

Infant Feeding

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Many adolescents are concerned about whether to feed their infant breastmilk or infant formula. They want to be certain their infant is receiving the food they need, but are unsure about whether breastfeeding or bottle feeding is best.

Health professionals can have a tremendous impact on adolescents' decisions about infant feeding. They can provide adolescents with information about infant feeding choices and an opportunity for the adolescent to discuss and decide if breastfeeding or bottle feeding fits their circumstances. Health professionals can assist them in identifying and contacting resources in the community for additional support. Infant feeding choices include breastfeeding and/or infant formula feeding and the introduction of solid foods at about 4 to 6 months of age when the infant is developmentally ready.

BREASTFEEDING

From 1989 to 1995, breastfeeding initiation among adolescents and women increased from 52.2% to 59.7% and continued breastfeeding to at least 6 months of age increased from 18.1% to 21.6%. The increases in breastfeeding were observed across all sociodemographic groups but were greater among groups that have historically been less likely to practice breastfeeding: women who are black, younger (less than 25 years of age), in the lowest income group (less than \$10,000), have no

more than grade school education, primiparous, and living in the South Atlantic region of the United States; women who had infants of low birth weight; women who were employed outside of the home; and women who participated in the Women, Infants and Children (WIC) Supplemental Nutrition Program.¹ Recent data on adolescent mothers suggests that 47% of adolescents (less than 20 years of age) initiate breastfeeding after delivery but only 12% continue to breastfeed to at least 6 months of age.²

Benefits of Breastfeeding

Breastfeeding has many health, psychological, and economical benefits for the infant, mother, and family.³⁻⁵

Health benefits for the infant

- Meets all of the infant's nutritional requirements for about the first 6 months and is superior to any substitute.
- Changes in composition to meet infant's changing needs.
- Promotes optimal growth and development, including brain growth.
- Provides the ideal nutrients for infant brain growth in the first year of life.
- Reduces the incidence and/or severity of diarrhea.
- Provides protection against gastrointestinal, respiratory, and urinary tract infections.

- Reduces incidence of type 1 diabetes mellitus, lymphoma, and Crohn's disease.
- Reduces risk of developing allergic symptoms such as eczema and asthma.

Health benefits for the mother

- Reduces risk of maternal postpartum hemorrhage.
- Helps the uterus return to its normal size quickly.
- Delays return of menses, helping to protect the mother against anemia by conserving iron.
- Reduces risk of developing premenopausal breast and ovarian cancer and osteoporosis.

Psychological benefits for the mother

- Fosters a special bond between mother and infant. The relationship of a mother with her suckling infant is considered to be the strongest of human bonds.
- Promotes sense of pride and accomplishment.

Economical benefits for the family

- Saves families the cost of purchasing infant formula.
- Reduces health care costs.
- Reduces employee absenteeism for care attributable to infant illness.

Barriers to Breastfeeding

Despite the widespread recognition of breastfeeding benefits, many adolescents choose to feed their infants formula based on an inability to overcome barriers. Barriers to breastfeeding among adolescents have been identified and include:⁶⁻¹¹

- Concern that breastfeeding is incompatible with attending school or working outside the home.
- Lack of breast pumps and space at school or work to pump breastmilk.
- Lack of support from family (e.g., husband, mother, grandmother, other female relatives), boyfriend, and friends.
- Lack of confidence in their ability to breastfeed, to produce an adequate supply of nutritious breastmilk, or acquire the skills necessary to breastfeed successfully.

- Fear of sore nipples or breasts.
- Being solely responsible for feeding the infant.
- Lack of discussion of breastfeeding with a health professional early in pregnancy.
- Fear that they will be unable to follow a diet necessary to ensure a healthy supply of breastmilk.
- Concern that they must give up cigarettes and alcoholic beverages.
- Loss of freedom associated with breastfeeding.
- Lack of accurate information regarding breastfeeding and the use of breast pumps.
- Embarrassment about breastfeeding infant around others, at home or in public.
- Infant's father feels threatened or jealous of the infant's intimate relationship with the mother and the loss of attention.
- Lack of exposure to breastfeeding role models.

A coordinated strategy using a variety of activities can help overcome the barriers adolescents perceive about breastfeeding. Positive attitudes about breastfeeding and its initiation, and provision of support throughout pregnancy and during the postpartum period can help establish breastfeeding as a socially acceptable norm and valued pattern of infant feeding for adolescents. Health professionals can encourage adolescents to breastfeed, provide accurate information and educational materials, and develop strategies to bring about institutional change to promote breastfeeding policies. Schools can be an ideal place to offer lactation education including breastfeeding information and access to breastfeeding rooms.

