-fortified infant formula. Breast milk is the preferred milk for infants.

If breastfeeding is not chosen, iron-fortified infant formula is the recommended alternative. When infant formula is used, proper preparation and handling is important.

Solid foods should not be fed before four months of age since infants have no nutritional need for them and are not developmentally ready to eat them before this age. Some infants may not be ready until six months of age. Even after solid foods have been introduced, it is strongly recommended that infants continue to be breastfed or receive an iron-fortified formula through their first year of life.

Breastfeeding Is Best

Breast milk is the best milk for infants in their first year of life. Human milk is perfectly suited to the nutritional needs of the human infant, which makes it superior to infant formula and cow's milk.

Benefits of Breastfeeding

The following is an abbreviated list of benefits afforded to the infant and mother when breastfeeding (refer to the *Breastfeeding Module and Resource Manual* for a more complete list):

- ✓ The nutrient composition of breast milk is ideal.
- ✓ While formula contains nutrients necessary for growth, human milk has the perfect composition for infant and changes as the infant's needs change. Breast milk is easily digested and nutrients easily absorbed.
- ✓ Constipation is rare among breastfed infants.
- ✓ The fat (lipid) portion of human milk is almost completely digestible, providing an excellent source of calories for energy.
- ✓ Breast milk contains more cholesterol than cow's milk and infant formula. Cholesterol is a necessary component in the formation of myelin, the covering of the nerve and brain cells. This covering is necessary for the development of muscular coordination of the infant during the first year of life.
- ✓ Human milk has factors that aid the absorption of iron and zinc.
- ✓ Breastfed infants have fewer illnesses than bottle-fed infants. Breast milk is rich in antibodies that protect the infant against infection and serious illness, including diarrhea, respiratory infections, and stomach/intestinal illnesses.

✓ Breastfeeding is easier to manage than bottle feeding–

- There is no mixing, measuring, or sterilizing involved with breastfeeding.
- Human milk is always at the correct temperature for baby.
- Breast milk is very portable and always ready when it is needed!

✓ Overfeeding the infant becomes less likely because the mother cannot tell how much the infant has ingested during breastfeeding and, therefore, cannot encourage the infant to "finish the bottle."

✓ There is less likelihood of developing allergies. Breast milk promotes maturation of the gastrointestinal tract to prevent allergens from entering the body. Cow's milk proteins are highly allergenic and early exposure could result in allergic symptoms later in life.

✓ The development of a strong mother-infant bond may be enhanced.

✓ Breast milk has economic benefits. Breastfeeding saves money such as there is no need for expensive formulas and fewer trips to the doctor's office with a sick infant.

Support of Breastfeeding

Breastfeeding is recognized by health care professionals as the best feeding choice for infants. The American Dietetic Association, The American Medical Association, The American Public Health Association, and The American Academy of Pediatrics have all developed statements supporting the promotion of breastfeeding. In order for breastfeeding to be successful, there needs to be a strong emotional support system for the mother. This support system includes WIC staff, the family as well as the physician and health care team. Mothers who have successfully breastfed their infants are also useful in supporting new breastfeeding mothers. The mother must be provided with information on breastfeeding before she starts and with continued information and support after breastfeeding has been started. The Level II: Breastfeeding Module and Resource Manual will provide the information to enable you to support the breastfeeding mother.

In instances where breastfeeding is unsuccessful or inappropriate (such as if the woman has tested positive for HIV, the virus that causes AIDS), or stopped early, the mother should not be made to feel guilty about her decision to switch to formula feeding. She should continue to receive encouragement and support from the health care team.

The following begins a series of Self-Checks that occur throughout this module. As you come to each Self-Check, complete it right away.

SELF-CHECK #1

INFANT NUTRITION

QUESTIONS

1. List two reasons why solid foods should not be fed to infants before 4 to 6 months of age.

   a. _____

   _____

   b. _____

   _____

2. Which of the following are reasons why breast milk is the best milk for infants? Circle the letter(s) of the correct answer(s).

   a. It is perfectly suited to the nutritional needs of an infant.

   b. Breast milk has special substances that protect an infant against infections.

   c. Breast milk is portable and ready when needed.

3. Place a "T" (True) or an "F" (False) in the space to the left of each of the following statements:

   ___ a. Breast milk is easily digested and nutrients easily absorbed.

   ___ b. Constipation is common among breastfed infants.

   ___ c. Breast milk is always at the correct temperature while baby is nursing.

   ___ d. In cases where breastfeeding is unsuccessful, the mother should not be made to feel guilty–she should continue to receive support from the health care team.

Go to pages 75-78 to check your answers.

Formula Feeding

When circumstances exist where breastfeeding is not chosen, the use of an iron-fortified commercial infant formula is the recommended alternative for the first year of life. It is important that the formula be iron-fortified to prevent iron-deficiency anemia. Low iron in infancy may put the baby at risk for more illness, delays in mental and motor development and impaired energy metabolism. The more severe the anemia the more severe the consequences. The test to check iron level in infancy is often done between 9 and 12 months of age.

Infant formulas are modified to be nutritionally similar to breast milk and therefore are digestible. Nutrients are added to infant formula to promote optimal infant growth.

Contrary to popular belief, the iron in iron-fortified formulas does NOT cause gastrointestinal distress such as constipation, colic, and diarrhea in infants. For more information on this topic, refer to the American Academy of Pediatrics Position Statement of Iron Fortification of Infant Formulas, July 1999, found in the Colorado WIC Formula Guide.

Types of Infant Formulas

There are several different types of infant formulas:

- Milk-based formulas like **Enfamil , Good Start ,** and **Similac** are made from cow's milk. Most infants can tolerate formulas made from cow's milk.

- Soy milk-based formulas, like **ProSobee , Isomil ,** and **Alsoy** are made from soybeans. These formulas are available for all infants as well as infants who are unable to tolerate cow's milk formulas.

- Several kinds of special formulas are produced for infants who have specific problems such as, prematurity, certain diseases, or a physical disability. The formulas are usually more expensive, have specific uses, and must be prescribed by physicians for the necessary period of time. In all cases, these infants need to be seen by the WIC nutritionist or nurse.

Formula Packaging

The cow's-milk-based and soy-based formulas are available in concentrated, powdered, or ready-to-feed (RTF) forms and must be diluted with water according to instructions on the label. It is very important for WIC staff to evaluate if the caregiver is mixing formula correctly according to the physician and label instructions. The infant nutrition questionnaires include a question that asks

how the formula is being mixed. Review this information with the caregiver. **WIC staff should not recommend caregivers change the formula dilution unless the WIC professional has discussed it with the physician.**

Concentrated liquid formula requires dilution with water in a one-to-one ratio; that is, one can of concentrated formula is mixed with one can of water. The can size is 13 ounces. **Once a can of concentrated formula is opened and refrigerated, it should be used within 24 hours.**

Powdered formula is usually mixed with water in a ratio of one scoop formula to two ounces of water. (The scoop is included in the can.) The directions on the formula can will give exact dilution requirements. When mixing powdered formula, fill the bottle with water first, then add the formula to the water. The powdered formula is available in 16 ounce, 14 ounce and in some areas 32 ounce cans. **Powdered formula is suggested for breastfed infants needing a supplemental bottle because, once opened, the can of powdered formula can be stored for up to one month.**

Ready-to-feed formula requires no mixing or diluting with water and is available in bottles and cans of various sizes. The ready-to-feed formula is generally the most expensive but may be preferable when the family's water supply is contaminated, the family lacks a source of refrigeration, or when the caregiver has difficulty in correctly diluting concentrated or powdered formula. **Once a can of ready-to-feed formula is opened and in the refrigerator, it should be used within 24 hours.**

**** Important Note ****
Some special formulas are mixed at different ratios of formula to water. The directions on the formula can will describe these requirements.

Formula Preparation

Once a can of liquid concentrate or ready-to-feed formula is opened, it should be covered and stored in a refrigerator no longer than 24 hours. Once a can of powdered formula is opened, it should be covered and stored in a cool, dry place for no longer than one month.

When preparing formulas for feeding, it is very important that caregivers follow the directions on the label to correctly mix the formula and to handle it carefully to avoid contamination.

The **aseptic method** of sterilization is acceptable when preparing the bottles.

In the aseptic method, special care is given to ensure that each item coming in contact with the formula or any item used in preparing the formula is as clean as possible before the formula is mixed. This is the method most commonly used in the WIC Program.

The following describes the steps to be taken for formula preparation.


The preparer's hands should be thoroughly washed. Then, the top of the formula can should be washed before opening in order to eliminate contaminants such as bug spray, dust, roach droppings, etc. The can opener should also be washed.

Aseptic Method

1. Wash Bottles:


Wash bottles, nipples, caps, rings, and tongs with in warm, soapy water and a bottle brush. Be sure water is able to get through the nipple hole. Rinse well.

2. Sterilize Bottles:

Place these objects in a large pan and cover with water. Boil for 5 minutes with the lid on. Let cool. Remove bottle supplies from sterilizer with tongs and place on clean cloth or paper towel to dry.

3. Prepare Water:

Formula makers provide directions for mixing their products with water but don't specify the water source. In all situations avoid using hot tap water. Allow cold tap water to run for a short period of time (about 2 minutes) before collecting the water. In most situations, it is safe to mix formula with cold tap water that is brought to a boil and boiled for 1-5 minutes (one minute for residence at <6,500 feet, 3 minutes for residence between 6,500 and 8,000 feet, and 5 minutes for residence at >8,000 feet).

Many parents use bottled water to mix infant formula because of fear of water safety. If the family lives in a rural area and is using well water, encourage them to have their water tested for bacteria and heavy metals (e.g., lead) contamination by the local health department. Boiling water will not free the water of heavy metals and because of the evaporation of the steam, the metals will actually be concentrated in the remaining water. If the quality of the water is undesirable, use store-bought bottled water. Water companies marketing infant water must meet the same standards as

tap water. As with tap water, consumers should boil bottled water one minute before mixing with infant formula.

The sterilization of water and bottles should be continued until the infant is 4 to 6 months of age. After that time, preparation using safe tap water and proper washing techniques should be adequate. Cleanliness during formula preparation and proper refrigeration of bottles is very important through the first year of life because these measures help to prevent gastrointestinal problems caused by bacteria.

4. Prepare formula:

Mix concentrated or powdered formula with the boiled water once it has cooled to warm bath water temperature (100 degrees F) in a clean container according to the label on the can. Powdered formula mixes best at this temperature.

Thus, to prepare a 6-ounce bottle of formula, mix 3 ounces of the concentrated formula with 3 ounces of water; or, mix 3 scoops of the powdered formula with 6 ounces of water.

NOTE: *Carefully read the label on the formula can for the appropriate directions for dilution. Any variation from the recommended dilution should be made only by a physician or nutritionist.*

Improper dilution of formula can result in very serious health problems for the infant. Formula mixed with too little water might be too concentrated for a baby to digest easily. Formula mixed with too much water might not supply the calories needed for recommended growth and may provide an overload of water that can be equally dangerous to the infant.

Reasons Caregivers Incorrectly Dilute Formula

There are a variety of reasons why a caregiver may not follow the instructions for proper dilution. Some reasons caregivers over dilute formulas are because they believe:

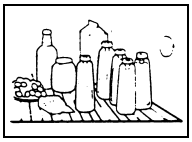
- it will help a baby with constipation, spitting up, diarrhea,
- it will help control the baby's weight,
- it will reduce the amount of iron to the baby, and
- it will make the formula last longer.

Some reasons caregivers over-concentrate formula are for the belief that

- it will help the baby sleep through the night,
- it will help the baby grow faster,
- it will thicken the formula to fill the baby up.

Also some caregivers have difficulty measuring the formula, and therefore, over-concentrate the formula.

5. Storing Formula:



Keep the formula in its original container and fill bottles as needed or if the caregiver has an adequate number of bottles, pour the prepared formula into the number of bottles needed for 24 hours. Using tongs, place nipples (upside down), disc seals, and caps on the filled bottles.

Store in refrigerator for up to 24 hours. Formula can be kept for up to 2 hours without refrigeration.

Counseling Tip

An easy way to tell caregivers how to mix **concentrated** formula with water is to pour the contents of a 13-ounce can of concentrated formula into a **clean** container. Fill the can with boiled water and pour this water into the container with the concentrated formula. Mix well. With this method the caregiver doesn't have to worry about the "exactness" of the ounce-for-ounce mixing. The final mixture is 26 ounces of prepared formula (13 ounces of concentrated formula plus the 13 ounces of water). Pour the mixture into clean bottles. This is similar to the method used to prepare frozen orange juice, where the empty can becomes the measuring device.

Lack of Sanitation in Preparation and Handling of Nursing Bottles
Nutrition Risk Factor #87
Lack of knowledge or access to facilities to ensure that water, bottles, and nipples used for feeding infants have been properly sanitized. This includes:

- no access to a safe water supply or stove for sterilization;
- failure to practice appropriate sanitation techniques in preparing bottles;
- failure to properly handle prepared
- formula, such as:

feeding formula held at room temperature longer than 2 hours or longer than recommended by the manufacturer;
feeding prepared formula held in refrigerator longer than 48 hours; and re-feeding formula remaining from an

Subjective; low risk.

Unused Formula

Throw away any formula left in the bottle after a feeding. The formula left in the bottle after a feeding has the infant's saliva mixed in with it, and this provides an ideal breeding ground for bacteria. If formula is offered to an infant and the infant drinks it for 5 minutes and then stops, it should be thrown away after one hour if the infant doesn't continue to drink. Also, a dropped bottle whose nipple has come into contact with the floor or another unsanitary source should not be given to the infant.

If the caregiver plans to take the infant with her on an "outing"–shopping, clinic appointment, etc.,–it is important that proper care is taken with the infant's bottles that will be packed in the diaper bag. The formula in the bottles should start out very cold. The bottles should be insulated (wrapped in a thick cloth) to keep them cold. If the caregiver will not have access to refrigeration for a very long time, it is a good idea to keep the bottles in a small ice chest or buy the single ready-to-feed bottles.

Proper Feeding Temperature of Formula

Infants can be fed formula that is room temperature, slightly cooler, or slightly warmer. If an infant prefers a warm bottle, special care must be given not to warm the formula beyond body temperature. The best way to warm a bottle of infant formula is to set it in a pan or bowl of warm water for a few minutes or shake it under warm tap water. A few drops of formula on the wrist is a good test of temperature: if it feels slightly warm on the wrist, it is the correct temperature for the infant.

