Feeding Baby Safely:
Facts, Fads and Fallacies

A Report by The American Council on Science and Health

Table of Contents

Executive Summary
Introduction
The Role of baby Food in an Infant’s Diet
Feeding Baby Safely
Temperature
Microorganisms
Choking Hazards
Ingredients
Avoiding Allergies
Protecting Baby’s Teeth
Nutrition
Human Milk, Formula, and Cows’ Milk
How Much Should a Baby Eat?
Iron
Juice Abuse
Babies Are Not Little Adults
Are Homemade Foods More Nutritious than Commercial Foods?
Comparing Costs
Conclusions
Appendix A: Nutrition Labeling of Baby-Food Products
Appendix B: Cost Comparisons
ACSH Gratefully Acknowledges the Comments and Contributions of the Following Reviewers of this Report

Julie A. Albrecht, Ph.D.
University of Nebraska at Lincoln

Dean O. Cliver, Ph.D.
University of California, Davis

Ruth Kava, Ph.D., R.D.
ACSH

George R. Kerr, M.D.
University of Texas at Houston

Cindy F. Kleiman, M.P.H.
ACSH

Kathryn Kolasa, Ph.D., R.D., LD/N.
East Carolina University

Manfred Kroger, Ph.D.
Pennsylvania State University

ACSH

Mary Frances Picciano, Ph.D.
Pennsylvania State University

Herbert P. Sarett, Ph.D.
Sarasota, Florida

Fredrick J. Stare, M.D., Ph.D.
Harvard School of Public Health

Elizabeth M. Whelan, D.Sc., M.P.H.
ACSH

Ekhard E. Ziegler, M.D.
University of Iowa
Executive Summary

Both commercial and homemade baby foods can be safe and nutritious if used appropriately. To provide their infants with a healthful diet, parents need to choose foods wisely, introduce them correctly, and follow appropriate safety precautions:

- To prevent burns, always check the temperature of heated foods before serving.
- Use safe food-handling procedures to prevent the introduction and growth of disease-causing bacteria.
- Never feed unpasteurized apple juice, juice blends containing unpasteurized apple juice, or unpasteurized apple cider to infants.
- Never feed infants foods that pose a high risk of choking, such as whole hot dogs, hot dog “coins,” peanuts, hard candies, or raw carrots.
- Because of the possibility of contamination with the microorganism that causes infant botulism, never feed honey or corn syrup to infants under the age of one year.
- Because of the possibility of excessively high levels of nitrate, it may be best not to home-prepare beets, carrots, collard greens, turnips, or spinach for infants under the age of 6 months. Parents who prepare their own baby food should consult with the infant’s health-care provider for individualized advice on this subject.
- Severe tooth decay can occur if an infant habitually drinks any carbohydrate-containing liquid (milk, formula, or juice) from a bottle at bedtime or sips from a bottle continually during the day. If an infant wants a bottle at bedtime or likes to carry one around, the bottle should be filled with plain water.

To minimize problems with food allergies and other types of food sensitivity, parents should:

- wait until an infant is four to six months old before introducing solid foods;
- introduce new foods or ingredients one at a time in order to detect those that may cause allergic reactions; and
- delay the introduction of foods that are particularly likely to provoke allergic reactions.

For good nutrition, parents should:

- breast feed or use iron-fortified infant formula throughout the first year of life;
- let the infant decide how much food to eat;
- make sure that infants over 4 to 6 months of age receive some supplementary source of iron;
- not feed any fruit juice in greater than the recommended amount (water can be given instead if the infant is thirsty); and
- not apply adult dietary guidelines (such as the recommendation to limit intakes of fat and cholesterol) to infants.

Salt does not increase infants’ acceptance of foods; sugar does. Neither of these substances is a necessary baby-food ingredient. However, neither is known to be harmful when consumed in small amounts.

The flours and modified starches that are used to thicken some commercial baby foods do not harm an infant’s health.

The minute amounts of pesticide residues found in some baby foods are not a cause for concern. The amounts of pesticides found in commercial baby foods are usually lower than those found in regular produce. The nutrient content of commercial baby foods is comparable to that of properly
prepared homemade baby foods.

On an ounce-for-ounce basis, commercial baby foods are more expensive than regular products intended for adults. However, parents should realize that they are paying for the convenience of avoiding the extensive labor involved in baby-food preparation and for the security of having sanitary, shelf-stable products that are easy to handle and store safely.

For individualized advice on all aspects of infant feeding, parents should consult with their infant’s health-care provider.

Introduction

When the time comes for an infant to start eating solid foods, parents often find that they have many questions. Would it be better to make homemade baby food or to buy commercial products? Are some brands of baby food really better than others? Are there some foods or ingredients that the baby would be better off without? And what about those recent news reports: Are the modified starches and pesticide residues in some baby-food products really a cause for concern?

This report by the American Council on Science and Health is designed to answer these and other questions about baby foods. It provides tips on safety, nutrition, and the prevention of food allergies both for families who use commercial baby foods and those who prepare baby foods at home.

The Role of Baby Food in an Infant’s Diet

The term “baby food” refers to food prepared in special ways (usually by pureeing or straining) so that it can be eaten by infants. This category includes both “solid” foods (cereals, fruits, vegetables, meats, and mixed foods) and fruit juices; it does not include either human milk or formula. The process of introducing foods other than human milk or formula into an infant’s diet is usually called “starting solids.”