Counseling Tips for Breastfeeding

- Begin breastfeeding as soon as possible after birth, usually within the first hour.
- Breastfeed the newborn infant when he starts to show signs of hunger, such as increased alertness or activity, mouthing or rooting. Crying is a late indicator of hunger.
- In the first few weeks after birth, breastfeed the infant approximately 8 to 12 times in 24 hours.

- No supplements (e.g., water, glucose, formula) should be given to the breastfeeding infant unless a medical condition requires it.
- Allow the infant to finish feeding at the first breast before offering the second breast. There are no restrictions on the length of feedings, though 20 to 45 minutes provides adequate intake and allows some time to rest between feedings.
- If the infant prefers one breast at a time, do not restrict the time spent feeding at that breast.
- Infants have periods when they grow very fast. It may be necessary to feed more often to give milk production a chance to adjust to the infant's growth needs. Frequent feedings help establish milk supply and prevent the breast from getting too full.
- Refrigerated, expressed breastmilk should be used within 48 hours. Breastmilk kept at 0 degrees F in a standard home freezer or in a freezer compartment of a refrigerator can be stored for 6 months.

Counseling Tips for the Breastfeeding Mother

- Eat a variety of healthy foods: 9 servings of grains, 4 servings of vegetables, 3 servings of fruit, 3 servings of dairy products, and 2 to 3 servings of protein each day are recommended. Eating well helps the mother stay healthy and the infant to grow better.
- Drink when thirsty and try to drink a glass of water at every feeding.
- Limit caffeine-containing beverages to 2 servings a day (e.g., coffee, tea, or soft drinks).
- Avoid drinking alcoholic beverages, but certainly no more than 2 to 2.5 oz of liquor, 8 oz of table wine, or 2 cans of beer on any one day (less for small women).
- Sources of breastfeeding information include friends, family, peer support groups, lactation consultants, other health professionals, the La Leche League and other community organizations, and educational materials.

Medical Contraindications to Breastfeeding

The great majority of drugs taken by breastfeeding mothers, whether prescription or over the counter, are

compatible with breastfeeding. However, there are a few circumstances in which breastfeeding is contraindicated, either permanently or temporarily, and the mother should be counseled not to breastfeed. (See Table 1.) Antimetabolites, radioactive isotopes, and certain drugs of abuse (such as amphetamine, cocaine, heroin, marijuana, nicotine, and phencyclidine) are some of the contraindications to breastfeeding.¹² Every effort should be made to substitute safe drugs and/or to maintain lactation with pumping during the period of risk.

INFANT FORMULA

In the absence of breastmilk, iron-fortified infant formula is an appropriate substitute for feeding infants during the first year of life. Infant formula provides all the energy and nutrient requirements for healthy full-term infants for the first 6 months of life. After this period, infant formula still continues to supply a significant part of the infant's nutritional requirements. Infant formula is available in three forms: ready-to-feed, concentrated liquid, and powder. All three forms of formula, when prepared properly provide the nutrients important for infants.^{13, 14}

Indications

The use of infant formula has three indications:¹³

- Provides a substitute (or supplement) for breastmilk for infants whose mother chooses not to breastfeed (or not to do so exclusively).
- Provides a substitute for breastmilk for infants whose mother has medical contraindications to breastfeeding.
- Provides a supplement for breastfed infants who do not gain weight adequately.

Infant Formula Composition

Cow's Milk-Based Formula

Standard cow's milk-based formula is the feeding choice when breastfeeding is not used or is stopped before 1 year of age.¹³ Most infants thrive on cow's milk-based formula, however some infants experience intolerance to this type of formula.

TABLE 1
Summary of Medical Contraindications to Breastfeeding in the United States

PROBLEM	OK TO BREASTFEED?	CONDITIONS
INFECTIOUS DISEASE		
Acute infectious disease	Yes	Respiratory, reproductive, gastrointestinal infections
HIV	No	HIV positive
Active tuberculosis	Yes	After mother has received 2 or more weeks of treatment
Hepatitis		
Hepatitis A	Yes	As soon as mother receives gamma globulin
Hepatitis B	Yes	After infant receives HBIG, first dose hepatitis B vaccine should be given before hospital discharge
Hepatitis C	Yes	If no co-infections (e.g., HIV)
Venereal warts	Yes	
Herpes viruses		
Cytomegalovirus	Yes	
Herpes simplex	Yes	Except if lesion on breast
Varicella-zoster (chicken pox)	Yes	As soon as mother becomes noninfectious
Epstein-Barr	Yes	
Toxoplasmosis	Yes	
Mastitis	Yes	
Lyme disease	Yes	As soon as mother initiates treatment
HTLV-1	No	
MEDICATIONS/PRESCRIPTION DRUGS AND STREET DRUGS		
Antimetabolites	No	
Radiopharmaceuticals		
Diagnostic dose	Yes	After radioactive compound has cleared mother's plasma
Therapeutic dose	No	
Drugs of abuse	No	Exceptions: cigarettes, alcohol
Other medications	Yes	Drug-by-drug assessment
ENVIRONMENTAL CONTAMINANTS		
Herbicides	Usually	Exposure unlikely (except workers heavily exposed to dioxins)
Pesticides		
DDT, DDE	Usually	Exposure unlikely
PCBs, PBBs	Usually	Levels in milk very low
Cyclodiene pesticides	Usually	Exposure unlikely
Heavy metals		
Lead	Yes	Unless maternal level ≥ 40 mg/dL
Mercury	Yes	Unless mother symptomatic and levels measurable in breastmilk
Cadmium	Usually	Exposure unlikely
Radionuclides	Yes	Risk greater to bottle fed infants