Using Microwaves to Warm Formula or Breast milk

Never use microwaves for preparing infant formula or heating. The following risks are too great and outweigh the convenience of using microwave ovens for heating infant formula or expressed breast milk:

- After microwaving, glass or plastic bottles can remain cool to the touch while the formula or breast milk inside them can be scalding hot. Microwaving also heats liquids unevenly. The formula or breast milk may feel lukewarm to touch and will contain scalding hot spots.

- After microwaving, formula or breast milk in bottles with disposable plastic liners can become so hot that the plastic liners may burst.

- The heat of the microwave oven can destroy antibodies in breast milk. The correct way to warm breast milk is to take the milk out of the refrigerator just before using. Gradually, over 5 to 10 minutes, warm the milk to room temperature in a container of warm water. To use frozen breast milk–thaw the milk either in the refrigerator, where it can remain up to 24 hours, or in water just before feeding–gradually increase the temperature from cool to warm. Do not defrost the milk in a microwave or over the stove.

SELF-CHECK #2

INFANT NUTRITION

QUESTIONS

1. Circle the infant formulas that are made from cow's milk. Underline the ones that are made from soybeans.

Similac	Enfamil	Isomil
ProSobee	Good Start	Alsoy

2. Cow's milk-based formula and soy-based formula are packaged in three different forms: concentrated, powdered, and ready-to-feed. Briefly describe how to mix or dilute each one.

   Concentrated: _____

   _____

   Powdered: _____

   _____

   Ready-To-Feed: _____

   _____

Complete the sentences to make accurate statements in questions 3, 4, and 5.

3. Improper dilution of infant formula can result in _____
   _____
   _____
   _____

4. Sterilization of water and bottles (until the infant is 4 to 6 months of age) and overall cleanliness during formula preparation are necessary in order to prevent _____
   _____

5. Liquid formula (prepared or RTF) may be stored in the _____ for up to _____ hours after the formula can has been opened.

Go to pages 75-78 to check your answers.

Cow's Milk During the First Year

Fresh or powdered milk (whole, reduced fat, lowfat, and skim), evaporated milk, sweetened condensed milk, and goat's milk are **not** recommended for infants during the first year of life. *It is strongly suggested that infants continue to be breastfed or receive an iron-fortified formula through the first year of life.*

Some of the reasons why cow's milk (whole, lowfat, skim, powdered) is not acceptable for infants before age one are:

- Cow's milk has a higher level of protein and minerals than breast milk or iron-fortified infant formulas. This is not desirable for infants because these high levels of protein and minerals place stress on the kidneys of the young infant.

- The immature digestive system of the young infant is not able to adequately break down whole milk.

- In the early months, the feeding of fresh milk has been associated with gastrointestinal blood loss, which puts the infant at risk for the development of iron-deficiency anemia. Also, cow's milk has been associated with allergy development.

- Fresh or powdered milk, evaporated milk, sweetened condensed milk, and goat's milk are poor sources of iron. Prolonged use in early infancy may result in iron-deficiency anemia. These types of milk do not contain many essential nutrients such as vitamin C, some B vitamins, folacin, and some minerals that are needed for growth and development of the infant.

After the first year, only whole milk and breast milk are appropriate. Skim, lowfat, and reduced-fat milk are not recommended until age two. After age two, follow the advice of the health professional in selecting the type of milk that is best for the child.

Feeding Schedules

Newborn infants, whether breast or bottle-fed, need to be fed throughout the day and night. Young infants cannot take much breast milk or infant formula at any one feeding and must have a supply throughout the day and night.

Infants differ in the age at which they are ready to sleep through the night without feedings. Some infants will sleep through the night at an early age, but will resume night feedings during periods of rapid growth or teething.

Newborn Breastfed Infants

Most newborn infants lose weight the first few days of life. Usually they lose no more than 8% of their birth weight. That would mean that an 8 pound infant at birth might lose up to 10 ounces during the first few days of life. However, they should regain that weight within one week. Infants usually gain at least 5 ounces a week for the first six months of life.

Newborn breastfed infants should be fed when they are hungry and should nurse until they are full. This is called feeding "on demand." Although there are several possible reasons for an infant crying, mothers and other caregivers of infants learn to identify crying due to hunger. When the infant's other needs are met, and crying is not a result of any obvious discomfort, the breastfed infant is most likely hungry. Feeding "on demand" will not spoil the breastfed infant.

Most breastfed infants will nurse every 1 to 3 hours during the early weeks of life. Sleepy infants may need to be awakened to nurse. The amount of time between feedings increases as the baby grows older. Infants may nurse more during growth spurts, usually around 2-3 weeks, 6 weeks, and 12 weeks. Feedings can be expected to last 20-30 minutes. Growth spurts generally last 2-3 days.

Breastfed infants who receive supplemental formula have different feeding patterns. Refer to the Level II Breastfeeding Module and Resource Manual for more detailed information on breastfeeding.

Newborn Bottle-Fed Infants

The quantity of formula an infant consumes in 24 hours will vary greatly, depending on the infant's age, size, level of activity, and if it is a supplement to breast milk. Infants should be fed formula as they need it ("on demand"), with special instructions to the caregiver to watch for the first signs of fullness (decrease in sucking, lack of interest in the feeding, etc.) to prevent overfeeding. Encourage caregivers to let the baby decide how much to eat. Throw away any formula remaining in the bottle. Do not try to get the infant to finish the bottle. There should always be a little formula left in the bottle at the end of each feeding to indicate that the infant is being offered

adequate formula.

Adequate infant growth is the best indication that a baby is getting enough breast milk or infant formula.

Infants do not always get hungry on a schedule and do not always take the same amount at a feeding. However, in general, a

- newborn infant may drink 1-2 ounces every 2-3 hours
- 1-2 month old infant may drink 2-3 ounces every 2-3 hours
- 2-3 month old infant may drink 4-5 ounces every 3-4 hours
- 3-4 month old infant may drink 1-2 ounces every 3-4 hours

Recognizing Hunger and Satiety

Some early hunger cues include sucking on the lips, fingers and fist; smacking the lip and sucking on the tongue. Active hunger cues include rooting (looking for a nipple), fidgeting, and fussing. Late hunger cues include furrowing the brow, moving the head frantically from side to side and crying.

Signs of satiety and fullness are when the infant:

☺ ends the feeding by releasing the breast;
☺ seems content and calm;
☺ falls soundly asleep; and
☺ hands, toes, legs and arms open and become limp.

Encourage parents to be flexible and responsive to their baby's signs of hunger before he reaches the late stage of crying. Suggest parents talk with their health care provider if they have concerns about growth.

Signs of Adequate Intake

During the first few days of life, wet and dirty diapers gradually increase. Breastfed and formula-fed infants should have at least 6 wet diapers a day by the fifth day of life. The urine should be clear. Breastfed infants should have 3 or more dirty diapers whereas formula-fed infants do not stool as frequent or as soft. After about 6 weeks of age, the older infant may stool less frequently. If there is no abdominal discomfort, it is normal and not constipation.

SELF-CHECK #3

INFANT NUTRITION

QUESTIONS

1. Circle the types of milk that are good to feed an infant during the first year of life:

Iron-fortified formula	Sweetened condensed milk
Fresh whole milk	Goat's milk
Reduced fat, lowfat, or skim milk	Breast milk

2. Place a "T" (for True) or an "F" (for False) in the space to the left of each of the following statements:

___a. Feeding "on demand" will spoil a breastfed infant.

___b. To prevent overfeeding, a caregiver should look for signs of fullness, such as a decrease in sucking and lack of interest in the feeding.

___c. Infants differ in the age at which they are ready to sleep through the night without feedings.

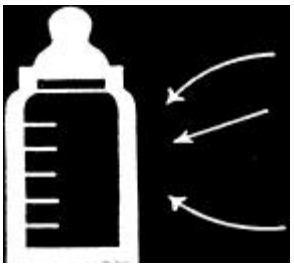
___d. Fresh and powdered milk (whole, reduced fat, lowfat, or skim) are good sources of iron for older infants.

Go to pages 75-78 to check your answers.

Use of Bottles

Bottles are appropriate for feeding infants who are not developmentally ready to drink from a cup. However, bottles must be used properly.

What–and What Not–to Put into a Bottle



There are only three items which should be fed from a bottle:

☺ Infant formula

☺ Breast milk which has been "expressed" or removed from the breast by hand techniques or by use of a breast pump

☺ Water, but not given routinely: Human milk and infant formula provide infants with enough water. Supplemental water generally is not indicated for healthy infants who are not receiving solid foods, except possibly during hot weather for formula-fed infants. Discourage parents from routinely using water as a supplement for infants less than 6 months of age. Infants with diarrhea or vomiting should be referred to their health care provider who will likely recommend an oral rehydration solution rather than plain water. Formula-fed infants may be offered one-two ounces of plain water each day for one to two days for constipation. Breastfed infants generally do not need water. Water should not be forced on an infant.

There are many items that should never be fed from a bottle:

✗ Cereals and pureed foods: Solid foods should not be fed until the infant is developmentally ready to take these foods from a spoon. Feeding solids from a bottle will not help the baby sleep through the night and may lead to overfeeding. Also, feeding infant cereal in a bottle or "infant feeder" can cause choking.

✗ Juices: Juice should be introduced when the baby is developmentally ready to drink juice from a cup (usually occurs around seven months of age). Feeding juice from a bottle may lead to tooth decay and an over-consumption of juice. When offering juice in a cup, give only one-two ounces a day.

✗ Sweeteners: Adding sweeteners of any kind including honey, syrup, sugar, Kool-Aid, or "gelatin water" to the bottle is inappropriate. These sweeteners can result in excessive caloric intake and "Early Childhood Caries."

Early Childhood Caries are discussed in the "Dental Health" section later in this module.
In addition, honey may contain botulinum spores which are responsible for the very serious food poisoning– **botulism**.

Botulism can cause severe illness and death in infants. Thus, honey should not be given to an infant under one year of age.

Making Baby Comfortable When Formula-Feeding

There are proper ways to hold the bottle while feeding an infant in your arms. The bottle should be tilted so that the neck and nipple are always filled with formula. This will help prevent the infant from swallowing air. Swallowed air can lead to a decrease in formula intake because the infant will feel full early in the feeding. It also can cause discomfort for the infant. *Infants should be burped during and after feedings to release swallowed air. This is true for <u>both</u> breastfed and bottle-fed infants.*

Crying or fussiness is not always an indication of hunger. Help parents to understand that breastfeeding or bottle feeding should not be used as a substitute for an infant's other needs. Holding and rocking the infant, changing the infant's diapers, or offering a pacifier when the parent is certain the infant isn't hungry is often adequate to soothe an infant.

<u>Propped Bottles Lead to Problems</u>

An infant who is bottle-fed should always be held during feeding while they are too young to hold their own bottle. Holding, touching, and establishing good eye contact increases bonding between the parent and infant and enables the parent to learn their infant's hunger and fullness cues.

Strongly discourage the practice of propping the bottle with a pillow or blanket. Caregivers will often do this to give themselves the opportunity to do other things, such as fill out WIC paperwork or take care of another child's needs. Bottle propping" is not a safe practice. The infant may choke on the liquid and the fluid can get into the lungs. Furthermore, health care professionals believe that infants who are fed while lying back without their heads being raised a little have a greater incidence of middle ear infections. Caregivers are not engaged with their infant when they prop the bottle and therefore can not respond to their infant's needs, for example, if the infant wants to stop feeding.

Infants need to be held as part of their development and feeding time is a good time for holding!!!

Early Introduction of Solids

There is no advantage to the introduction of solid foods (e.g., infant cereal, jarred baby foods) before four months of age. Introducing solids too early can cause infants to reject foods and struggle with parents about feeding. The infant's nutritional needs can be entirely met by breast milk or iron-fortified infant formula from birth to four months of age.

In fact, some negative effects are associated with the early introduction of solid foods. For example, very young infants lack the enzymes needed to break down the types of carbohydrates found in cereals and vegetables. Early introduction of solids may result in gastrointestinal problems such as constipation and diarrhea for these infants. Solid foods have been associated with the development of allergies in young infants. Young infants who are not developmentally ready for solid foods may choke on solids, which can force these food particles into their lungs. This aspiration* of food particles can result in pneumonia, or even death, in young infants.

It is commonly thought that feeding infant cereal at a very early age will help the infant sleep through the night. Research studies have failed to find truth in this common belief. It seems that the termination of the night feeding is a developmental stage which is reached at any time from the newborn period to 15 months of age.

*Aspiration is the drawing of foreign matter, especially food particles, into the lungs with the breath.

SELF-CHECK #4

INFANT NUTRITION

QUESTIONS

1. Name the three items that are appropriate to put in an infant's bottle.

   a. _____

   b. _____

   c. _____

2. Name three items that should <u>not</u> be put in an infant's bottle.

   a. _____

   b. _____

   c. _____

3. Place a "T" (for True) and "F" (for False) in the space to the left of each of the following statements:

   ___a. Early Childhood Caries are caused by an infant using a bottle, filled with sweetened drinks, juice, or milk, as a pacifier.

   ___b. Feeding honey to an infant under one year of age can cause botulism poisoning.

   ___c. "Bottle propping" is a good way to feed an infant because it frees up the caregiver to do other things.

   ___d. Only bottle-fed infants need to be burped during feedings.

Go to pages 75-78 to check your answers.

Nutrition for the Infant 4 to 8 Months of Age

Around four months of age, most infants are ready to begin eating solid foods with a spoon. The American Academy of Pediatrics recommends that semi-solids and solids be introduced into an infant's diet between 4 and 6 months of age if the infant has the developmental readiness and is not satisfied with breast milk or formula as the sole source of nutrients. Some signs of developmental readiness include:

- ✓ sits up with support
- ✓ holds head up with support
- ✓ reaches for things and can hold them
- ✓ watches food and opens mouth for food.
- ✓ ability of the tongue and swallowing mechanism to deal with non-liquids.

At this time, the infant is able to digest and absorb proteins, fats, and carbohydrates other than those in breast milk or formula. Also, the infant's immune defense system has matured so that the risk of allergic reactions to solid foods is reduced.