Baby foods may be purchased ready-made, or they may be prepared at home. In general, home-prepared foods are described as “baby food” only when special procedures (such as pureeing) have been used to make the food suitable for an infant. Adult foods that are served to an infant with little or no modification are referred to as “table foods.” A very few table foods, such as applesauce and fork-mashed raw bananas, are appropriate for infants who are in their first few months of eating solids. Most table foods, however, should not be given to infants until near the end of the first year.

Baby foods should never be the mainstay of an infant’s diet. Throughout the first year of life, the principal food for an infant should be human milk, iron-fortified infant formula,*1 or some combination of the two.*2 Baby foods should be given as a supplement to human milk or formula, not as a substitute.

Over the years, recommendations on when to introduce solid foods have varied greatly. Before 1920, solid foods were seldom recommended for infants under one year of age. In the decades that followed, however, solids were introduced earlier and earlier. Often, infants started eating baby food during the early weeks of life.

In 1980 the American Academy of Pediatrics recommended that solid foods not be started until infants reach the age of four to six months. At that age, their ability to swallow and digest foods has matured sufficiently to allow them truly to benefit from eating solids. This recommendation remains in effect today.

Most babies eat baby food for about six months. By the end of the first year (roughly half a year after the introduction of solids), most infants have progressed beyond the need for pureed and strained foods. For these children, the solid portion of their diets consists largely of chopped or cut-up table foods.
Parents often wonder whether homemade baby foods are best for their infants or whether it is wiser to choose commercial products. In truth, both types of food are safe, nutritious, and appropriate for infants as long as parents choose foods wisely, introduce them correctly, and follow appropriate safety precautions. It takes more time and effort to prepare homemade foods than to use commercial products, however, and parents who prepare homemade baby foods have to be especially careful to use safe food-handling and storage procedures.

The next few sections of this report describe the general procedures that parents should follow to ensure that their infant’s food is safe and nutritious, to protect their infant’s teeth, and to minimize the risk of food allergy problems. The information presented here is general in nature; it is not intended as specific medical advice. Decisions about when to start solids, which foods to introduce, how much food to offer, and how to deal with feeding problems should be made by an infant’s health-care provider.*3

Feeding Baby Safely

To ensure that their infant’s food is safe to eat, parents must pay particular attention to four aspects of the food:

- temperature;
- microorganisms;
- choking hazards; and
- ingredients.

Temperature

Obviously, food that is too hot can burn a baby. Fortunately, this problem can be easily avoided. There is no real need to warm up baby food. Adults may prefer that certain foods be served warm, but infants have no such preferences. Parents can serve their infant’s food at room temperature or even at refrigerator temperature. The only time it’s really necessary to heat baby food is when frozen food needs to be thawed in a hurry.**4

Parents who insist on warming baby food and those who must thaw frozen products should use extreme caution, especially if they use a microwave oven. Microwave heating is very uneven; hot spots can develop within a container of food. The food may become hot enough to burn an infant even if the container remains cool. Very thick baby foods, such as pureed meats and egg yolks, should never be microwaved because they can become superheated and spatter or explode. Accidents of this type are a common cause of visits to hospital emergency departments.

When baby food has been heated, either in a microwave oven or by other methods, the parent should stir it thoroughly (to eliminate hot spots) and check the temperature before serving by touching or tasting a bit of the food—not by touching the container. Baby food should never be served hot; if heated at all, it should be warmed only to body temperature.

Microorganisms

If you ask people to list the most important health hazards associated with food, they often mention additives, pesticide residues, or nutritional problems. But in reality, none of these is the highest priority concern. According to the Food and Drug Administration and other experts, the primary cause of illness from food is microbial contamination.¹ Foodborne disease—what most people call food poisoning—is the number-one food hazard in the United States.

The U.S. Department of Agriculture estimates that between 15 and 60 million cases of food poi-
soning occur in the U.S. each year.¹ Most of these illnesses are attributable to mishandling or improper storage of food by the people who prepare it, either at home or in a food-service establishment. Very few cases are attributable to mistakes in the production or commercial processing of food.

Microbial contamination of foods is even more of a concern for infants than it is for adults. Infants tend to become more severely ill from foodborne diseases than adults do, and they are at risk for dangerous—even fatal—complications. Unlike many of the other food-associated risks that parents of infants worry about, bacterial contamination is a very real and immediate threat.

For example, a case was recently reported in a medical journal in which a five-month-old infant developed a severe illness requiring prolonged hospitalization after eating eggs fried sunny side up.² Why did the baby become ill? Sophisticated parents (or people who have been reading this booklet from back to front) might suspect that the illness was an allergic reaction (eggs should not be introduced until late in the first year because they are a potentially allergenic food) or that it was due to some type of chemical contaminant in the eggs or the frying fat. Neither of these guesses would be correct, however. The illness was a bacterial infection.

Raw eggs, like other raw foods of animal origin, are sometimes contaminated with microorganisms that can cause illness, and they should always be cooked thoroughly to destroy all potentially harmful bacteria. The traditional sunny-side-up method of cooking eggs isn’t always thorough enough to kill all the bacteria that may be present. Some bacteria evidently survived in the eggs given to that infant, and the bacteria caused the illness.

Bacteria in Unpasteurized Apple Juice

Practically any food can become contaminated with disease-causing bacteria if appropriate safety precautions are not taken. For example, in 1996 an outbreak of food poisoning on the West Coast of the U.S. was traced to an unexpected source—unpasteurized apple juice.