Source: Lawrence RA. A review of the medical benefits and contraindications to breastfeeding in the United States. Arlington, VA: National Center for Education in Maternal and Child Health, 1997.

Milk-Based Formulas

Three milk-based formulas with special compositional features are available: (1) PM-60-40[®] contains low levels of minerals and electrolytes for infants with renal or cardiovascular diseases that benefit from a lower renal solute load; (2) Lacto-Free[®] is lactose-free and with glucose polymers as the source of carbohydrates for infants with lactase deficiency; and (3) Portagen[®] contains 86% of the fat content in the form of medium chain triglycerides for infants with severe fat malabsorption or with bile duct obstruction or severe cholestasis.¹³

Soy Formulas

Soy formula is recommended for infants who have an immunoglobulin E-mediated reaction to cow's milk protein, infants with lactase deficiency or galactosemia, postdiarrheal refeeding for infants with signs of lactose intolerance, and infants with minor intolerances to milk-based formulas such as colic, loose stools, spitting up, or vomiting. It can also be used by vegetarians.¹³

Protein Hydrolystate Formulas

Protein hydrolystate formula is recommended for infants intolerant of cow's milk or soy protein or for infants with significant malabsorption due to gastrointestinal or hepatobiliary disease such as cystic fibrosis, short gut syndrome, biliary atresia, cholestasis, and protracted diarrhea.¹³

Cow's Milk

Full-fat cow's milk, goat's skim milk, low fat milk, and evaporated milk are not recommended for use during the first 12 months of life.¹³

Counseling Tips For Formula-Feeding

- Follow sanitary procedures when preparing infant formula:
 - Wash hands before preparing infant formula.
 - Clean the area in which infant formula is prepared.
 - Wash the nipples and bottles with detergent and a bottle brush, rinse well, and allow to dry.
 - Wash and dry the top of the infant formula container before opening.

- Start by preparing 3 to 4 oz of infant formula per feeding, but prepare and offer more infant formula as the infant's appetite increases.
- Any infant formula left in the bottle when the infant has finished eating should be discarded. A bottle that has been started should not be reused.
- Open containers of ready-to-feed or concentrated formula should be covered and refrigerated.
- Store powdered infant formula at room temperature.
- Make sure the bottle nipple is the right size. If the infant seems to be gagging or gulping too fast, the nipple hole may be too large. Also, if the infant is sucking hard and seems frustrated, the hole may be too small.
- Angle the bottle so the infant is not sucking in air. Burp the infant at natural breaks (e.g., midway during and after feeding) by gently rubbing or patting the infant's back while holding her.

SOLID FOOD

As infants grow, their capacity to process a greater volume and variety of foods increases. The newborn infant needs small, frequent feedings, while the older infant is able to consume more milk at one time and requires fewer feedings. Supplemental foods should be introduced at about 4 to 6 months of age when the infant is developmentally ready. At this stage of development, the infant is able to sit with support and has good neuromuscular control of the head and neck. The infant is also able to indicate a desire for food by opening the mouth and leaning forward or satiety by leaning back and turning the head away.¹³

Counseling Tips for Introducing Solid Foods

- A typical sequence of introducing solid foods is iron-enriched baby cereal, vegetables, fruits, and meats, but after serving iron-fortified baby cereal, you can follow any sequence.
- Introduce one food at a time, waiting 7 days or more to see how the infant tolerates the food.
- Use only breastmilk or iron-fortified infant formula, even in infant cereal. Do not use low-iron milks (e.g.,

cow's milk, goat's milk, soy milk) until age 12 months.

- Match foods with infant's developmental abilities. Puree the food prepared for the family meal and serve to infant. By about 9-10 months, an infant can handle foods with more texture. Ground foods can be initiated, followed by chopped foods at about 10-11 months of age. Avoid adding sugar or salt to infant's food.
- Check commercially prepared food labels for additives, sugar, or salt.
- Never warm expressed breastmilk, infant formula, or any food in containers or jars in a microwave. The container may feel cool, but the contents can be too hot because it can heat unevenly and cause a burn. Bottles can be warmed by holding them under running hot water or placing them in a bowl of hot water for a few minutes. To check the fluid to see if it's too warm, sprinkle a few drops on your wrist (it should feel lukewarm).
- Honey should not be added to food, water, or formula that is fed to infants younger than 1 year of age because it can be a source of spores that cause botulism in infancy.
- By 1 year of age, the infant should be eating a wide range of foods. A rule of thumb is that one serving equals 1 tablespoon of food per year of age.