There is a critical time in the development of an infant (usually between 4 to 6 months) when he or she is ready to eat solid foods. Delaying the introduction of solid foods past 6 months of age may result in some problems. Lack of solid foods in the diet after six months of age can lead to deficiencies of calories, iron, protein, fiber, and other nutrients. The baby may even reject solid foods and/or spoon feeding if they are introduced after 6 months of age.

Iron Needs During Infancy

Iron is vital throughout life, but is especially important during infancy and childhood when growth is rapid. Iron is a part of red blood cells, and it carries oxygen to all parts of the body. Adequate oxygen is necessary for normal growth.

Healthy full-term infants are born with a supply of iron that will last for about four to six months. However, between 4 and 6 months of age the supply is used up and iron must come from the infant's diet. Breast milk contains a form of iron that is well absorbed and utilized by infants. Iron-fortified infant formula also provides a good source of iron for infants.
Iron-fortified infant cereals are an excellent solid food source of iron for both breastfed and formula-fed infants. Since they are also easy for a young infant to eat and digest, infant cereals make an

excellent choice for the first solid feedings. *Even after other solids have been introduced, iron-fortified infant cereals remain a good food source of iron for infants.*

Some other solid foods that supply iron for an infant after 6 months are:

- meats–ground or minced meat from the family table or commercially strain
- cooked dried beans and peas–pureed or mashed
- egg yolks

The iron in meats is readily absorbed in the body. Iron in non-meat sources is not as easily absorbed by the body. To enhance the absorption of iron from non-meat sources, caregivers can offer a vitamin C rich food (such as vitamin C-enriched juice or a fruit); or a meat source at the same meal. For example, serving vitamin C-enriched apple juice along with iron-rich infant cereal causes the iron in the cereal to become more available to the body.

Fruits, most vegetables, and commercial baby food dinners provide very small amounts of iron in an infant's diet and are, therefore, not considered good sources of iron. The use of tea should be discouraged because it also can inhibit iron absorption. Also, remember that fresh or powdered milk (which should not be fed to infants under 1 year of age) is a poor source of iron.

Sequence of Solid Food Introduction

Iron-fortified Infant Cereals

As was discussed in the last section, iron-fortified infant cereal is the best choice for the first solid food since it provides a good food source of iron. Iron stores of full-term infants can meet an infant's needs until age 4-6 months. Therefore, infant cereal should be introduced between 4 and 6 months. Infant cereal has additional iron to meet the rapidly growing needs of the infant. It is important to note that the manufacturers of infant cereal add a form of iron to the infant cereals which is better absorbed by the infant's body. Thus, only infant cereals should be given. Iron-fortified cereals not specifically made for infants do not generally contain a form of iron that is more easily absorbed by the infant's body. In addition, infant cereals provide a smooth texture and can be varied in thickness to help the infant adjust to the new eating experience.

Rice cereal is recommended as the first cereal choice because it is a single grain and is not likely to cause an allergic reaction. This rice cereal should be fed to the infant for 5 to 7 days before introducing a new cereal.

Barley and oatmeal are good choices after rice has been started. High protein and mixed cereals should not be offered until the infant is 7 to 9 months old because they are more likely to cause an allergic reaction when introduced at an earlier age.

Dry infant cereals are less expensive than jars of prepared cereals and they are more nutritious. Jars of prepared cereals are usually mixed with fruit which makes them higher in calories.

Mix dry infant cereals with breast milk or infant formula. Start with a teaspoon of cereal mixed with the liquid in a small dish to form a very thin cereal. Offer the cereal one-two times a day. As the infant gets used to eating cereal, larger portions can be offered, and the cereal can be made thicker. Serve infant cereal plain, without added sugar or sweeteners.

During the first feedings, it may appear that the infant is trying to push the cereal out of his mouth. This does not necessarily mean that he does not like it. It takes time for the infant to learn to use the tongue to move food to the back of the mouth to swallow. If he becomes very upset and refuses to eat the cereal at the first feeding, do not force it, but offer it again at another time. Infants are developing their sense of trust in the world and it is dependent on the caregiver being able to read their reactions.

Avoiding Food Allergies

Once solids are introduced into an infant's diet, only one new food at a time should be given, and the new food should be fed for 5 to 7 days prior to the intro-duction of another new food. If a sensitivity to the food such as skin rash, diarrhea, hives, or vomiting is exhibited, the food can be readily identified and eliminated from the diet until a later date when the food can be reintroduced.

Vegetables and Fruits

After cereals have been started, vegetables and fruits should be introduced to provide a variety of flavors and textures. This will be approximately between 5 and 7 months.

Vegetables may be more readily accepted if they are introduced before fruits, since many infants prefer the sweet flavor of fruits. In addition, this may encourage the feeding of vegetables to infants whose families may not regularly eat vegetables.

Commercially prepared (for baby) strained carrots, peas, green beans, sweet potatoes and squash are good first vegetables for infants. Yellowing of the skin (carotenemia) can result, however, if an excessive amount of dark green and deep yellow/ orange vegetables are given. This problem is non-toxic and disappears when the high concentrations of carotene-containing foods are discontinued. The dark green and yellow vegetables such as spinach, carrots, sweet potatoes, and squash should be limited to once a day. Canned vegetables not specifically made for infants should be avoided because of the high salt content. Vegetables should be served plain without added fat (margarine, lard, etc.), salt, or sauces. (Remember that an adult's taste preferences are not the same as a baby's. Just because an adult likes salted vegetables doesn't mean that a baby does too!)

Remember that each new vegetable should be served one at a time for about 5 to 7 days in a row before introducing the next vegetable. Also, when each new vegetable is given, it should be a single vegetable, i.e., strained carrots instead of "peas and carrots."

Suggested fruits to serve that are commercially prepared for infants include strained pears, applesauce, and peaches. A soft, ripe banana, or unsweetened applesauce would also be good fruits for an infant. Commercially prepared (for baby) bananas, plums, and apricots contain tapioca and complex starch which may be difficult for a young infant to digest, and they are also higher in calories. Fruits packed in heavy syrup should be avoided because of a higher sugar content.

Commercially prepared infant desserts such as chocolate pudding, peach cobbler, and banana/apple dessert, as well as other desserts should not be encouraged because of their high sugar content.

Protein Foods

Plain strained meats or mashed beans are next in the progression.

They should be started at approximately 6 to 8 months of age. Chicken, turkey, lamb, beef, and veal are suggested meats to serve. Remember to encourage that each new protein food be served one at a time for about 5 to 7 days in a row before introducing the next. This way it is easier to identify the source of a possible allergic reaction. Also, when a new meat is given, it should be a single meat, i.e., strained lamb instead of a combination dinner that contains lamb.

Egg yolks are also an excellent source of protein and may be offered to the infant. The yolk of the egg may be hard cooked and then mixed with cereal or other food. *Egg whites contain a variety of proteins and are highly allergenic; they should not be fed to an infant younger than one year of age.*

Discourage the commercially prepared strained dinners (vegetable/meat combination) because of their high cost and low nutrient content. Cooked dried beans and peas, tofu, and mild cheese are good meat substitutes.

After a variety of plain strained vegetables, fruits, and meats have been introduced, begin to add more textures with foods, such as coarsely chopped cooked vegetables. Use plain, unseasoned table foods and modify the texture by hand chopping or using an infant food grinder.

Fruit Juices

Fruit juices should only be offered when an infant can drink from a cup with assistance, which is usually around 7 months of age. As previously mentioned, when juice is offered in a bottle, it is often used as a pacifier and can lead to tooth decay, and result in over consumption of juice.

When introducing juice into the infant's diet, the single juice varieties should be offered first for a week at a time to check sensitivity. A good first choice would be apple juice fortified with vitamin C. The mixed juices can then be offered one at a time. On the other hand fruit drinks, artificially colored and flavored drinks, sweetened drinks, tea, "gelatin water," and colas or other sodas, should not be offered to infants.

Some additional points about feeding fruit juices to infants include:

- Infant juices are expensive and not necessary. Thus, infants can be offered unsweetened adult juices. Initially recommend that infants be offered juices which have been diluted with equal amounts of water. Once the infant tolerates juices, the dilution may be gradually decreased. Be sure the juices are fortified with vitamin C.

- The older infant needs only 2 ounces of juice daily. Do not give more than 2 ounces of juice a day because too much juice may give the infant a feeling of fullness and, therefore, other important foods may not be eaten. Too much juice may also cause stomach upset and diarrhea.

- **Citrus juices, e.g., orange juice, may cause an allergic reaction, especially if there is a family history of allergies. Avoid citrus juices until one year.** Other types of vitamin C-enriched juices, such as vitamin C-enriched apple juice, may be better choices to start with for young infants.

Appropriate Infant Feeding Practices

Feeding practices influence infant health and lifelong eating habits. Any of the following practices can be recommended during a WIC visit throughout the infant's first year of life.

✓ It is best to feed infants in a high chair or propped in a safe chair. Another good position is to seat the infant upright on the parent's lap. This helps to make the infant feel secure about this new feeding experience. The caregiver and infant should have good eye contact so that they can readily see each other. Always check the infant to make sure the food is being swallowed easily.

✓ Feed solids from a spoon. Spoon feeding is an important part of developing the ability to self-feed. It also promotes the proper development of tongue muscles that are important for speech and allows the infant to experience the taste and texture of foods. There are several inexpensive feeding utensils especially designed for infant feeding. Long-handled spoons with small shallow bowls and infant cups with handles and weighted bottoms make feeding easier for the infant and caregiver.

✓ Introduce each new food one at a time with approximately 5-7 days in between new items. This allows the infant to become accustomed to new foods. It will also provide an opportunity for parents to readily identify if any one food causes an adverse reaction such as rash, hives, vomiting, diarrhea, or respiratory problems. In the case of an adverse reaction eliminate the food from the diet until a later date.

✓ Introduce new foods when the baby is in a good mood and hungry, but not overly hungry.

✓ Start new foods in small quantities--a teaspoon--and slowly increase to a tablespoon or more.

✓ Wait for the infant to open her mouth before trying to feed her. Feed as slowly or as fast as she wants to eat. Let her touch the food.

✓ Wash baby food jars before opening. Jar lids should make a popping sound when opened. The popping indicates the product was safely processed and stored. If the "bubble" on the top of the jar has already popped up, the food in that jar should not be fed to the infant.

✓ Do not force new foods that are rejected by an infant, but

rather offer them at another time. Infants will generally learn to accept most new foods if they are offered repeatedly. Let infants set the pace for feeding. Wait until the infant indicates he is ready for another spoonful. Most infants will indicate their fullness by turning their heads, spitting out food, or keeping their mouths shut.

✓ Parents can encourage acceptance of new foods by demonstrating a positive attitude about them. Infants will not necessarily refuse foods that other family members do not like. Infants who are exposed to more foods are more likely to enjoy a greater variety of foods as an adult.

✓ It is not necessary for an infant to finish a bottle or solids. The infant is usually the best judge of how much to eat. Pay attention to their signals. Overfeeding or forcing an infant to eat may lead to an overweight infant or to habits that may eventually cause obesity.

SELF-CHECK #5

INFANT NUTRITION

QUESTIONS

1. Fill in the blanks to complete the sentences accurately.

   a. There is no advantage to the introduction of solid foods before _____ months of age.

   b. An infant's nutritional needs can be entirely met by _____or _____ from birth to 4 months of age.

2. Which of the following statements are indicators of a 4 to 6 month old infant's readiness to start the introduction of solid foods? (Circle the letters.)

   a. Ability to sleep through the night.
   b. Ability of the tongue and swallowing mechanism to deal with non-liquids.
   c. Ability of the infant to sit with good head and neck support.
   d. Ability of the infant to crawl.
   e. Ability to indicate a desire for food by opening the mouth and leaning toward the spoon.

3. Circle the foods that would be most appropriate for a 4 to 7 month old infant.

Iron-fortified infant cereal	Strained fruits	Strained beef
Banana/apple dessert	Egg yolks	Orange juice
Strained vegetables	Whole eggs	Fruit drinks

4. Circle the items that are good sources of iron for the infant:

Iron-fortified formula	Fortified infant cereal
Breast milk	Strained meats
Fresh whole milk	Cooked dried beans–mashed
Strained fruits	Tea

5. Fill in the blank to accurately complete the statement.

   Absorption of iron by the body can be increased by feeding a vitamin ____-enriched food at the same time that the iron-rich food is fed.

6. True False a. Infants need only 4 ounces of juice daily.
   True False b. Introduce new foods to infants when they aren't overly hungry and are in a good mood.
   True False c. Forcing an infant to eat may lead to habits that may cause obesity later in life.

Go to pages 75-78 to check your answers.

Dental Health

The primary or "baby" teeth begin to form in the jaw before birth and they continue to develop throughout the first years of life. This is why good nutrition during pregnancy and infancy helps to form teeth that are strong and healthy.

There are several nutrients that are necessary for the development of healthy teeth, but the most important ones are **protein, calcium, phosphorus,** and **fluoride**. Teeth will form with just the minerals calcium and phosphorus, but will be stronger and more resistant to decay if the mineral fluoride is a part of them. For this reason many communities add fluoride to the water supply if it is not present naturally. *The American Academy of Pediatrics and the American Dental Association recommend fluoride supplements for infants starting at 6 months old if the water supply does not have adequate fluoride.* Refer caregivers to their local water treatment plant to learn if the community water supply has adequate fluoride. Caregivers can also be given the Colorado Oral Health Program telephone number to receive the above information. The Oral Health Program number is 303-692-2360.

If prescribed by a physician, fluoride supplements can be given by mouth from a dropper, or drops can be added to the infant's drinking water, infant formula, or juice. Parents should give only the amount of fluoride prescribed. Too much fluoride over a period of time can cause staining of the teeth called **mottling**.

Caries = cavities

Early Childhood Caries

Early Childhood Caries are caused by bacteria called *Strepto-coccus mutans*. People who do not take care of their teeth have a large amount of these bacteria in their mouths and are more likely to spread it to others. Infants do not have the bacteria when they are born, but they can get it from others. The presence of this bacteria, combined with improper feeding practices such as allowing infants to be put to bed with a bottle of infant formula, milk, juice, or sweetened drink increases the chances that early childhood caries will occur.