Apples can become contaminated with disease-causing bacteria at several steps during their production and handling. In several reported incidents, apples in the orchard became contaminated with microorganisms from animal droppings. In another reported incident, apples were contaminated when they were washed with contaminated water. If contaminated apples are processed into juice or cider without being pasteurized, some bacteria may survive in the finished product.*⁵

All apple beverages sold in shelf-stable form—that is, in cans, bottles, or juice boxes that can be stored at room temperature—are pasteurized (the label may not indicate this, however). Some brands of apple juice and cider sold in perishable forms—that is, in cartons found in a store’s refrigerator case—are also pasteurized; but some other brands of perishable apple beverages are not. Some manufacturers choose not to pasteurize their apple beverages because some consumers prefer the flavor of the unpasteurized versions. Consumers should check the labels of perishable apple juice and cider to determine whether the products have been pasteurized.

Pasteurized apple beverages are safe for infants and children. Unpasteurized apple beverages may not be. The microbiological safety of unpasteurized apple beverages cannot be guaranteed, and the bacteria that these beverages may harbor can cause especially severe illness in infants and young children.

When buying fruit juices for infants and children, parents should choose shelf-stable products (from either the baby-food section or the regular juice aisle of the supermarket) or should check the labels of perishable beverages to make sure they have been pasteurized.

Keeping Commercial Foods Safe

For parents who use conventional commercial baby foods (i.e., dry infant cereals and jarred
foods), making sure that baby food is microbiologically safe is relatively simple. The food is safe when purchased; parents merely have to keep it that way by heeding these precautions:

- Store boxes of infant cereal in a clean, dry place.
- Once infant cereal has been mixed with liquid, serve it immediately. Don’t save leftovers for another meal.
- Store unopened jars of baby food at room temperature.
- If the tops of baby food jars become dusty or dirty, wipe them with a clean cloth or rinse them with water (and dry with a clean paper towel) before opening.
- Do not use a jar of baby food if its vacuum seal has been broken.
- Refrigerate opened jars of baby food immediately after opening. Fruits and small bottles of juice can be covered and stored for three days after opening; large bottles of juice can be stored for seven days. All other baby foods should be stored in the refrigerator for no more than two days after opening.
- Contrary to popular opinion, it is not dangerous to feed a baby directly from a baby-food jar. If this is done, however, any food that remains in the jar cannot be saved for another meal. When a baby is fed directly from the jar, enzymes and bacteria from the baby’s saliva contaminate the food and may cause spoilage. To avoid waste and save money, many parents spoon the amount of food they want to serve out of the jar into a bowl and then refrigerate the rest for another meal. When they’re away from home, however, they feed the baby directly from the jar and throw the leftovers away.
- Never put leftover baby food back in the jar, and never save leftovers from the infant’s dish for another meal.

Preparing Homemade Foods Safely

Preparing homemade baby foods safely takes considerable knowledge and effort. The following general guidelines may be helpful. More specific advice can be obtained from baby-food cookbooks, child-care manuals, and health-care providers.

- Clean all utensils and work surfaces thoroughly before preparing baby food. Be especially careful about cleaning blenders, food processors, and cutting boards. Any equipment that’s used to handle raw foods (especially meat, poultry, seafood, or eggs) should be washed very thoroughly with detergent and hot water and then rinsed before being used to handle other foods.
- Food preparers should wash their hands before starting to prepare baby food. Preparers should also wash their hands after using the toilet, handling pets, coughing, sneezing, changing baby’s diaper, touching raw animal products (such as meat or eggs), or touching their own or the infant’s nose or mouth.
- Keep hot foods hot (140°F or hotter) and cold foods cold (40°F or colder) so that bacteria can’t grow. Don’t allow foods to sit at room temperature for more than one hour during preparation. (This may be easiest to accomplish if someone other than the food preparer cares for the baby during food preparation.)
- Cook all foods of animal origin (meat, poultry, seafood, eggs) thoroughly. For a young baby, vegetables and fruits (except bananas) must also be cooked. Check with the infant’s health-care provider to find out when raw fruits and vegetables can be introduced into the diet.
- Leftover homemade baby food, like leftover commercial baby food, should not be saved for another meal.
- Never give unpasteurized juice or cider to an infant or young child.
- Remember that all homemade baby foods and all frozen commercial baby foods are perishable.
They must be kept cold (refrigerated or frozen) at all times and should not be stored in the refrigerator for more than a day or two.

• If the baby is going to be fed away from home, all perishable baby foods (homemade foods and commercial frozen products) must be carried in an insulated bag or cooler packed with ice or a cold pack. If the food becomes warm, it should not be used. Because it is difficult to keep perishable foods at safe temperatures while traveling, some parents carry commercial jarred or dehydrated baby foods on outings, even if they rely primarily on homemade or frozen baby foods when they are at home.

• Thaw frozen baby food only in the refrigerator or in the microwave—never on the kitchen counter.

Choking Hazards

During the early stages of solid feeding, the most important step parents can take to reduce the risk of choking is to make sure the baby is in an upright position during feedings. Later on, the choice of foods becomes more important.

