



American Academy of Pediatrics



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Bottlefeeding **Types of bottlefeeding formulas**

Most infant formulas are available in ready-to-feed liquid forms, concentrates, and powders. Although ready-to-feed formulas are convenient, they are the most expensive.

Formula made from concentrate is prepared by mixing equal amounts of concentrate and sterile water (i.e., one can of concentrate and one can of drinking water or one bottle at a time, leaving the can of concentrate covered in the refrigerator for no more than 48 hours).

Powder formula, the least expensive form, comes either in premeasured packets or in a can with a measuring scoop. To prepare it, you'll add one level scoop of powder for every 2 ounces of water, and then mix thoroughly to make sure there are no clumps of undissolved powder in the bottle. The solution will mix more easily and the lumps will dissolve faster if you use slightly warmed water. Aside from the price, one advantage of the powder is its light weight and portability. You can place a couple of scoops of powder in a bottle when you are going out with your baby, and then add water just before feeding. The powder will not spoil, even if it stays in the bottle several days before you add water.

In addition to coming in the styles mentioned above, formula also comes in several different types of bases: *cow's-milk*, *soy* and *specialized*.

Cow's-milk-based formulas account for about 80 percent of the formula sold today. Although cow's milk is at its foundation, the milk has been changed dramatically to make it safe for your baby. It is treated by heating and other methods to make the protein more digestible. More milk sugar (lactose) is added to make the concentration equal to that of breastmilk, and the fat (butterfat) is removed and replaced with vegetable oils and, in some formulas, animal fats that are more easily digested by infants.

Cow's milk formulas are available with added iron. Some infants do not have enough natural reserves of iron to meet their needs. So, the AAP recommends that iron-fortified formula be used for all bottle-fed infants from birth to one year of age. Soy formulas contain a different protein (soy) and different carbohydrate (glucose polymers or sucrose) from milk-based formulas. Pediatricians recommend soy formula most commonly for babies unable to digest lactose, the main carbohydrate in cow's milk formula. Many infants have brief periods when they cannot digest lactose, particularly following bouts of diarrhea. When these babies are placed on a lactose-free formula, their digestive enzymes have a chance to return to normal. Depending on the severity and type of diarrhea, your baby may need to stay on the lactose-free formula for as

little as a week or, rarely, as long as several months. Your pediatrician will tell you when it's safe to return to milk-based formula.

Soy formulas today contain a good source of protein, but not quite as good as cow's milk (which, in turn, is not as good as human milk). Also, babies absorb calcium and some other minerals less efficiently from soy formulas than from milk-based formulas. Because premature infants have higher requirements for these minerals, they usually are not given soy formula at all. Healthy full-term infants should be given soy formula only when medically necessary. Some strict vegetarian parents choose to use soy formula because it contains no animal products.

A far less common reason for placing an infant on soy formula is milk allergy, which can cause colic, failure to thrive, and even bloody diarrhea. This reaction can be so dangerous to a newborn that some pediatricians prescribe soy formula from birth as a preventive measure when there is a strong family history of allergies to cow's milk. Unfortunately, as many as half the infants who have milk allergy are also sensitive to soy protein, and they must be given a specialized formula or breastmilk.

Specialized formulas are manufactured for infants with particular disorders or diseases. There also are formulas made specifically for premature babies. If your newborn has special needs, ask your pediatrician which formula is best. Also, be sure to check the package for details about feeding requirements (amounts, scheduling, special preparations), since these may be quite different from regular formulas.

You and your pediatrician should work together to select a formula that best suits your baby's needs. But be sure to give your baby formula, not cow's milk, for the first year of life. Young infants cannot fully digest regular cow's milk as completely or easily as formula. Cow's milk contains high concentrations of protein and minerals, which can stress a newborn's immature kidneys and can cause severe illness at times of heat stress, fever, or diarrhea. Also, this feeding lacks the proper amounts of iron and vitamin C that infants need. It may even cause iron-deficiency anemia in some babies, since protein can irritate the lining of the stomach and intestine, leading to loss of blood into the stools. For these reasons your baby should not receive any regular cow's milk for the first twelve months of life.

Preparing formula for bottlefeeding

Make sure all bottles, nipples, and other utensils you use to prepare formula, or to feed your baby, are clean. If the water in your home is chlorinated, you can simply use your dishwasher or wash the utensils in hot tap water with dishwashing detergent and then rinse them in hot tap water. If you have well water or nonchlorinated water, either place the utensils in boiling water for five to ten minutes or use a process called terminal heating.

In terminal heating you clean, but do not sterilize, the bottles in advance. You then fill them with the prepared formula and cap them loosely. Next, the filled bottles are placed in a pan with water reaching about halfway up the bottles, and the water is brought to a gentle boil for about twenty-five minutes.

Be sure to follow the manufacturer's directions exactly for the formula type you choose. Too much water and your baby won't get the calories and nutrients she needs for proper growth. Too little water and the high concentration of formula could cause diarrhea or dehydration and will give your infant more calories than she needs.

Next, bring the water you plan to use in the formula (concentrate or powder) to a rolling boil for approximately one minute. Then add it to the formula you're preparing.

A few families still prefer to prepare their own infant formula, but most pediatricians discourage this. It is unwise to give your baby homemade formula without your pediatrician's advice.

Any formula you prepare in advance should be stored in the refrigerator. If you don't use refrigerated formula within twenty-four hours, throw it out. Refrigerated formula doesn't necessarily have to be warmed up for your baby, but most infants prefer it at least at room temperature.

The easiest way to warm refrigerated or frozen milk is to place the container in warm water and rotate it frequently. To speed up this process, place the container in a pan of water at low heat on the stove. You also can thaw milk by leaving it at room temperature, but this takes much longer and can lead to bacterial growth if left for many hours. Microwave ovens should not be used for heating bottles. Microwaving overheats the milk in the center of the container. Even if the bottle feels comfortably warm to your touch, the superheated milk in the center can scald your baby's mouth. Also, the bottle itself can explode if left in the microwave too long.

If you warm a bottle or use it immediately after terminal heating, test it in advance to make sure it's not too hot for your baby. The easiest way to test the temperature is to shake a few drops on the inside of your wrist.

Incidentally, once milk is thawed, its fat may separate, but it is still safe to drink. Just shake the container gently until the milk returns to a uniform consistency. Thawed milk should be used within four hours. Never refreeze it.