Streptococcus mutans are spread by sharing eating utensils, putting things in an adults mouth then in to the infant's mouth (such as the pacifier being cleaned in the parent's mouth first), and pre-chewing foods for the infant. These practices should be discouraged.

Sugar is a natural ingredient in all milks including breast milk,

cow's milk and infant formula. Juices, Kool-Aid, and other drinks also contain natural or added sugars. The sugar in these liquids is used by the *Streptococcus mutans* bacteria in the infant's mouth and acid is formed. The acid attacks the teeth causing decay. The upper front teeth are usually the most affected in infants and these sometimes fall out or need to be pulled or capped when decay is excessive.

Early childhood caries are not only painful and unattractive, but also cause problems later on, such as crooked permanent teeth, and speech problems, such as lisping. Children with these problems may be teased by other children.

Care of the Gums and Teeth

The primary teeth usually begin to appear near the age of six months and are subject to decay from the time that they first appear. Therefore, care of the gums and teeth should begin in the first months of life.

Preventing Early Childhood Caries

- ✓ Good dental health, including daily cleaning of the gums and teeth, should be started early in life. Even before the teeth appear, parents can clean the infant's gums with a clean cloth or gauze. This removes residues from the mouth and gets infants used to having their mouth cleaned. When the teeth do appear, they should also be cleaned daily with a cloth or gauze.

- ✓ When an infant is near the age of one year, parents can begin to use a small, soft toothbrush to gently brush the baby's teeth. Toothpaste is not recommended until two years of age because young infants are likely to swallow it.

- ✓ Do not share utensils and toothbrushes among family members.

- ✓ Discourage the practice of caregivers chewing the food to be given to the infant to prevent the transfer of *Streptococcus mutans* from the adult's mouth to the infant's.

- ✓ Infants should never be put to bed with a bottle of infant formula, milk, juice, or sweet drink. Encourage parents to hold their infants when feeding them and to teach them to fall asleep without a bottle.
- ✓ Do not permit older infants who are walking to carry around a bottle that is filled with juice, etc., and use it as a pacifier throughout the day.

- ✓ Begin weaning from bottle to cup near 6-7 months of age and

be completed near the time of the first birthday. As weaning occurs, formula or breast milk can be offered in the cup.

✓ Never dip pacifiers in honey, sugar, or syrup.

Common Concerns in Infancy

Certain gastrointestinal disturbances are commonly reported by caregivers of infants. These include constipation, diarrhea, spitting up, and colic. When caregivers complain of these problems WIC staff need to assess whether it is a chronic problem, a one-time problem, and whether the caregiver understands what is "normal."

Constipation

Many caregivers become concerned if their infants do not have daily bowel movements. Although many infants have a daily stool, others may only have a stool every 2 to 3 days. The older breastfed infant (over 2 months of age) as well as bottle-fed infants may have infrequent stools. Frequency is not a good indicator of constipation. Constipation in infants is better characterized by hard, dry stools that are difficult to pass.

Constipation in infants may result from physical problems, incorrect formula dilution, i.e., the formula is not being mixed with enough water so the infant is not getting adequate water, or inappropriate diet.

The amount of iron supplied by iron-fortified infant formula does not cause constipation.

WIC staff should encourage consultation with a health care provider before use of laxatives, enemas, or manipulation to induce a bowel movement. These can be harmful to infants. WIC staff can suggest to caregivers to try offering 1 to 2 ounces of plain water each day for one to two days. If it doesn't help by the third day, they should call their health care provider. For older infants, 2 ounces of fruit juices can be tried. Discourage the use of honey. Honey may contain botulism spores and therefore should not be added to water.

Diarrhea

Diarrhea is defined as the passage of frequent, loose, unformed, or watery stools. Diarrhea is difficult to define, however, because each infant has his own pattern of bowel movements, and what is normal for one infant may not be normal for another.

For example, breastfed infants may normally have loose, frequent stools. This is not a matter of concern. However, if the stools become green, explosive, and foul smelling, then there is cause for concern.

Persistent diarrhea can be dangerous. Parents of infants with true diarrhea should be referred to their health care provider for treatment to prevent dehydration and other serious complications

in the infant. Use of sports drinks, such as Gatoraid, are not recommended for hydrating young children.

Spitting Up

Spitting up should be differentiated from vomiting. Spitting up involves small amounts of milk that are spilled from the mouth, as opposed to forcefully ejected out of the mouth. This may occur several times a day during or shortly after feeding. It can occur with jostling, squeezing, or even just laying the infant down. Spitting up is harmless if the baby is growing well and content.

Occasionally, a change in feeding techniques will alleviate the problem. Some feeding techniques which may be the cause of excess spitting up include:

- Feeding too much food at a time (encourage caregivers to watch for signs of satiety)
- Feeding with nipples that have holes that are too large– these allow liquid to flow too rapidly causing excessive intake and swallowing of air
- Feeding the baby without burping him during and after the feeding
- Playing with and jostling the infant right after eating

Refer the participant to the WIC nutritionist or nurse if formula change is requested.

On the other hand, forceful and persistent vomiting may be a symptom of a more serious illness. Refer these caregivers to a health care provider immediately.

Colic

Colic is when a healthy infant cries from extreme discomfort in the upper and/or lower gastrointestinal tract. Infants with colic will frequently show discomfort and aggravated behavior such as screaming, drawing their legs onto the abdomens, passing gas, and inconsolable crying. It may occur at similar times every day. Many infants, no matter whether they are formula-fed or breastfed, have a regular fussy time, usually in the late afternoon or early evening.

A number of psychosocial and dietary reasons have been suggested as the cause of colic, e.g., maternal anxiety, overfeeding, but these theories have been disproved. Recent studies have linked cow's milk and soy milk with colic. However, the bottom line is–the causes of colic are not really known.

The psychological stress and harm to the parent-child relationship is of concern when an infant has colic. Parents need support and assurance throughout these difficult months.

Offer parents of infants with colic the following suggestions:

- ✓ Burp the infant if needed
- ✓ Change the diaper if needed
- ✓ Soothe the infant by swaddling him in a blanket, rocking him to music
- ✓ Carry him in a carrier
- ✓ Lay him tummy down on the bed and pat his back until he has calmed down (it is not recommended that newborn infants be put to sleep on their stomachs)

If the infant cries excessively, encourage the caregiver to identify someone they can contact if they feel they may lose control. Empathize with parents to understand the frustration of not being able to soothe one's baby.

SELF-CHECK #6

INFANT NUTRITION

QUESTIONS

1. Fill in the blanks:
   a. The four most important nutrients for healthy teeth are:

      _____ _____

      _____ _____

   b. The American Academy of Pediatrics and the American Dental Association recommend that a supplement of _____ be given to infants six months old and older if the water supply does not have adequate amounts of it.

   c. Early childhood caries are caused by a bacteria called _____ _____.

2. List one way that the bacteria that cause dental caries are spread:

   _____

3. Place a T (for True) or an F (for False) in the space to the left of each of the following statements:

   a. ____ Infants put to bed with a bottle of formula, milk, or juice can develop tooth decay.
   b. ____ Good dental health practices begin early in life, even before infants have teeth.
   c. ____ It is acceptable to dilute formula for 2-3 days for infants with constipation.

4. List four potential feeding-related causes of spitting up.

   a. _____
   b. _____
   c. _____
   d. _____

5. List three suggestions for a caregiver of a colicky infant.

   a. _____
   b. _____
   c. _____

Go to pages 75-78 to check your answers.

Nutrition for the Older Infant: 8 to 12 Months of Age

Changing from strained or pureed foods to foods with more texture is an important part of developing the skills to learn to eat independently.

Finger Foods

When the baby shows signs of being able to chew with up and down movement, and can move the tongue from side to side and swallow, **finger foods** should be offered. This is usually at 7 or 8 months of age.

Finger foods are small pieces of soft food which can be easily dissolved in the throat or dislodged if they become stuck. They are called finger foods because they allow infants to practice using their hands and fingers to feed themselves. Examples of good choices for finger foods include: soft, peeled fruit; cooked vegetables; mild cheese; toast pieces; tortillas, crackers; and small pieces of tender meat.

Food in small, round, or hard pieces that can become lodged in the baby's throat or that can "ball up" in the baby's throat should not be given. Examples of such foods are nuts, popcorn, raisins, raw vegetables, grapes, cherries, whole hot dogs or meat sticks, and peanut butter on soft bread.

Self-Feeding Skills

Near the age of 1 year, infants become interested in holding utensils and feeding themselves. They enjoy playing with spoons during meal- or play-time. This is a good way for them to begin to learn to use a spoon. Infants gradually learn to get food on the spoon and the spoon to their mouth, although food is often spilled before it gets into their mouth.

Many infants prefer to feed themselves with their hands and fingers rather than with utensils. This is their way of experimenting with food. It is important that infants be allowed to take part in this activity, even though it is messy, because it is an important part of learning to feed themselves. Some suggestions that WIC staff can offer to parents of infants who are learning to feed themselves include:

- ✓ Make meal time happy and calm. Smile and talk to the baby.
- ✓ Be patient with the baby during this learning period.
- ✓ Pick a time or times of the day to allow the baby to "play" with his food.
- ✓ Cover the floor under the baby's chair with paper or an old shower curtain and dress the baby in clothing that will not be harmed by spilled food.
- ✓ Include foods which are fed to the baby, as well as items that the baby can self feed at meals.
- ✓ Give the baby small portions of food.
- ✓ Avoid spicy foods. Infants also do not need added butter, salt, or sugar.
- ✓ Let the baby use a cup with all meals.
- ✓ Stay with the baby when he eats so that it is a social experience and to be there should he gag.

Each infant develops at his own rate. There is no specific age at which an infant should be able to feed himself. Although, full term infants should be trying to finger feed themselves by seven months of age. The process of learning to eat independently continues into the second year of life.

Meal Planning

An infant who is 8 months to 12 months of age should be eating many types of solid foods with a variety of textures and colors. Finger foods should be included at meals and snack time. The daily diet should include foods from all of the food groups. Encourage caregivers to offer solid foods following a schedule that considers the baby's appetite and the family's schedule. The amount offered depends on the infant's age and weight. Smaller infants and infants at the lower end of the age range will usually eat less than older, larger infants.

Suggested Meal Patterns

	Early Morning	Mid Morning	Noon	Mid Afternoon	Supper	Bedtime
8th to 10th month	Infant cereal Mashed fruit Breast milk or formula	Crackers Juice (2 oz) Yogurt	Mashed cooked egg yolk Grain (toast strip) Mashed fruit Breast milk or formula	Breast milk or formula	Ground meat Mashed potatoes Mashed vegetable Breast milk or formula	Breast milk or formula Infant cereal
10th to 12th month	Infant cereal Soft fruit Breast milk or formula	Crackers Juice (2 oz) Cheese slices	Chopped meat or cooked egg yolk Vegetable Rice or grain Breast milk or formula	Canned fruit Crackers	Chopped meat Cooked vegetable Pasta or grain Breast milk or formula	Dry finger cereal Breast milk or formula

Home-Prepared Baby Foods

Home-prepared baby foods are a nutritious, inexpensive way to feed an infant. However, care must be taken during the preparation and storage of the food to prevent contamination. The following are guidelines to discuss with caregivers:

- ☺ The preparer's hands should be washed in hot, soapy water. All equipment used in the preparation should be thoroughly washed and rinsed.
- ☺ Wash fruits and vegetables; and remove skin, pits, and seeds.

Boil and steam the vegetables or fruits in a small amount of water to preserve the nutrients. The fruits or vegetables can then be mashed with a fork or put in a blender or food grinder. If liquid is needed in the preparation, use water, breast milk, or formula only.

☺ Meats should be trimmed and then baked, broiled, or boiled in a small amount of water. The meat can then be put in a blender or food grinder.

☺ There is no need to add salt, sugar, fat, or seasonings to foods prepared for the infant. Discourage canned vegetables because of their high sodium content. Recommend use of fruits packed in their own juices instead of those canned in heavy syrup. Suggest to caregivers that luncheon meats, hot dogs, bacon, and sausage be offered sparingly, if at all, because of sodium nitrate, salt, and high fat contents.

☺ Spoons used to "taste test" foods should not be put back into the food.

☺ If the food is not to be eaten immediately after it is prepared, it must be properly stored. Home-prepared foods can be stored in a refrigerator for up to 48 hours.

Microwave ovens should <u>not</u> be used to warm baby foods, whether left in the jar or placed in another container. The unevenness in the consistency of the baby foods causes the more liquid or watery parts to heat up faster in the microwave than the thicker or more solid parts, also burning baby. This can allow pockets of steam to occur leading to scalds from splattered foods or exploding jars.

☺ Foods can be stored in a freezer for one month. To store single servings for the freezer, the food can be frozen in clean ice cube trays or muffin liners and covered with aluminum foil. Once frozen, the food can be removed from the tray and stored in plastic bags or glass jars. The frozen foods can be placed in a pan or dish and thawed in the refrigerator or warmed in an oven or pan of water on the stove. Any thawed, heated food that is not eaten should be thrown away.

Using Commercially Prepared Foods

Some caregivers will prefer the convenience of purchasing infant foods from the store. Help caregivers to understand that there will be a point in time when the infant will also be ready for table foods that are easy to chew and safe to swallow, such as rice and pasta. Around one year of age, infants should be able to eat what their caregivers eat -- only the size of the pieces of food may need to be modified.

For caregivers who purchase jarred infant food, encourage them to not feed the infant directly from the baby food jar. Instead, food should be placed into a clean dish before it is served to the infant, and food that is leftover in that dish should be discarded. The reason is if the infant is fed directly from the baby food jar or if leftover food is returned to the jar, the infant's saliva will enter the food. The saliva contains bacteria which can cause the food to spoil. If the infant was not fed directly from the jar, any uncontaminated food left over in the jar can be tightly resealed and stored in the refrigerator for up to 48 hours.

Developing Healthy Eating Habits

The following are some tips to pass along to participants about feeding habits and how all this information relates to their infants' attitudes toward eating:

- Lifelong eating habits are formed in childhood and early positive experiences with foods can encourage acceptance of them later in life.

- It takes time to learn to enjoy some foods. Parents should not assume that a food that is rejected once will be disliked permanently.