During the second half of the first year, infants progress from a diet that consists entirely of pureed and strained foods and liquids to a more adult-style diet that includes chopped foods and small pieces of “finger foods” that babies can feed to themselves. As a general rule, finely chopped homemade foods (or the slightly chunky “third-stage” products sold by commercial baby-food companies) are appropriate by the age of 8 to 12 months. Some finger foods (such as well-cooked cut-up soft vegetables; small chunks of raw banana or of canned peach or pear; small pieces of crackers or toast; and the ever-popular O-shaped oat cereals) can be introduced at around the same time. Parents should follow the specific instructions of the child’s health-care provider concerning the introduction of new textures and forms of food.

The food most frequently implicated in choking accidents in infants and young children is the frankfurter. Before giving hot dogs (or toddler “meat sticks”) to a young child, the parent should cut them first lengthwise and then crosswise into small pieces less than an inch long. Hot dogs should not be cut into coin shapes. Soft breads (such as white bread) are also a hazard because they can turn into a pasty glob in a child’s mouth; breads should be toasted and cut up before being given to an infant or toddler.

Foods that should not be given to an infant or toddler because they pose a high risk of choking include:

• nuts and peanuts;
• peanut butter, caramel candy, and other thick, sticky foods;
• whole grapes;
• large chunks of apple or underripe pear or peach;
• pieces of firm raw vegetables (such as carrot, celery, bell pepper, or peas);
• chunks of meat or poultry;
• pieces of bacon;
• sunflower seeds;
• raisins;
• popcorn; and
• hard candies.

Ingredients

Certain foods and ingredients are not suitable for consumption by infants. Foods that should be
avoided because of allergenicity or choking hazards are discussed elsewhere in this report. This section describes foods that should not be fed to babies for other safety reasons. It also discusses some ingredients and contaminants that have recently aroused public concern.

**Honey and Corn Syrup**

Honey should never be fed to infants under the age of one year because it is sometimes contaminated with spores of a bacterium called *Clostridium botulinum*. In an infant’s digestive tract these spores give rise to active bacteria. The bacteria then produce a toxin that can cause a serious illness called infant botulism. Older children and adults can eat honey safely because their digestive tracts are so well colonized with bacteria that newly arrived spores cannot establish themselves. (*Clostridium botulinum* can also cause a severe form of food poisoning if it contaminates improperly canned foods. In that case, however, the illness results from a toxin produced by *C. botulinum* bacteria growing in the food; the microorganisms do not colonize the digestive tract.) Commercial baby foods sold in the U.S. do not contain honey.

The consumption of corn syrup has also been associated with an increased risk of infant botulism. This link has not been established as clearly as the association with honey, and the risk is probably very small. Nevertheless, it is prudent to avoid giving corn syrup to infants under the age of one year. If it is necessary to sweeten homemade baby foods (for example, if the fruit being prepared for an infant is very tart), ordinary table sugar (sucrose) is a better choice. The corn syrup used in some infant formulas and jarred baby foods is not a cause for concern because these products are heated sufficiently during processing to destroy bacterial spores.*

**High-Nitrate Vegetables**

The pureed vegetables sold by baby-food companies are safe for infants. However, home-prepared versions of certain vegetables—specifically, beets, carrots, collard greens, spinach, and turnips—may not be safe,* especially if consumed in large amounts. These vegetables sometimes contain high levels of nitrate, derived from the soil and water in which they were grown. Excessive nitrate intake can cause a serious type of anemia, called *methemoglobinemia*, in young infants. Older children and adults are less susceptible to this problem because the chemical composition of their hemoglobin is different.

The commercial forms of these vegetables sold by baby-food companies are safe for young infants because baby-food processors take precautions that are not available to home cooks. The processors conduct chemical tests to detect nitrate in vegetables, and they avoid buying vegetables grown in areas where soil nitrate levels are high.6

There is disagreement among health professionals about the degree of risk posed by high-nitrate vegetables. Some experts say that home-prepared versions of potentially high-nitrate vegetables should never be offered during the first six months of life, while others believe that the risk of methemoglobinemia is so small that this restriction is not really necessary. Parents who prepare their own baby foods should consult with their infant’s health-care provider for individualized guidance on this topic.

**Salt**

The addition of salt to baby foods is unnecessary. Unsalted food contains enough naturally occurring sodium to meet an infant’s need for this mineral. And adding salt to foods does not seem to improve their acceptability to infants: In a recent study that evaluated young infants’ acceptance of various vegetables, no differences were found between salted and unsalted peas or green beans.7

Scientists have speculated that high salt or sodium intake in infancy might contribute to an
increased risk of high blood pressure in later life. This suggestion has not been confirmed by scientific studies, however. In one study, infants received either high-salt or low-salt diets for five months, and no effect was found on blood pressure in later childhood. There is no conclusive evidence that high sodium intakes during infancy and childhood are detrimental to health, even for those children who are genetically predisposed to develop high blood pressure later in life.

During the 1970s experts recommended that salt not be added to infant foods, both because it was unnecessary and because the possibility of harm had not been ruled out. Today most baby foods contain no added salt. (The “3rd Foods” dinners and vegetables produced by Gerber are an exception; some varieties do contain salt.) Because of the removal of salt from most baby foods and other changes that have taken place in infant feeding practices (the delayed introduction of cows’ milk, for example), current infant sodium intakes are substantially lower than those of several decades ago. The American Academy of Pediatrics has stated that efforts to reduce further the sodium content of foods primarily intended for infants would be unwise.