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SUGGESTED READING

Best Start Social Marketing. Health care providers' breastfeeding support kit. Tampa, FL: Best Start Social Marketing, 1998.

Best Start Social Marketing. Physicians' breastfeeding support kit. Tampa, FL: Best Start Social Marketing, 1998.

Dietz WH, Stern L, eds. Guide to your child's nutrition: Making peace at the table and building healthy eating habits for life. New York: Villard Books, 1999.

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Worthington-Roberts BS, Williams SR. Nutrition in pregnancy and lactation. 6th ed. Madison, WI: Brown and Benchmark Publishers, 1997.

RESOURCES

National Organizations

The Academy of Breastfeeding Medicine

P.O. Box 15945-284
Lenexa, KS 66285-5945
Tel: (913) 541-9077
Fax: (913) 541-0156

American Academy of Family Physicians

11400 Tomahawk Creek Parkway
Leawood, KS 66211-2672
Tel: (913) 906-6000; (800) 274-2237
Fax: (913) 906-6075
<http://www.aafp.org>

American Academy of Pediatrics

141 Northwest Point Boulevard
Elk Grove Village, IL 60007-1098
Tel: (847) 228-5005
Fax: (847) 228-5097
<http://www.aap.org>

The American Dietetic Association

216 West Jackson Boulevard, Suite 800
Chicago, IL 60606-6995
Tel: (312) 899-0040; (800) 877-1600
Fax: (312) 899-4757
<http://www.eatright.org>

American Nurses Association

600 Mayland Ave, S.W., Suite 100 West
Washington, DC 20024-2571
Tel: (202) 651-7000; (800) 274-4262
Fax: (202) 651-7001
<http://www.ana.org>

Healthy Mothers, Healthy Babies Coalition

121 North Washington Street, Suite 300
Alexandria, VA 22314
Tel: (703) 836-6110
Fax: (703) 836-3470

Association of WIC Directors

2001 S Street, N.W., Suite 580
Washington, DC 20009-3355
Tel: (202) 232-5492
Fax: (202) 387-5281
<http://www.wicdirectors.org>

Best Start

3500 East Fletcher Avenue, Suite 519
Tampa, FL 33613
Tel: (813) 971-2119
Fax: (813) 971-2280

International Lactation Consultant Association

4101 Lake Boone Trail, Suite 201
Raleigh, NC 27607
Tel: (919) 787-5181
Fax: (919) 787-4916
<http://www.ilca.org>

La Leche League International

1400 North Meacham Road
Schaumburg, IL 60173-4048
Tel: (847) 519-7730; (800) 525-3243
Fax: (847) 519-0035
<http://www.lalecheleague.org>

National Association of Pediatric Nurse Associates and Practitioners

1101 Kings Highway North, Suite 206
Cherry Hill, NJ 08034-1912
Tel: (856) 667-1773; (877) 662-7627
Fax: (856) 667-7187
<http://www.napnap.org>

National Clearinghouses and Resource Centers

National Center for Nutrition and Dietetics

The American Dietetic Association
216 West Jackson Boulevard, Suite 800
Chicago, IL 60606-6995
Tel: (312) 899-0040; (800) 877-1600
Fax: (312) 899-1739
<http://www.eatright.org>

National Maternal and Child Health Clearinghouse

2070 Chain Bridge Road, Suite 450
Vienna, VA 22182-2536
Tel: (703) 356-1964; (800) 434-4624
Fax: (703) 821-2098
<http://www.nmchc.org>

Federal Agencies

Food and Nutrition Information Center

National Agricultural Library
U.S. Department of Agriculture
10301 Baltimore Avenue, Room 304
Beltsville, MD 20705-2351
Tel: (301) 504-5719
Fax: (301) 504-6409
<http://www.nal.usda.gov/fnic>

Food and Nutrition Service

U.S. Department of Agriculture
3101 Park Center Drive, Room 609
Alexandria, VA 22302
Tel: (703) 305-2554
Fax: (703) 305-2576
<http://www.fns.usda.gov/fns>

Maternal and Child Health Bureau

Health Resources and Services Administration
U.S. Department of Health and Human Services
5600 Fishers Lane
Parklawn Building, Room 18-20
Rockville, MD 20857
Tel: (301) 443-0205
Fax: (301) 443-1797
<http://www.mchb.hrsa.gov>