- Allow children to develop their own food likes and dislikes. Parents should not assume that their infants will not like a food that another family member will not eat. .

- Parents can serve as good examples for their children by being open to trying new foods themselves.

- The habits of eating sugar, salt, and fat begin early in life for many people. These habits can be harmful if learned while young and continued throughout life. Thus, parents should limit less-nutrient-dense foods such as potato chips and soft drinks.

- The family's meal time is an important time for children to learn good eating habits. Have the baby take part in the family's meal time. Perhaps feed the baby earlier and give him finger foods while the rest of the family eats.

- Parents are responsible for presenting appropriate food in a supportive fashion. The baby should be allowed to make the choice about eating. The more a baby is pressured to eat, the more poorly he will eat.

Weaning

Weaning from the breast or bottle to a cup is a gradual process. Weaning to a cup should begin when the infant is able to sit up without support and is eating solid foods. The process of weaning can usually be initiated at 6-7 months of age and for bottle-fed infants should be completed near the time of the first birthday. Waiting too long to wean makes it harder on both the baby and the family. Bottles should not be used after fourteen months of age by normal, healthy infants.

Weaning From the Bottle

When beginning the process, instruct the caregiver to choose a feeding in which the infant is least interested (such as, the late afternoon feeding) and introduce a cup in its place. Encourage the caregiver to offer assistance in holding the cup for the early weeks of weaning.

At first, the infant will not consume the same quantities of formula from a cup as from a bottle. The caregiver should continue with the cup at this feeding for a week or two before another cup feeding is added.

The weaning process should continue gradually until the infant is entirely weaned from the bottle. The bedtime bottle and early morning bottle may be the most difficult to discontinue. This is a time when the infant is tired and more apt to not want his routine changed. The bottle is often a source of security. To help the infant feel secure have on-hand a favorite toy or blanket when the bottle is being used, so that when the bottle is removed, the favorite item is still with the infant or in view.

Weaning From the Breast

The decision to wean the breastfed infant from the breast to the bottle or cup is an individual one and should be left up to the mother. For mothers who decided to wean their infant from the breast before their infant is one year old, WIC staff can encourage mothers of older infants (aged 7 months or older) to wean to a cup, while younger infants may need to be weaned to a bottle. WIC staff should dialogue with mothers about breastfeeding to make sure they are deciding to wean based on correct information.

Recommend that weaning be done slowly and gradually. Weaning is usually accomplished by stopping one nursing at a

time. It is suggested that the first feeding to stop be the one in which the infant is least interested, such as the late afternoon feeding. The mother then substitutes a bottle or cup of breast milk or iron-fortified formula for this feeding. The mother or caregiver should continue to use a bottle or cup at this feeding for 5 to 7 days before another nursing is stopped. During this time give the baby extra cuddling and attention so that weaning does not mean separation from the mother. The procedure should continue gradually until the infant is entirely weaned from the breast. The weaning process will result in a gradual decrease in the breast milk supply with little or no discomfort to the mother. If the mother should experience some engorgement, she should be instructed to hand express enough milk to relieve the discomfort.

Counseling Tips For Parents About Weaning

- Between 7 and 12 months, infants are developmentally ready and usually interested in learning to drink from a cup. Delaying the change to a cup during this period can result in a refusal to change at an older age. At about 6 months of age, allow the infant to play with an empty cup.

- When liquids are first introduced from the cup, the infant's lips may not close around the edge of the cup and liquids will leak. At first it may be helpful for the caregiver to hold the cup.

- Give small amounts of water, breast milk, or formula. As the baby gets used to drinking from a cup, 1-2 ounces of juice may be offered. *Sweetened beverages should not be given to infants.*

- Some infants do not want to give up breast or bottle feeding or are unwilling to drink from a cup. The weaning process often requires much patience from the parents.

- Infants who use the bottle after one year of age may drink too much milk and not eat enough solids which provide iron and other important nutrients. Inadequate iron can lead to anemia.
- Continuous sips of milk from the bottle can cause tooth decay. Discourage the practice of allowing toddlers to use the bottle without restriction (e.g., walking around with a bottle).

- For infants who are bottle fed, the bottle given before a nap or bedtime is often the most difficult one to discontinue. This bottle can also be the most harmful to the teeth if it is filled with a sugar containing beverages (breast milk, formula, juice) and the infant

takes it to bed.

Some suggestions for helping an infant give up the bedtime bottle include:

- ✓ Interest the infant in something other than the bottle at bedtime--a stuffed toy, blanket, etc.
- ✓ Provide lots of affection and attention instead of a bottle at bedtime.
- ✓ Offer a small snack or beverage from a cup near bedtime.
- ✓ Put a small amount of water in the bottle instead of milk.

Bottles are inappropriate after 14 months of age!

SELF-CHECK #7

INFANT NUTRITION

QUESTIONS

Place a check mark next to each phrase which correctly completes the statement (may be multiple answers):

1. Finger foods should be offered:

   ___a. when the infant starts to walk alone.
   ___b. when the infant sleeps through the night.
   ___c. when the infant can chew with up and down movements.
   ___d. when the infant can move his/her tongue from side to side.
   ___e. around 7 or 8 months of age.

2. Place a check mark next to the following choices of finger foods that are appropriate for an older infant (8-12 months).

   ___a. soft, peeled fruit
   ___b. grapes
   ___c. toast pieces
   ___d. crackers
   ___e. popcorn
   ___f. peanut butter on soft bread

3. Place a "T" (for True) or an "F" (for False) in the space to the left of each of the following statements:

   ___a. Many infants prefer to feed themselves with their hands and fingers rather than with utensils.
   ___b. Infants who are learning to feed themselves should be served large portions of food.
   ___c. All developmentally normal infants should be able to feed themselves by 9 months of age.
   ___d. Infants 8 to 12 months of age should be eating many types of solid foods with a variety of textures and colors.
   ___e. Lifelong eating habits are formed in childhood.

4. Place a check mark (✓) in the blank next to all the statements that are <u>true</u>.
   ___a. Weaning from the breast or bottle to a cup should take approximately 1 to 2 days.
   ___b. Weaning to a cup should begin when an infant can sit up without support and is eating solid foods.
   ___c. Weaning to a cup should begin after 12 months of age.
   d. Weaning to a cup from the breast or bottle is a gradual process.
   e. Bottles are inappropriate after 14 months of age.

Questions (cont.)

   ___f. Infants need help holding the cup for the early weeks of cup feeding.

5. Circle the letter of the two choices that accurately complete the following statement. Home prepared foods for infants:

   a. Can be exactly the same foods that are prepared for the rest of the family with the added salt, sugar, etc.
   b. Can be stored in a freezer indefinitely
   c. Are generally less expensive.
   d. Can be reheated over and over.
   e. Must be prepared and stored with care to prevent contamination of the food.

6. Fill in the blank with the correct word. Honey should not be fed to infants under 1 year of age because it sometimes contains _____ spores.

7. Circle those foods that should never be given to infants because they can cause choking.

Raisins	Whole hot dogs	Apple juice
Soft, ripe bananas	Whole grapes	Popcorn

Go to pages 75-78 to check your answers.

Part 2: WIC Program Infant Nutrition Risk Factors

Introduction

As we discussed throughout this module, adequate nutrition during infancy is very important for long term growth and health. All infants enrolled in WIC will receive a nutritional assessment and follow-up care. Some infants will need special nutrition counseling because of certain factors related to their health. These are called nutrition risk factors. Nutrition risk factors affect an infant's nutritional needs and his/her food intake.

For instance, feeding an infant cow's milk instead of breast milk or infant formula is considered to be a nutritional risk. This is because: (1) The protein level in cow's milk is too high and may stress the infant's immature system; (2) the type of protein and fat are more difficult for the infant to digest; (3) it contains higher levels of sodium and other minerals than are recommended; (4) it is a poor source of iron and vitamin C; and (5) it may cause intestinal bleeding and contribute to the development of iron-deficiency anemia.

An infant with a nutritional risk has an increased chance of poor growth and development. Therefore, it is extremely important that we understand the nutritional risks of infancy and how to identify them.

There are some infants who are identified as high risk. These are infants who are at a greater nutritional risk than the others. An example of this is an infant who is not gaining weight. High risk infants need in-depth nutrition counseling and education. All high risk participants must be referred to the WIC nutritionist or nurse.

Moderate risk infants are at risk for nutrition-related problems, but do not require the intensive follow up of high risk participants. The charts of moderate risk infants should be reviewed by the WIC nutritionist or nurse after certification. A care plan for the WIC educator to follow should be developed and counseling provided to the caregivers.

There are many risk factors that will qualify infants for the WIC Program. This section of the module will define and discuss these factors. The first ones to be covered are those that are feeding and diet-related. They include inappropriate feeding practices, inadequate diet, inappropriate use of nursing bottles, highly restrictive diets, and excessive intake of dietary supplements, vitamins, or minerals.

Feeding and Diet-Related Risk Factors

Inappropriate Infant Feeding Practices

Inappropriate Infant Feeding Practices
Nutrition Risk Factor #82
Low risk

Defined as: Any routine use of these:

- Infant not fed breast milk or iron-fortified infant formula as the primary source of nutrients during the first six months of life and as the primary fluid during the second six months of life (includes infants prescribed low iron formula without iron supplementation).
- Feeding goat's milk, sheep's milk, imitation milks, or substitute milks in place of breast milk or FDA-approved infant formula
- Early introduction of solids; addition of solid food(s) into daily diet before 4-months of age.
- Late introduction of solids: failure to introduce solids by 7 months of age.
- Not using a spoon to introduce and feed early solids.
- Using a syringe-action nipple feeder. Mechanical "infant feeders" were developed to feed children with congenital abnormalities such as cleft palate. Solids from a bottle or nipple feeder can lead to overfeeding and may delay the infant's ability to feed himself and they can cause choking.
- Feeding foods of inappropriate consistency, size, or shape that put the infant at risk of choking.(see sidebar)
- Inappropriate or highly restrictive feeding schedules or forcing an infant to eat a certain type and/or amount of food
- Feeding any amount of honey.
- Feeding any form of cow's milk
- Routine overdilution or underdilution of formula (failure to follow manufacturer's dilution instructions or specific instructions accompanying a prescription.)

Ways to Reduce the Risk of Choking in Infancy

Certain foods should not be fed to infants because they might cause choking including small, round foods, and foods with seeds and pits such as grapes, olives, and cherries which can become lodged in the infant's throat. Foods in small pieces such as nuts and popcorn, hard candy, raisins, potato chips, and raw fruits and vegetables, includ-ing apples, carrots, and celery. Sticky foods and foods that can "ball up" such as peanut butter and soft bread. To reduce the risk of choking, foods such as hot dogs, toddler meat sticks, and grapes (if offered) should be cut into very small pieces . First, cut them lengthwise several time, and then into small pieces. Never offer hot dogs cut into coin-shaped pieces to infants.

Inadequate Diet

Inadequate Diet
Nutrition Risk Factor #90
Low risk

Defined as: Diet history reveals any of the following:

- No routine age appropriate iron source given after 6 months of age, such as iron-fortified cereals, iron-fortified formula, meats, or oral iron supplements.
- Routinely feeding foods low in essential nutrients: adding salt, fat, or sugar to infant's food, feeding infant or adult desserts, feeding sweet liquids. Plain foods are recommended to allow the infant to experience the individual tastes of foods, to avoid the development of sweet and salt habits, and to avoid feeding excessive calories. Low-calorie sweeteners, such as saccharin or aspartame, are not appropriate for infants and young children.
- Feeding caffeine-containing foods or beverages
- Feeding excessive amounts of water (any routine use of supplemental water under age of 6 months or routine use of more than 4 ounces per day over age of 6 months)

- Infrequent feeding of an infant NOT yet taking any solid foods:
  - less than 8 feedings of breast milk and/or formula in 24 hours if less than two-months of age, or
  - less than 6 feedings of breast milk and/or formula in 24 hours if two-months of age or older.

Inappropriate Use of Nursing Bottles
Nutrition Risk Factor #88
Low risk

Inappropriate Use of Nursing Bottles

Defined as:

- Routine use of bottle to feed liquids other than breast milk, formula, or water, such as fruit juice, soft drinks, corn syrup solutions, other sugar-containing beverages, cow's milk, diluted cereal, or other solid foods.
- Allowing the infant/child to fall asleep at naps or bedtime with the bottle. Infants should not be put to bed with a bottle because this will start a habit which may be difficult to break and which can lead to Early Childhood Caries.
- Allowing the infant/child to use the bottle without restriction (e.g., walking around with a bottle)
- Propping the bottle

Highly Restrictive Diets

Nutrition Risk Factor #86
Moderate risk

Highly Restrictive Diets

Defined as: Diets that are very low in calories or severely limit intake of entire food groups or important food sources of nutrients, such as, but not limited to:

- vegan diets (where all animal products are excluded including meat, poultry, fish, eggs, dairy products)
- macrobiotic diet
- very high protein/ low carbohydrate diets

Highly restricted diets may severely limit the nutrient intake for an infant, thus impair their growth and development. Infants on restrictive diets must have their charts reviewed by the WIC nutritionist or nurse.

Excessive Intake of Dietary Supplements, Vitamins, or Minerals
Nutrition Risk Factor #91
Low risk

Excessive Intake of Dietary Supplements, Vitamins, or Minerals

Defined as: Infants with an intake of any more than a one-a-day type infant vitamin/mineral drop or supplements recommended by an MD.

Megadoses of nutrient supplements can cause kidney damage, anorexia, weight loss, vomiting. Infants are especially sensitive to excessive vitamins or minerals because of their smaller body sizes and higher metabolic rates. Dietary supplements not prescribed by a physician put an infant at risk for toxicity, nutrient interactions, and teratogenicity.

Your Role

Responding to feeding and diet-related risk factors

Once a caregiver indicates by either their response on the WIC Infant Nutrition Questionnaire or in conversation that they are feeding their infant in a way that puts their infant at nutrition or health risk, staff must first ask questions to gather more information. For example, staff will want to determine why the caregiver is practicing a certain feeding behavior.

- *AI see that you haven=t begun feeding Johnny solids yet, would you tell me more about why you are choosing to wait?@*
- *AYou have noted on the questionnaire that you put cereal in Johnny=s bottle, what have you heard about offering cereal in the bottle?@*

Staff can ask questions to find out what the caregiver is planning for the infant's successive months of feeding.