It is not necessary for parents scrupulously to avoid giving their infants foods that contain salt (in the way that they must scrupulously avoid feeding anything that contains honey); but it is generally recommended that salt not be added to commercial or homemade baby foods, and that highly salted products intended for adults (such as canned vegetables with added salt) not be used in the preparation of homemade baby food. When parents home-prepare foods for both a baby and the rest of the family, the food preparer should remove a portion for the baby before adding salt or other seasonings for the adults.

Sugar

Infants have an innate preference for sweetness. They may reject foods that are too tart or bland in flavor, but they are usually enthusiastic about sweet-tasting foods. Some parents—and some baby-food companies—add a little sugar to some foods in an effort to make them more acceptable to babies. This practice has both advantages and disadvantages. Sugar is not harmful in itself, and its use might even contribute to good nutrition if it encourages a baby to eat a nutritious food that he or she would otherwise reject. (Need we add that foods not eaten cannot contribute to good nutrition?) On the other hand, excessive use of sugar is undesirable, because sugar does not provide the protein, vitamins, or minerals found in other foods. Also, babies who are fed only sweetened foods may not learn to accept a variety of flavors, and this may hamper their transition to a balanced, adult-style diet.

In recent years some parents have expressed a preference for baby foods that contain no added sugar. Baby-food companies have responded to this demand by increasing the number of products without added sugar. Instead, they sweeten tart fruits or bland cereals (and in some recently developed products, even meats) by mixing them with naturally sweet foods such as applesauce or pureed pears. Some parents do the same sort of thing at home.

From a nutritional standpoint, the mixing approach has some advantages, since apples or pears do contribute some nutrients (though not a lot; these fruits are not particularly rich in vitamins and minerals). However, in terms of teaching babies to accept a variety of flavors, mixing everything with applesauce is really no better than adding sugar.

Foods that consist mostly of sugar and that make little or no positive nutritional contribution to the diet—such as baby-food desserts and many family desserts—should, at most, compose only a very small part of an infant’s diet. Because infants’ nutritional needs are high, there is little room in their diets for foods that are low in nutrients.

Thickeners

Some foods do not puree well; they become excessively juicy or develop unpleasant textures.
Baby-food cookbooks acknowledge this problem; they sometimes recommend that parents deal with it by mixing the troublesome food with something starchy, such as rice or mashed potato, to create a more acceptable texture. The companies that make commercial baby foods have traditionally dealt with texture problems in a very similar way, adding a starchy ingredient (such as flour or modified tapioca starch) to some foods. This long-standing practice does not endanger infants’ health; nevertheless, the use of starchy thickeners has come under fire in recent years.

Charges have been leveled that some companies “cheat babies” by including starchy thickeners in some of their baby-food products. Such foods have even been described as “adulterated.” This is a misuse of terms, however. Flours and starches are safe, officially approved ingredients, and their presence is clearly stated on the labels of the commercial baby foods that contain them. The openly declared use of acceptable ingredients is not “adulteration.”

It’s hard to see why anyone would object to the use of small amounts of flours as thickening agents in baby-food dinners or vegetable mixtures. Flours are acceptable food ingredients for infants. In fact, they are the main ingredients of the infant cereals that most babies eat every day. How can the same rice or oat flour that’s considered to be appropriate and nutritious at breakfast turn into a “filler” or “adulterant” by dinnertime?

Modified starches derived from tapioca or corn are used to thicken acidic foods such as fruits that do not thicken well with flour. Food manufacturers use modified rather than unmodified starches because the modified types are more effective thickeners—a smaller amount can thicken a larger quantity of food. Modified starches also prevent water from separating out of the food; unmodified starches do not. Scientists have reviewed the safety of modified starches and concluded that these ingredients are acceptable for use in foods intended for infants. Very young infants (under the age of three months) do not digest any type of starch well, regardless of whether it’s modified or unmodified. However, since infants of this age are not yet eating solid foods, their limited ability to digest starch is not an issue. (Human milk and formula do not contain starch.)

Although modified starches are not harmful, baby-food manufacturers have responded to consumers’ unease about these ingredients by reformulating many products to eliminate their use. Beech-Nut eliminated all modified starches from its products in the 1980s, and Gerber removed them from many of its products in 1996. (The newer Earth’s Best and Growing Healthy product lines do not contain modified starches.) Instead of using modified starches to thicken fruit products, these companies now deal with texture problems by mixing different kinds of fruit together. For example, Gerber has replaced its traditional “apricots with tapioca” product with an apricot/apple/pear mixture.

**Pesticide Residues**

In 1995 data were published showing that some samples of fruits and vegetables sold by the three major baby-food companies (Gerber, Beech-Nut, and Heinz) contained detectable amounts of pesticides. The quantities of pesticides found in the baby foods were substantially lower than the maximum amounts allowed in food according to federal government standards, and the findings of the survey were very similar to those of previous tests on baby food conducted by the Food and Drug Administration. Nevertheless, the report unnecessarily led many parents to be concerned about the safety of baby food.

The presence of traces of pesticides in baby foods is not surprising. Most crops grown in the U.S. are produced with the aid of appropriate types and levels of pesticides. And as long as pesticides are used, there will inevitably be some pesticide residues in people’s diets. The hypothetical hazards posed by these minute traces of chemicals must be weighed against the very real threat that would accompany discontinuation of pesticide use: drastic reductions in the quantity and quality of food available to the public at reasonable prices.
Commercial baby food processors analyze their raw ingredients and finished products for pesticide residues, and they often set standards for pesticide residues that are stricter than those of the federal government. Home cooks cannot take similar precautions. For these reasons, commercial baby foods probably contain fewer pesticide residues than their homemade equivalents. This does not mean that homemade baby foods are unsafe; it simply means that home preparation of baby foods does not offer any special advantage when it comes to pesticide residues.