- *AI see that you are feeding Tanisha all types of baby foods now. What are you thinking of doing next to progress her eating skills?*

Staff may also need to inquire about the eating environment and feeding relationship.

- *AI see that you are propping the bottle for your baby, how do you typically feed him?@*

  This way if the caregiver states they usually hold the baby, you can praise them for what they are doing right and then provide education on the reasons why propping the bottle is not a good practice.

Staff should provide information about the specific risks for each practice. WIC staff are in a unique role to be able to provide anticipatory guidance (or telling parents what to expect next) on feeding and developmental stages. Staff can provide guidance and information on topics such as the caregiver's role in feeding, introducing new foods, nutrient adequacy, how to prepare formula properly and so on. Educate the caregiver on appropriate feeding practices incorporating best practices discussed in this module. Listen to the caregiver to learn what they would like to work on. Negotiate a plan that works toward healthier feeding habits. Find out what might or might not be helpful with carrying out the plan. Work together with the caregiver to find a solution. Once the plan has been developed to a comfort level for the caregiver, confirm the caregiver understands and agrees with the plan. Provide the caregiver with a related pamphlet to help reinforce the message. Confirm the follow up.

SELF-CHECK #8

INFANT NUTRITION

QUESTIONS

Match the risks with the correlating reason to identify why it is a risk in infancy.

1. _____feeding cow's milk
2. _____feeding solids from a bottle
3. _____routinely feeding infant desserts
4. _____propping the bottle in the infant's mouth
5. _____feeding a vegan diet

a. can lead to development of preference for sweetness and is source of additional less nutritious calories

b. can lead to overfeeding and delay infant's ability to feed self

c. can stress infant's kidneys because of high levels of protein and minerals

d. infant may not receive adequate nutrients for growth

e. limits the ability for an infant to show his fullness and can cause choking

Go to pages 75-78 to check your answers.

Growth-Related Nutrition Risk Factors

Introduction

Growth and Development in Infants

Growth is an increase in the physical size of the body whereas development is the process of maturing. Several factors affect these milestones of infancy.
1. Genetics - Inherited family characteristics that influence body build and height as well as inherited hormonal deficiencies such as, hypothyroidism, can affect normal growth and development.
2. Environment - Social and economic variables (such as, caregiver's ability to show affection, living in poverty, parents' educational level) that influence a person's ability to grow and develop.
3. Behaviors -Mother's behaviors can affect an infant's biological abilities for growth. For example, habits such as smoking or drug use during pregnancy can reduce birth weight and affect growth. Caregiver's food selection and feeding behaviors can affect growth and development.

In addition to feeding and diet-related risk factors there are growth related factors that may be affected by nutrition and therefore also will qualify an infant for the WIC Program. An infant's birth weight, length, gestational age at birth, as well as the infant's weight gain during the first year of life are indicators of how an infant will likely grow or is growing. The quality and quantity of the infant's diet will further influence the infant's growth and development.

The risk factors described below include: underweight, short stature, inadequate growth, low birth weight, prematurity, and overweight. It is important to recognize that identifying WIC infants as having these risk factors provides staff with a baseline for providing education, it does not necessarily mean that aggressive nutrition intervention is needed. For example, an infant born with a low birth weight will need to receive optimum nutrition in order to grow to his/her potential. WIC staff have an opportunity to greatly improve the outcome of an infant with growth challenges by providing nutrition education and, when necessary, making referrals to the WIC high risk counselor, health care providers, and other programs to help families with children who have special needs.

Furthermore, if WIC staff identify an infant as overweight according to WIC guidelines, staff should be able to gather information on feeding and eating skills and the family mealtime environment to assess whether the weight is normal for the infant and/or whether the family may benefit from nutrition information and education and counseling. All of the growth related risk factors are *flags* to draw attention to potential problems.

This section will describe the growth related risk factors and provide an overview of some of the ways WIC staff can work with the caregivers.

In WIC we want to emphasize a healthy feeding relationship rather than focus only on weight.

In all situations, an important role of the WIC staff is to collect information to best understand what the caregiver's concerns are about the infant. In WIC, staff become skilled at finding out about the infant's feeding environment (when and where the infant is fed, who feeds the infant, does the infant feed himself, etc.). Staff must assess the caregiver's level of concern about feeding related issues and learn how they are responding to them. For example, a parent reports her concern that her baby is small and is not drinking enough formula, so she has been trying to make the baby finish all bottles. The parent may not realize that her feeding

reaction could make the situation worse. In WIC we want to emphasize healthy feeding relationships rather than focus only on weight. In this situation, WIC staff could acknowledge the mother's concern about the baby's size and then go on to collect information about the feeding environment to determine what to discuss. Force feeding may not be the answer.

WIC staff are a great source of nutrition and developmental information. By providing anticipatory guidance on the next developmental milestone or expectation with feeding, you can prevent inappropriate feeding behaviors from ever occurring. At every visit, praise caregivers for what they are doing correctly. This may help caregivers to be more open to other suggestions.

Another important role of WIC staff is referring participants to their health care providers and other appropriate community resources to assist the caregiver in their efforts to raise a healthy infant.

Monitoring Growth

WIC uses growth charts to evaluate normal growth in length and weight. The standard growth curves on the charts are the variations seen in the normal growth of normal infants and children. The charts were constructed by weighing and measuring large numbers of infants and children and noting the variations in height and weight over time. When you use the growth charts in this way--to compare an individual infant's growth with that of other infants -- you are primarily checking for marked change to growth. Don't get caught up in treating growth curves like grades in school. An infant growing at the 95th percentile isn't doing any better than the one growing at the 5th percentile. The most important aspect of the growth curve is to be able to compare each individual infant to herself--to evaluate her growth as it progresses from one month to the next. You will want to assess whether an odd result is an inaccurate measurement or a potential health problem. Refer to the Level 1: Screening Module for more information.

Let's now review the risk factors related to growth.

Underweight
Nutrition Risk Factor #15
Weight for length less than or equal to 5th percentile
High risk
Nutrition Risk Factor #16
Weight for length greater than the 5th percentile to less than or equal to the 10th percentile.
Moderate risk

The Underweight Infant

Underweight reflects the body's thinness. It doesn't tell us the cause or nature of underweight. Poverty, infectious disease, and inadequate energy intake are factors that can lead to underweightness. The infant who weighs less than other infants of the same length and age may be an indication of a medical problem or a feeding problem or perhaps it may be a normal weight for the infant.

There are many reasons why an infant may have difficulty with gaining weight. Some of these include: inadequate intake of food being offered (such as with a family in poverty, a depressed caregiver, a quiet baby who doesn't let his needs be known, or caregiver who lacks knowledge and information on the needs of an infant); or inadequate retention of food, such as is common with vomiting, reflux, and diarrhea; or inadequate absorption of food as noted with cystic fibrosis; or increased calorie needs or decreased growth efficiency with certain diseases or illnesses (such as with the human immunodeficiency virus).

Your Role

Education Tips and Follow Up:

- ✓ Establish a rapport with the caregiver to determine possible factors for the infant's low weight. Refer to the Nutrition Questionnaire and ask questions to determine appropriate frequency of feeds and length of feeds. If formula feeding, check to find out how formula is being prepared.
- ✓ Find out about the eating environment.
- ✓ Find out how they feel about their infant's weight and what their health care provider has mentioned.
- ✓ Discuss the general eating behaviors/problems which can lead to inadequate calorie intake.
- ✓ For infants with a weight-for-length less than or equal the 5th percentile, refer the caregiver to the high risk counselor for follow up.
- ✓ For infants with a weight-for-length greater than the 5th percentile to less than or equal to the 10th percentile, forward the chart to the high risk counselor for their review and comments.

Short Stature
Nutrition Risk Factor #14
Length for age less than or equal to the 5th percentile
Low risk
Nutrition Risk Factor #18
Length for age greater than the 5th percentile to less than or equal to the 10th percentile.
Low risk

The Infant with Short Stature

Short stature is defined by two risk factors; see side bar. Stature is the amount of linear growth that has been achieved. Short length may be an indication of some form of chronic undernutrition due to a disease process or inadequate intake of nutrients. Over a long period of time an illness or nutritional deficiency may contribute to linear growth retardation or cessation. Stunted infants are likely to become stunted children, and stunted children are like to become stunted adolescents, and so on.

It may also be perfectly normal for this infant to be small. Some children have a family history of short stature and grow at a normal rate, however, short parental stature shouldn't be used as an explanation for a child's poor growth. Some children's parents may have grown up poor and undernourished in a developing country. WIC staff must assess normal, healthy feeding and eating to ensure nutrition is not affecting the infant's growth.

Your Role

Education Tips and Follow Up:

- ✓ Establish a rapport with the caregiver to find out how they feel about their infant's stature and what their health care provider has mentioned. Refer to the Nutrition Questionnaire and ask questions to determine appropriate frequency of feeds and length of feeds.
- ✓ Find out about the eating environment. If applicable, discuss the general eating behaviors/problems which can lead to inadequate intake.
- ✓ Review appropriate eating behaviors and offer information on the progression of solids and feeding abilities to expect in the coming months.
- ✓ Short stature is a low risk factor and therefore follow up is provided by the educator.

Inadequate or Potentially Inadequate Growth
Nutrition Risk Factor #25
Any weight gain that is less than the expected weight gain from the Weight Gain Tables using current weight and the most recent previous weight (as permitted by the tables).
Low risk
Nutrition Risk Factor #26
Meets criteria for low risk inadequate growth **AND** growth drops one channel in 6 months or less for weight-for-age, length-for-age, or weight-for-length.
Moderate risk
Nutrition Risk Factor #27
Current weight less than birth weight at 2 weeks of age or greater **OR**
Current weight pound or less than birth weight **OR**
Meets criteria for low risk inadequate growth **AND**
-growth drops two channels in 6 months or less for weight for age, length for age, or weight for length
-weight loss or no gain in 6 months or less
-both weight for age and length for age less than the 5th percentile.
High risk

The Infant with Inadequate or Potentially Inadequate Growth

In WIC to assess inadequate growth we measure the differences of weights and lengths between two points in time. We plot those measurements on the charts to determine the rate of growth. In most cases, once an infant is established in a percentile rating of growth, she will remain in that percentile track. When an infant does not grow at her/his expected rate, we become concerned that either s/he is not receiving adequate nutrition, or that s/he may have a medical problem. There are three risk factors that define inadequate growth; see side bar.

Factors that are associated with not adequately nourishing an infant include a lack of social support for the caregiver, an adverse social or psychological environment, a disorganized family, depressed caregivers, a caregiver's lack of education, health and nutrition knowledge, mental and physical abilities.

Your Role

Education Tips and Follow Up:

- ✓ Establish a rapport with the caregiver to find out how they feel about their infant's growth and what their health care provider has mentioned. Refer to the Nutrition Questionnaire and ask questions to determine appropriate frequency of feeds and length of feeds. If formula-fed, find out how the formula is prepared.
- ✓ Find out how the caregiver knows when their infant is hungry and full. Solicit information about the types of solids being offered.
- ✓ Inquire about the eating environment.
- ✓ Discuss age appropriate foods and the general eating behaviors/problems which can lead to inadequate calorie intake.
- ✓ Refer to the WIC high risk counselor for high risk conditions; forward the chart for review if moderate risk condition; educators may follow up and monitor growth for low risk infants. Under some conditions, the educators may also choose to have the high risk counselor follow up with low and moderate risk infants.

The Low Birth Weight Infant

Low Birth Weight
Nutrition Risk Factor #12
Birth weight of 5 pounds (2500 grams) or less.
Moderate risk

Infants born with a low birth weight have more health challenges than infants born at higher birth weights. Low birth weight infants are either born small for their gestational age (SGA) or born prematurely (see next risk factor, NRF #11).

SGA infants weigh less and may be shorter than expected for their birth date. This low birth weight may be a result of intrauterine under nutrition. Inadequate nutrition to the uterus can be caused by any condition that interferes with the transfer of nutrients and oxygen from the mother to the baby before birth. This can happen if during pregnancy the mother smoked, had a poor diet, or if the infant had certain medical problems. Appropriate nutrition is necessary for these infants to grow and develop. Some low birth weight infants may not get enough attention from their caregivers if they are too weak to cry loudly or to move about normally. Other infants may not get enough to eat if they are too weak to suck.

Your Role

Education Tips and Follow Up:

- ✓ Encourage caregivers to follow their physician's advice on breast and formula feeding and vitamin and mineral supplements. Support caregiver's plans for breast or formula feeding.
- ✓ Find out how the caregiver can tell when the infant is hungry and full.
- ✓ When the caregiver is getting ready to progress their infant to solids, review the signs of an infant's development readiness.
- ✓ Parents of young infants are probably receiving more advice than most other parents; be sensitive to the fact that they may be overwhelmed by too much "good advice."
- ✓ Make referrals to community resources as needed. Low birth weight is a moderate risk which requires the WIC high risk counselor review the chart. The high risk counselor may document a plan to offer additional referrals and follow up.

The Infant Born Prematurely

Prematurity
Nutrition Risk Factor #11
Live birth which occurs at or before 37 weeks gestation.
Moderate risk

We learn from the Nutrition Questionnaire if a infant was born three or more weeks before the due date. An infant born at or before 37 weeks gestation is described as being premature. It is difficult for the premature infant, who comes into the world "unfinished," to get enough nutrition to complete the rapid growth and development that would normally occur in the last months before birth. The premature infant's weight at birth may be appropriate for his gestational age. His nutritional needs are greater than mature term infants because he is continuing to "catch up" in growth and development and to lay down nutrient and energy stores that are normally complete by birth. His immature feeding skills, such as sucking and swallowing, and immature digestive system, interfere with meeting these nutritional needs.

Your Role

Education Tips and Follow Up:

- ✓ Encourage parents to receive and follow their physician's advice on breast and formula feeding, and vitamin and mineral supplements. Support parent's plans for breast or formula feeding.
- ✓ Parents of young infants are probably receiving more advice than most other parents; be sensitive to the fact that they may be overwhelmed by too much "good advice."
- ✓ Find out how the caregiver can tell when the infant is hungry and full.
- ✓ When the caregiver is getting ready to progress their infant to solids, review the signs of an infant's development readiness.

✓ Preterm infants are considered to be at moderate risk. The chart of this participant must be reviewed by the WIC high risk counselor.

The Overweight Infant

Overweight
Nutrition Risk Factor #17
Weight for length greater than or equal to the 90th percentile to less than the 95th percentile.
Moderate risk
Nutrition Risk Factor #19
Weight for length greater than or equal to the 95th percentile.
High risk

Some infants become overweight during their first year of life. While not every infant at greater than the > 90th % weight for length is a concern, WIC staff must assess the infant's intake and the family feeding environment. Overweight can result from excessive calories for the amount of energy used for growth, daily body maintenance and activity as well as if there is impaired regulation of energy metabolism. Infants learn their own body's hunger cues and develop eating habits for a lifetime. There are many preventable behaviors which can contribute to an infant becoming overweight. These include:

- Overfeeding of formula or solids for an extended period of time, including over concentrating formula
- Introducing solids too early
- Feeding solids from a bottle
- Feeding the infant when he is not hungry
- Using food as a reward, bribe, or for comfort
- Discouraging the infant from activity, such as keeping him contained in a child carrier.

Overweight in infancy is not a predictor of overweight as an adult. However, the risk of an infant growing up to become an overweight adult is related to the size of his/her parents. That is, if one or both of the infant's parents are overweight, the likelihood the infant will grow up to be an overweight adult increases.

Infants who become overweight should never be put on a diet to lose weight. Weight loss during infancy would deprive the infant of nutrients needed for growth and development. *These infants should be given time to "grow into" their weight.* Also, the best milk for an overweight infant is the same as for a normal weight infant--either breast milk or iron-fortified infant formula. Infants between the 90th and 95th percentile weight for length are considered moderate risk. Infants who are above the 95th percentile weight for length are considered high risk and should be referred to the WIC high risk counselor.

Your Role

Education Tips and Follow Up:

- ✓ Review the nutrition questionnaire for clues on how the infant is being fed. The overweight infant's diet should be assessed to determine whether it is developmentally appropriate for the infant, whether correct formula dilutions are being made, and if any inappropriate foods are being fed.
- ✓ Find out how the caregiver knows when their infant is hungry and full.
- ✓ Discuss with the caregiver the infant's behaviors and patterns of eating. Determine if the feeding relationship could be improved.
- ✓ Find out how the infant is treated when he cries.
- ✓ Discuss with the caregiver the child's behavior and patterns of eating which may be causing the problem.
- ✓ Identify potential feeding issues and make suggestions. Some suggestions for caregivers include:

    - If feeding solids in the bottle, recommend feeding solids from a spoon

    - If finger foods include cookies and other high fat treats, suggest nutritious finger foods such as fruit and cooked vegetables.

    - If giving sweetened water or soft drinks, advise that breast milk or formula is the best choice for thirst.

    - If coaxing infant to eat more than he wants, discourage forcing the infant to finish a bottle or food. Rather learn to watch for the infant's signs of fullness and respect them.

    - If food is used to quiet the baby every time he cries, encourage the caregiver to try to learn to distinguish between cries of hunger and those of discomfort. Offer food only when the infant is hungry.

    - If the infant is kept mostly in a play pen or infant carrier, encourage the caregiver to allow the infant to be active by playing with him.

    - If the infant is forced to eat everything that is offered, recommend that caregivers respect the baby's food likes, dislikes, and needs. Most infants like plain food. Butter and sugar may make the flavor palatable to parents, but adds unnecessary calories for baby. Parents can learn to read labels on baby food jars and avoid the extra calories provided by sugar, tapioca, and starch.

    - Suggest caregivers be in charge and take responsibility for the child's health. Older children, grandparents, and babysitters often feed the infant and may not be as particular as the caregiver about what the infant is being fed.

SELF-CHECK #9

INFANT NUTRITION

QUESTIONS

1. Place a "T" (for True) or an "F" (for False) in the space to the left of each of the following statements:

   __a. Overweight infants are generally put on a weight-loss diet to avoid obesity in later life.

   __b. Overfeeding of formula or solids for an extended period of time can cause infants to become overweight.

   __c. A caregiver of an overweight infant should not use food to quiet the baby every time the baby cries.

   __d. The infant who weighs less than other infants of the same length and age may be a normal weight for the infant.

   __e. Nutritional deficiencies over a long period of time may lead to growth retardation.

   __f. Short stature is not a concern if both parents are short.

2. Besides the information collected on the Infant Nutrition Questionnaire and infant growth charts, what is a question to ask the caregiver to collect information of the feeding relationship?

   _____

3. An infant is defined as having a low birth weight if (s)he weighs _____ at birth.

4. Any infant is described as being premature if (s)he is born before _____ weeks gestation.

Go to pages 75-78 to check your answers.

Biochemical and Other Medical Indicators of Nutrition Risk

In addition to diet and growth-related risk factors, there are several biochemical and medical indicators that define nutritional risk. These include anemia, elevated blood lead levels, and breastfeeding complications.

Anemia

Nutrition Risk Factor #45
Low risk

An infant is considered at risk for anemia if his/her hematocrit is below the following standards:

Elevation (feet)	Low Risk
3000-4999	<34%
5000-6999	<35%
7000-7999	<36%
8000-8999	<37%
9000-9999	<38%
>10000	<39%

Severe Anemia

Nutrition Risk Factor #46
High risk

An infant is considered at risk for anemia if his/her hematocrit is below the following standards:

Elevation (feet)	High Risk
3000-4999	<29%
5000-6999	<30%
7000-7999	<31%
8000-8999	<32%
9000-9999	<33%
>10000	<34%

The Infant with Anemia

The most common form of nutrition-related anemia is iron-deficiency,
which can be caused by a diet inadequate in iron. Inadequate intake of iron in infancy has been found to be related to poverty, inadequate dietary intake, and malnutrition. Infants who do not receive an appropriate iron source after six months of age are at risk for developing anemia. Iron deficiency can result in poor growth, decreased resistance to infection, fatigue, irritability, behavioral problems, and deficits in cognitive ability. Appropriate iron sources include iron fortified formula, iron-fortified cereals, meats, or oral iron supplements.Therefore, breastfed infants who are not receiving any iron rich solids after six months of age are at risk for anemia. Low birth weight infants are also at increased risk of developing anemia because of low neonatal iron stores. Infants on low-iron formulas are also at risk for anemia.
The Colorado WIC Program does not permit the issuance of low-iron formulas to infants over four months of age unless the infant is diagnosed by a physician as having hemolytic anemia, iron overload secondary to chronic blood transfusions, or inherited blood disorders, such as thalassemia.

Your Role

Education Tips and Follow Up:

- ✓ Encourage parents to receive and follow their physician's advice on breast and formula feeding, and vitamin and mineral supplements. Support parent's plans for breast or formula feeding.
- ✓ Recommend iron fortified formula to all caregivers who choose to offer formula to their infants.
- ✓ Educate caregivers on the importance of offering iron-rich foods to an infant over 6 months of age. If the caregiver has not begun these foods, probe to understand her reasons.
- ✓ Educate caregivers on sources of iron-rich foods (such as iron-fortified infant cereals, cooked dried beans [mashed], minced meats) for infants.
- ✓ Refer infants identified as high risk to the WIC nutritionist or nurse for follow up.

Elevated Blood Lead Levels
Nutrition Risk Factor AB
Blood lead level of greater than or equal to 10 micrograms/deci-liter within the past 12 months.
Moderate risk

The Infant with an Elevated Blood Lead Level

Occasionally an infant will be tested for a blood lead level. This information is collected on the Infant Nutrition Questionnaire. Lead poisoning can lead to brain damage, mental retardation, and convulsions. Therefore it is very important to protect infants from sources of lead. Lead is a metal found in old paint, dust, soil, and sometimes, water. Dust clings to toys and other objects that infants put in their mouths, and paint chips can also be put into the infant's mouth. Encourage caregivers to wash infant's hands before they eat. Some folk remedies contain lead such as Azarcon and Greta, which Hispanic families may give for colic. Lead poisoning in infants is a preventable disease. Furthermore, an adequate intake of iron, zinc, calcium, and calories is known to decrease child's susceptibility to the toxic affects of lead.

Your Role

Education Tips and Follow Up:

- ✓ Encourage parents to receive and follow their physician's advice on vitamin and mineral supplements.
- ✓ Find out what the caregiver has learned from their health care provider regarding their infant's elevated blood lead level.
- ✓ Educate caregivers on the importance of offering an iron- and calcium-rich and balanced diet to their infant.
- ✓ Discuss ways to protect their infant from household sources of lead.

Breastfeeding Complications or Potential Complications
Nutrition Risk Factor #52
A breastfed infant with any of the following:
- jaundice
- weak or ineffective suck
- difficulty latching onto mother's breast
- inadequate stooling (for age, as determined by a physician or other health care professional), or less than 6 wet diapers per day.

High risk

The Infant with Breastfeeding Complications

Breastfeeding infants identified with breastfeeding complications or a potential complication are considered high risk and must be referred to the WIC high risk counselor within 24 hours. If the high risk counselor is not available, a referral must be made to the participant's health care provider. A detailed description of staff's role in handling the participant with this risk factor is found in the Breastfeeding Module and Resource Manual

The Infant with Specific Medical Conditions

The list of medical conditions and their descriptions are found in the WIC Procedure Manual and Mini-Manual. The list includes:
HA- Nutrient Deficiency Disease
HB- Gastro-Intestinal Disease
HC- Diabetes Mellitus
HD - Thyroid Disorder
HE - Hypertension
HF - Renal Disease
HG -Cancer
HH - Nervous System Disorder
HI - Genetic/Congenital Disorder
HJ - Inborn Error of Metabolism
HK - Infectious Disease
HL - Food Allergy
HM - Celiac Disease
HN - Lactose Intolerance
HO - Eating Disorder
HP - Major Surgery or Burns
HQ - Juvenile Rheumatoid Arthritis
HR - Lupus Erythematosus
HS - Cardiorespiratory Disease
HT - Heart Disease
HU - Cystic Fibrosis
HV - Asthma
HW - Clinical Depression
HX - Developmental Delay
HY - Dental Problem
HZ - Failure to Thrive
JA - Small for Gestational Age
JB - Large for Gestational Age
JC - Fetal Alcohol Syndrome
JD - Pyloric Stenosis

There are only certain medical conditions that can be used as nutrition risk factors. A medical problem is a nutrition risk factor if it causes, contributes to, or results from an inability to obtain adequate nutrition for growth and development of the infant or the maintenance of health. To be used the condition must have been diagnosed by a physician as self-reported by the caregiver; or be reported or documented by a physician, or someone working under physician's orders. Lactose Intolerance, Eating Disorder, and Dental Problem can be diagnosed as a risk factor by the WIC nutritionist or nurse, but they are unlikely to occur in the infant. Large for Gestational Age (or any infant with a birth weight of 9 pounds or great) may be assigned by any WIC staff.

Some of these conditions interfere with eating a large variety of foods such as a wheat allergy (which may prevent eating not only many foods from the grain group, but many other foods containing wheat). Other conditions change the need for nutrients or energy so that they are significantly above or below the normal requirement for the participant's age. Examples of these conditions include severe burns, cancer, heart disease, and some kinds of cerebral palsy. Some medical conditions require special diets, varied timing for when to start solids, nutrition supplements, eating equipment, or medications. For example, special diets are usually prescribed for diabetes and certain metabolic disorders. Nutrition supplements and medications are often used by participants with cystic fibrosis and celiac disease. Specially adapted eating utensils may be used by participants with severe cerebral palsy or cleft palate.

Risk Assessment: When these conditions are first known on the WIC Program, the infant are considered high risk and should be referred to the WIC nutritionist or nurse. After the initial certification, depending on the nutritionist or nurse's assessment, subsequent recertifications may continue with the risk factor as a moderate risk.

Your Role

Education Tips and Follow Up:

- ✓ Establish a rapport with the caregiver to develop trust between them and you.
- ✓ Determine if their health care provider requires a special diet for the infant and how you can support the diet if applicable.
- ✓ Offer information on the progression of the diet in infancy and educate on general feeding relationship behaviors if appropriate.

Predisposing Nutrition Risk Factors

Lastly, there are conditions that predispose infants to inadequate nutrition patterns by virtue of their home environment as well as their mother's nutrition and health risks. These conditions include homelessness, migrancy, having a caregiver with limited ability to make feeding decisions and/or prepare food, residing in foster care, having a mother on WIC, or a mother who wasn't on WIC but would have qualified.

Homelessness
Nutrition Risk Factor #70
Low risk

Homelessness

An infant who lacks a fixed and regular night time residence; or whose primary night time residence is: a supervised publicly or privately operated shelter (including a welfare hotel, a congregate shelter, or a shelter for victims of domestic violence) designated to provide temporary living accommodations; an institution that provides a temporary residence for individuals intended to be institutionalized; a temporary accommodation in the residence of another individual not exceeding 365 days; or a public or private place not designed, or ordinarily used, as a regular sleeping accommodation for human beings.

Migrancy
Nutrition Risk Factor #71
Low risk

Migrancy

An infant whose family's principal employment is in agriculture on a seasonal basis, who has been so employed within the last 24 months, and who establishes, for the purposes of such employment, a temporary abode.

Counseling Tips: Many migrants have participated in WIC Programs in other states where food delivery, allowable foods, and the design of the check are very different. Therefore, priority topics for education should include how to use the WIC checks; allowable WIC foods, and how to use the foods.

Woman or Primary Caregiver with Limited Ability to Make Feeding Decisions and/or Prepare Food
Nutrition Risk Factor #93
Low risk

Woman or Primary Caregiver with Limited Ability to Make Feeding Decisions and/or Prepare Food

Infant whose primary caregiver is assessed to have a limited ability to make appropriate feeding decisions and/or prepare food. Examples may include individuals who are:

- mentally disabled/delayed and/or have a mental illness such as clinical depression (diagnosed by a physician or licensed psychologist);

- physically disabled to a degree which restricts or limits food preparation abilities; or
- currently using or having a history of abusing alcohol or other drugs.

Foster Care
Nutrition Risk Factor #94
Low risk

Foster Care

Entering the foster care system during the previous 6 months or moving from one foster care home to another foster care home during the previous 6 months.