Concerns about pesticide residues have prompted some parents to seek out organically grown foods for their infants. One company, Earth’s Best, is currently marketing organic baby food in some parts of the U.S. Parents can also purchase organically grown produce and use it to prepare their own baby foods at home. Organically grown foods, however, typically cost much more than conventionally grown foods, and they have no proven health advantage. In some instances, they may not even be free from pesticides; they can easily become contaminated by chemicals used in neighboring fields or those present in the general environment. Organic food producers can claim only that their products were produced without pesticides, not that they are totally free from pesticide residues.

The current federal pesticide residue standards are appropriate for protecting the public’s health. However, questions have been raised about whether the standards for infants and children should be set differently from those for adults. As a 1993 report from the National Research Council (NRC) pointed out, infants consume fewer types of foods than adults do; and this means that their exposure to pesticides may not be the same as that of adults. Also, children may be either more or less sensitive to chemicals—both man-made and naturally occurring—than adults are; this makes it difficult to extrapolate scientific data from adults to children.

The NRC report recommended that the government take the special characteristics of infants and children into account when developing more sophisticated methods for setting tolerance levels for pesticides in foods. This is an important goal for future research.

Meanwhile, the best current scientific evidence indicates that the trace levels of pesticides currently found in the U.S. food supply are not a threat to the health of infants and children.

Avoiding Allergies

Infants, particularly young infants, are more prone than adults to food allergies and intolerances. To minimize the risk of allergy problems, experts recommend that solid foods not be fed before the age of four to six months; that foods that are especially likely to provoke reactions not be offered during the first months of solid feeding; and that new foods be introduced one at a time, so that any problem foods can be identified. Rice cereal is often recommended as a good first food because it is very well tolerated and rarely causes any problems.

All the major commercial baby food companies have special lines of single-ingredient products (and single-grain cereals) designed for young infants. Parents who make their own baby food should also start with single-ingredient foods. As a general rule, parents are advised to choose one food and offer it to the baby daily, for three to five days (some experts say a week) before introducing another new food into the diet. If any unusual symptoms develop while a new food is being introduced, parents should consult with the baby’s health-care provider. If a baby has shown an allergic reaction to a food, that particular food should not be tried again until the health-care provider says that it is appropriate to do so.

Once an infant has eaten several single foods without difficulty, parents can serve mixtures that contain these ingredients. As the baby gets older, mixtures can become increasingly complex. It is still a good idea to try to introduce only one new ingredient at a time, however. For example, if a baby has already eaten applesauce and pears without problems, the parent could introduce a commercial or homemade apricot/apple/pear mixture. It would not be a good idea to introduce a new
vegetable during the same few days when the baby is eating apricots for the first time, however. Foods that are particularly likely to cause reactions include dairy products, eggs, wheat, corn, citrus fruits, tomatoes, nuts, and seafood. In general, these foods should not be offered to infants during the first few months of feeding solids. Parents should check with the infant’s health-care provider for specific advice on when each of these foods can be started. The timing may differ depending on whether the baby (or the family) has a history of food allergy.

Protecting Baby’s Teeth

Prolonged exposure to carbohydrates can contribute to severe tooth decay in infants. This problem is most likely to develop if an infant is allowed to go to bed with a bottle of a carbohydrate-containing liquid (milk, formula, or juice) or allowed to sip from a bottle constantly throughout the day. To help prevent tooth decay, parents should avoid these practices. If a child insists on carrying around a bottle or taking it to bed, the bottle should be filled with plain water.

Another way to protect an infant’s dental health is to make sure that he or she gets the appropriate amount of fluoride. Parents who live in areas where the water is not fluoridated should discuss fluoride supplementation with their infant’s health-care provider.

Nutrition

Although good nutrition is important to an infant’s health and growth, the exact nutritional composition of the solid foods that a baby eats is not as crucial as many parents believe. Human milk and/or infant formula provide most of an infant’s nutrition, even after the baby has started to eat solids. Continuing to feed one of these types of milk throughout the first year is far more important than feeding any particular type or amount of solid food.

The transition from an all-milk or formula diet to a balanced, varied adult-style diet is lengthy and gradual. The first few months of eating solid foods (i.e., the months during which baby foods are used) are primarily a learning period. Although parents should make an effort to choose nutritious foods and to introduce a variety of foods into their infant’s diet, they need not panic if the baby takes a while to accept the idea of solid foods, wears more of his meals than he eats, or spends a few weeks spitting out all of his vegetables while gobbling up cereal (or vice versa).

There are really only five crucial nutritional concerns that parents need to pay attention to during the months when an infant eats baby food:

- deciding which type of milk or formula to feed;
- letting the infant decide how much to eat;
- providing the infant with a reliable source of iron;
- preventing juice abuse (see below); and
- not applying adult dietary guidelines to infants.

Human Milk, Formula, and Cows’ Milk

Because milk in some form is the single most important component of the diets of infants and young children, the choice of the type of milk to feed to a baby or toddler is crucial.