Mother on WIC
Nutrition Risk Factor #23
Low risk

Mother on WIC

Infant up to 6 months of age born to a WIC participant

Mother at Risk, Not on WIC
Nutrition Risk Factor #24
Low risk

Mother at Risk, Not on WIC

Infant up to 6 months of age born to a WIC mother who was at medical-nutritional risk during pregnancy, but not on WIC.

For both risk factors #23 and #24: An infant born to a mother who had a nutritional need during pregnancy may not have received optimal nutrition while in the uterus and may be more likely to have nutritional problems after birth. Enrolling the infant in WIC means to insure a healthy diet for the critical first year of life.

Your Role

Education Tips and Follow Up:

- ✓ Providing effective and appropriate nutrition education to individuals who have a transient lifestyle requires that staff have an understanding of the participant's transient lifestyle. It is important to identify the caregiver's ability to provide regular healthy meals to the infant. Because a participant may only be enrolled for a short period of time, ongoing, long-term education goals may not be appropriate. Priority topics to be covered include: (1) how to use the WIC check, (2) what are WIC-allowable foods, and (3) referral to other services.
- ✓ Work with the caregiver to select a food package that will fit her ability to store and prepare food. Ready-to-feed formula may be necessary for the homeless infant who is not breastfed.

SELF-CHECK #10

INFANT NUTRITION

QUESTIONS

1. Put a check mark (✓) next to the nutrition risk factor for infants.

a ___ Anemia
b ___ Underweight
c ___ Overweight
d ___ Inadequate diet
e ___ Pica
f ___ Substance Abuse
g ___ Complications of delivery
h ___ Medical conditions
I ___ Infant (up to 6 months of age) born to a WIC participant or to a mother who was at medical-nutritional risk during pregnancy.
j ___ Preterm infant
k ___ Low birth weight infant
l ___ Short stature
m ___ Inadequate growth
n ___ Homelessness
o ___ Breastfeeding complications or potential complications

Place a "T" (for True) or an "F" (for False) in the space to the left of each of the following statements:

2 ___ An overweight infant of normal-weight parents has substantial risks to grow up an overweight adult.

3 . ___ A 9-month old infant with a hematocrit of 29% (living at 5200 feet) must be referred to the WIC nutritionist or nurse for follow up.

Go to pages 75-78 to check your answers.

Part 3: Normal Infant Protocols

The following pages outline infant protocols for breastfed and bottle-fed infants at certification and follow-up visits. The protocols provide guidance for assessing an infant's nutritional risk and eligibility, providing nutrition education, making referrals, and following up at subsequent visits.

Developmental Patterns and Feeding Style in the First Six Months

	Birth	1 month	2 months	3 months	4 months	5 months	6 months
Mouth Pattern:	Sucking, extrusion pattern.				Beginning swallow pattern. Can transfer food from front of tongue to back. Beginning of drooling.		
Hand Coordination:	Random motion of hands.				Hands beginning to go to mouth..		Palmar grasp.
Body Control:	Prone on back. Can raise head when on stomach.				Sits supported. Loses balance when reaches.		Sits unsupported. Can balance while manipulating with hands.
Digestive Ability:	Can digest appropriate milk.				Intestinal amylase begins to increase to allow starch digestion.		
Homeostatic Ability:	Low. Needs carefully-adapted formula.						
Nutritonal Require-ments:	Relatively high nutrient requirement for rapid growth.		Iron stores depleted In premature infants.			Iron stores begin to be depleted in term babies.	
Feeding Style:	Nipple-feeding by breast or bottle.					Beginning spoon feeding.	
Food Selection:	Breast milk or formula.					Beginning solids: iron source.	

Adapted from: Child of Mine by Ellyn Satter

Developmental Patterns and Feeding Recommendations

	6 month	7 month	8 month	9 month	10 month	11 month	12 month	13 month	14 month	15 month	18 month
Mouth Pattern:	Beginning swallow pattern. Can transfer food from front of tongue to back.		Beginning chewing pattern; side-to-side motion of tongue and mashing food with jaws.				Continuing maturation of biting, chewing, swallowing.				
Hand Coordination:	Palmar grasp.	Pincer grasp beginning.	Grabs spoon.		Can get spoon in mouth but generally turns it over.		Beginning mastery of spoon–still spilling most times.			Spoon to mouth–with load intact.	
	Urge to put anything in mouth continues until about age three years. Increases risk for poisoning throughout this time.										
Body Control:	Sits unsupported. Can Balance while manipulating with hands.		Continuing improvement in balance while sitting.								
		Begins to stand.	Can pull self to feet and move around.				Beginning and increasing mastery of walking.				
Digestive Ability:		Gastric acid volume begins to increase.			Can handle balanced amounts of all reasonably soft, moderately–seasoned family food.						
Nutritional Requirements:	Iron stores begin to be depleted in term babies.		Gradually increasing proportion of adequate diet offered by foods other than milk/formula feeding.							All daily nutritional requirements provided by a mixed table food diet; primary source of nutrients and calories is table food and cup.	
Feeding Style:	Spoon feeding.	Introduce cup meals.		Begin self-feeding with cup. Beginning proficiency with spoon.						Reasonably adept with spoon & cup. Can feed self with spoon, drink from cup. Weaned from bottle. Continuance baby and parents.	
Food Selection:	Semi-solid foods.	Increase texture, stiffness of solids.				Pieces of soft, cooked foods.					

Adapted from: Child of Mine by Ellyn Satter

Normal Infant Protocol - Formula-fed

I. Assessment at Certification Visit

A. Check and plot weight and recumbent length.
B. Check hematocrit if over 6 months of age.
C. Complete a Nutrition Questionnaire.
D. Assign Subjective Nutrition Risk Factors (NRFs).
E. Refer to RD/RN if infant is two weeks old or older and below birth weight, or current weight is pound less than birth weight at any time, or if high risk.

II. Counseling Points

A. Explain reasons for WIC eligibility. Describe NRFs.
B. Encourage good infant feeding practices.
   1. Iron-fortified formula for the first year.
   2. Appropriate frequency of feeding for young infants not yet taking solid food: at least 8 feedings in 24 hours if less than 2 months of age, or 6 feedings in 24 hours if 2 months of age or older.
   3. Feed on demand.
   4. Introduce solids at 4-6 months of age and no later than the end of the 7th month; start with iron-fortified infant cereal.
   5. Introduce solids and self-feeding with a cup and spoon as the infant is developmentally ready.
   6. Discuss growth patterns and growth spurts.
C. Discourage:
   1. Taking a bottle to bed.
   2. Liquids in the bottle except formula or water (for older infants), particularly sweetened waters such as honey or sugar water, Kool-Aid, or soda pop.
   3. Use of cow's milk.
   4. Exposure of infant to secondhand tobacco smoke which can cause breathing difficulties and more respiratory and ear infections.

III. Behavior Change Goal Setting

Help parent/caregiver prioritize nutrition concerns and identify 1-2 nutrition or feeding changes that the parent is willing to make to improve infant's nutrition issues. Define specific goals–what, how much, how often, and by when.

IV. Referral

A. Clinic or physician for well baby care, including immunizations.
B. Other community services as appropriate and available such as Medicaid, Food Stamps, TANF, parenting classes.

V. Documentation

Document referrals made, pamphlets provided, client comments/follow up on goals and referrals, assessment/counseling/ plan, and behavior change goals set.

VI. Follow up at Next Visit

A. **Low Risk Participants**

1. Review behavior change goal from previous visit. Praise parent/caregiver.
2. Reinforce good principles of infant nutrition, including guidance that will help parents anticipate their infant's developmental feeding and nutritional needs.
3. Follow up on referrals as appropriate.

B. **Moderate Risk Participants**

Follow same steps as above plus have chart reviewed by the RD/RN within one month after visit.

C. **High Risk Participants**

Schedule follow-up visit by RD/RN according to State Protocols within one to two months of initial visit.

Normal Infant Protocol - Breastfed

I. Assessment at Certification Visit

A. Check and plot weight and recumbent length.
B. Check hematocrit if over 6 months of age.
C. Complete a Nutrition Questionnaire.
D. Assign subjective Nutrition Risk Factors (NRFs).
E. Refer to RD/RN if infant is two weeks old or older and below birth weight, or current weight is pound less than birth weight at any time, or if high risk. Refer immediately to RD/RN if breastfeeding complications.

II. Counseling Points

A. Explain reasons for WIC eligibility. Describe NRFs.
B. Encourage good infant feeding practices.
   1. Review frequency and duration of breastfeedings.
   2. Discuss urine and stool output.
   3. Basic breastfeeding techniques.

4. Discuss growth patterns and growth spurts.
5. Use of supplemental formula, including impact on breast milk production.
6. Introduce solids at 4-6 months of age and no later than the end of the 7th month.
7. Baby does not need supplemental water or vitamin/ mineral supplements for the first 6 months.
8. Introduce solids and self feeding with a cup and spoon as the infant is developmentally ready.
9. A supplemental source of iron, such as iron-fortified cereal should be started at 6 months.

C. If infant takes a bottle, discourage:
   1. Taking a bottle to bed.
   2. Liquids in the bottle except formula or water (for older infants), particularly sweetened waters such as honey or sugar water, Kool-Aid, soda pop, or juice
   3. Use of cow's milk.

D. Discourage exposure of infant to secondhand tobacco smoke which can cause breathing difficulties and more respiratory and ear infections.

III. Behavior Change Goal Setting

Help parent/caregiver prioritize nutrition concerns and identify 1-2 nutrition or feeding changes that the parent is willing to make to improve infant's nutrition issues. Define specific goals--what, how much, how often, and by when.

IV. Referral

A. Clinic or physician for well baby care, including immunizations.
B. Other community services as appropriate and available such as Medicaid, Food Stamps, TANF, parenting classes.

V. Documentation

Document referrals made, pamphlets provided, client comments/follow up on goals and referrals, assessment/ counseling/plan, and behavior change goals set.

VI. Follow Up at Next Visit

A. **Low Risk Participants**
   1. Review behavior change goal from previous visit. Praise parent/caregiver for any attempted change.
   2. Reinforce good principles of infant nutrition, including guidance that will help parents anticipate their infant's developmental feeding and nutritional needs.
   3. Follow up on referrals as appropriate.

B. **Moderate Risk Participants**
   Follow same steps as above plus have chart reviewed by the RD/RN after visit.

C. **High Risk Participants**
   Schedule follow-up visit by RD/RN according to State Protocols within one to two months of initial visit.

CONGRATULATIONS!! You have just finished your study of the Infant Nutrition Module. This module is filled with a lot of information and you have worked hard to get to this point. We hope you will use this information in a positive way to help your own children and your participants' children. Remember—infants are a precious resource! You are now ready to take the post test that is stapled to the back of the module.

SELF-CHECK ANSWERS

Self-Check #1

1. a. Infants have no nutritional need for solid foods before 4 to 6 months.
   b. Infants are not developmentally ready to eat solid foods before this age.

2. a, b, c

3. a. T
   b. F
   c. T
   d. T

Self-Check #2

1. Cow's milk: Similac, Enfamil, Good Start
   Soy beans: ProSobee, Isomil, Alsoy

2. **Concentrated:** Requires dilution with water in a one-to-one ratio. Mix equal amounts of formula and water.

   Powdered: Mixed with water in a ratio of one scoop formula to two ounces of water. The directions on the formula can will give the exact dilution requirements.

   Ready-To-Feed: Requires no preparation; no mixing, no diluting.

3. Improper dilution of infant formula can result in very serious health problems for the infant. Too little water may be too concentrated for a baby to digest. Too much water might not supply the necessary calories for growth.

4. Sterilization of water bottles (until the infant is 4 to 6 months of age) and overall cleanliness during preparation are necessary in order to prevent gastrointestinal problems caused by bacteria.

5. Liquid formula (prepared or RTF) may be stored in the refrigerator for up to 24 hours after the formula can has been opened.

Self-Check #3

1. Iron-fortified formula
   Breast milk

2. a. F
   b. T
   c. T
   d. F

Self-Check #4

1. a. Breast milk
   b. Infant formula
   c. Water

2. a. Cereals
   b. Juices
   c. Sweet liquids

3. a. T
   b. T
   c. F
   d. F

Self-Check #5

1. a. 4 months of age.
   b. Breast milk or iron-fortified infant formula.

2. b, c, e

3. Iron-fortified infant formula
   Strained vegetables
   Strained fruits
   Egg Yolks
   Strained beef

4. Iron-fortified formula, breast milk, fortified infant cereal, strained meats, cooked dried beans–mashed

5. Vitamin C

6. a. False; 2 ounces
   b. True
   c. True

Self-Check #6

1. a. Protein, Phosphorous, Calcium, Fluoride
   b. Fluoride
   c. Streptococcus mutans

2. Either of the following:
   a. Sharing eating utensils
   b. Putting objects in an adult's mouth then into the infant's mouth (pre-chewed foods, pacifier)

Self-Check #6 (cont.)

3. a. True
   b. True
   c. False; never dilute formula.

4. a. Overfeeding
   b. Bottle nipples with holes that are too large
   c. Not burping the infant during feeding
   d. Playing with and jostling the infant right after eating

5. Any three of the following:
   a. Burp if needed
   b. Change diaper if needed
   c. Sooth by swaddling in a blanket
   d. Rocking
   e. Carry in an infant carrier
   f. Lay infant tummy down on the bed and pat his back

Self-Check #7

1. c, d, and e should be checked.

2. a, c, and d should be checked.

3. a. True
   b. False
   c. False
   d. True
   e. True

4. b, d, e, and f should be checked

5. c, e

6. botulinum

7. raisins, whole hot dogs, whole grapes, popcorn

Self-Check #8

1. c

2. b or e

3. a

4. e or b

5. d

Self-Check #9

1. a. F
   b. T
   c. T
   d. T
   e. T
   f. F. False; short stature in parents shouldn't be used to explain poor growth. WIC staff must assess feeding and eating to ensure adequate nutrition.

2. Any one of the following:

   a. How can you tell when your baby is hungry?
   b. How can you tell when your baby is full?
   c. Who feeds the baby?

3. ≤ 5 pounds

4. 37

Self-Check #10

1. All letters except e, f, and g should be checked.

2. F

3. T