The American Academy of Pediatrics recommends that human milk, iron-fortified infant formula, or some combination of the two be the only types of milk given to infants during the first year of life. Low-iron formulas should not be used unless the infant’s health-care provider specifically recommends their use. Cows’ milk of any type—whole, low-fat, or skim—should not be offered during the first year.
During the second year of life, it is generally recommended that toddlers drink whole cows’ milk. Those children who are still breast feeding, however, may continue to do so. Both whole cows’ milk and human milk contain higher levels of fat than those present in the reduced-fat milks that older children and adults drink; toddlers need this fat to help meet their nutritional needs. Reduced-fat milks should not be offered until after the second birthday.

Some babies do not tolerate cow’s-milk–based formulas well; they are given soy-based or other types of formulas during infancy. If these children are still intolerant of cows’ milk when they reach the age at which formula feeding is discontinued, special care is needed in the planning of their diets. This is one of the situations in which the expert advice of a registered dietitian can be very helpful.

How Much Should a Baby Eat?

Unless the infant’s health-care provider gives different instructions, parents should let their infants take the lead in deciding how much to eat. The parents’ role is to choose the foods that are offered; the infant chooses the amount.

Parents sometimes try to make an infant finish all of the food in a dish or jar or all of the liquid in a bottle or cup. This is not a good idea. Forcing an infant to eat more than he or she wants can lead to overfeeding and thus increase the risk of obesity.

It is also unwise to limit rigorously an infant’s food intake. Fear of obesity has led some parents to underfeed their infants, thus causing their infants to fail to thrive (failure to thrive is a condition characterized by poor weight gain and growth failure in infants or children).

Iron

Full-term babies are born with enough iron stored in their bodies to last for four to six months. After that, they need to get iron from an external source. Meat is a good source of iron, but most babies don’t eat enough of it to meet their need for this mineral. Most of the other foods that babies eat are not naturally rich in iron. For this reason, the American Academy of Pediatrics and other experts recommend that infants receive some supplemental source of iron—either iron-fortified infant formula, iron-fortified infant cereal, or vitamin drops that contain iron—by the age of four months.

Because commercial precooked infant cereals are fortified with iron, experts recommend that these cereals be among the first foods given to infants. Further, the experts recommend that these cereals continue to be fed throughout the first year and possibly even into the second year. All of the major commercial brands of infant cereal are fortified with enough iron that two servings per day meet most of an infant’s daily iron needs. The use of iron-fortified cereals is particularly important for breast-fed infants, since human milk usually does not supply enough iron to meet an infant’s needs during the second half of the first year.

Parents who make their own baby foods need to realize that home-prepared grain products are low in iron in comparison to commercial infant cereals. Whether the use of home-prepared grain products is acceptable for a particular infant depends on the composition of the rest of the infant’s diet.

Parents who would prefer not to use commercial infant cereals should discuss this issue with their infant’s health-care provider. If the infant is not receiving sufficient iron from other sources, the health professional may prescribe iron-containing vitamin drops or advise the parents to use a commercial product in this one instance, even if the rest of the baby’s food is homemade.

Juice Abuse
Most people realize that nutritional imbalances can develop if an individual overindulges in foods of low nutritional quality (such as candy, cake, and soft drinks). It is less obvious, however, that similar problems can result if one type of nutritious food (such as vegetables, fruit, or milk) is overconsumed—consumed to the exclusion of other types of foods that are needed for a balanced diet.

In the case of infants, the product that tends to be abused is fruit juice. Even if parents choose 100-percent-fruit-juice products rather than less expensive part-juice fruit drinks, overconsumption can lead to serious problems.

Fruit juice is natural, and it does provide some nutrients (such as vitamin C), but it is far less nutrient-dense than milk. If an infant or young child drinks too much juice, the juice can displace human milk, formula, or cows’ milk from the diet, leading to significant nutritional problems. Excessive fruit-juice consumption has been implicated as a contributing factor in some cases of failure to thrive in infants and young children.17

Overconsumption of fruit juice can also cause diarrhea in some infants and young children.18 The diarrhea results from malabsorption of carbohydrates in the juice, and individual children vary in their susceptibility to this problem.

Parents should follow the instructions of their infant’s health-care provider about limiting the intake of fruit juice. Often, health professionals recommend that an infant consume no more than four ounces of undiluted fruit juice (or eight ounces of half-strength juice) daily. If a baby is thirsty between meals, he or she should be offered water instead of juice.

Concerns about overconsumption of fruit juice do not stop after a child’s first birthday. While this report was in preparation, researchers published a study showing that excessive intake of fruit juice (12 fluid ounces or more daily) is associated with increased risks of both short stature and obesity in two- and five-year-old children.19 In some of the children who participated in the study, excess fruit juice may have displaced other, more nutritious foods from the diet, leading to a slowing of growth. In other children, fruit juice may have been consumed in addition to an already-adequate diet, leading to excessive caloric intake. This study should serve as a reminder that the excessive intake of fruit juice—or of any single food—can interfere with good nutrition at any age.

Babies Are Not Little Adults

Many aspects of the dietary guidelines recommended for adults are not appropriate for infants and children under the age of two years.20 The types of dietary restrictions that may help prevent chronic diseases in adults (limiting calories, fat, saturated fat and cholesterol; choosing high-fiber diets) are actually counterproductive in infants and toddlers because they may interfere with the baby’s ability to consume enough food for proper growth. Even the most basic of the adult dietary guidelines—the recommended consumption of a variety of foods—isn’t applicable to young infants, who thrive on diets that contain only a single food: human milk or formula.

The main goal of feeding during infancy is to provide enough calories and nutrients for normal growth and development. Since infants have small stomachs, they may not be able to get enough food if they are placed on low-fat, high-fiber diets. Such diets are not appropriate during the first two years of life. Parents should not attempt to limit an infant’s total fat intake unless specifically advised to do so by the health-care provider.

The format of the Nutrition Facts label on baby foods reflects the unique nutritional priorities of infancy. Unlike the labels on adult products, it focuses on the nutrients that a baby needs—such as protein, vitamins, and minerals—rather than on such food components as cholesterol and saturated fat. Appendix A contains more specific information on the nutrition labeling of baby foods as well as some samples of typical baby-food nutrition labels.
Are Homemade Foods More Nutritious than Commercial Foods?

One reason why some parents prefer to make homemade baby foods for their infants is that they believe that much of the nutritional value in commercial baby foods is destroyed during processing. This view is not correct, however. The retention of nutrients in commercial baby foods is very good. Commercial processors usually cook and pack foods quite soon after they are harvested, and they cook foods in minimal water in order to preserve nutrients. The only nutrient that suffers substantial losses during the production of baby foods is vitamin C, which is very sensitive to heat. To compensate for these losses, baby-food manufacturers add extra vitamin C to many fruit, vegetable, and juice products.

Homemade baby foods are comparable in nutritional value to commercial foods if home cooks use preparation techniques that preserve the food’s nutrient content. Boiling is not a good method of cooking because many nutrients leach out into the cooking water; and frying is not recommended because it adds large amounts of fat and calories—but few other nutrients—to food. Instead, foods should be steamed, microwaved, baked, or broiled before being pureed and strained for an infant.

Comparing Costs

It is often claimed that commercial baby foods are inordinately expensive in comparison with “regular” foods intended for adult consumption. However, when people compare the prices of baby foods and “regular” foods, they often fail to take into account the value of the parents’ time, the cost of fuel used for cooking and dish-washing, and the cost of wasted or inedible portions of the original ingredients.

For example, the price per pound of jarred baby-food meats is usually higher than the price of the fresh meat sold at a supermarket’s regular meat counter. The two types of meat products are not really equivalent, however. The baby-food meat is ready to serve; the fresh meat would have to be trimmed, cooked, cut up, pureed, and strained before it could be fed to a baby. Moreover, the home-prepared meat would have to be stored under refrigeration at all times, making it less convenient than the commercial product for away-from-home use. As indicated above, for a truly meaningful comparison between the two products, the parents’ time, the cost of fuel, the money spent on discarded trimmings, and the convenience of having a shelf-stable product would all have to be taken into consideration.

For many families, the parents’ time is the most important factor—and not just because of its economic value. Adults employed outside the home may have limited amounts of time to spend with their children. Many parents would prefer to spend as much of that time as possible interacting with their children—not preparing food.

In a few instances, though, parents may be able to save money without doing any extra work in the kitchen by choosing “regular” food products that are equivalent to baby-food products. For example:

- Baby-food applesauce is essentially equivalent to unsweetened regular applesauce.
- Baby-food fruit juices are equivalent to regular vitamin C–fortified, unsweetened, pasteurized, 100-percent-juice products.
- Toddler diced fruits are very similar to regular canned fruits packed in juice.
- Toddler diced vegetables are essentially identical to no-salt-added canned vegetables.

In these instances, consumers will usually find that the cost per pound of the “regular” products is lower than that of the baby-food or toddler products. The “regular” foods may therefore offer substantial savings, provided the family uses all of the food in the container. If the family does not eat
the leftovers, the larger containers of “regular” food may not be a bargain at all. The tables in Appendix B illustrate this point.

For applesauce and fruit juice, the easiest way to get a real bargain with no loss of convenience is to choose multipacks of small containers of adult brands (juice boxes and snack packs). These products typically cost less than baby food in packages of similar size, can be used with little or no wastage, and don’t have to be kept cold. Parents who choose these products should realize, however, that not all of them are equivalent in quality to baby-food products. For example, some of the drinks sold in “juice” boxes contain little fruit juice. Parents who wish to choose regular products that are truly comparable to baby foods need to read product labels carefully.

Conclusions

Both commercial and homemade baby foods can be safe and nutritious if parents choose appropriate foods and handle them correctly. Preparing homemade baby food is time-consuming, and it requires a thorough understanding of the principles of safe food handling. If these principles are observed, most homemade foods are just as healthful as their commercial equivalents. The major exception is infant cereal; homemade varieties are not iron fortified and may not be as easily digested as commercial products.

Safety should be a parent’s top priority when it comes to baby food. Important safety concerns include the temperature at which food is served, the use of safe handling procedures to minimize the risk of bacterial contamination, the avoidance of foods that pose a high risk of choking, and the avoidance of honey and corn syrup, which have been associated with an increased risk of infant botulism. Because of the risk of contamination with disease-causing bacteria, parents should not feed unpasteurized juice or cider to infants or children.

Salt and sugar, in moderate amounts, are not harmful to babies. However, their use in baby foods should be limited. Modified starches are safe, acceptable baby food ingredients. The pesticide residues occasionally detected in some commercial baby foods are well below federal standards and are not a cause for concern.

To minimize problems with food allergies and other types of food sensitivity, parents should wait until an infant is four to six months old before starting solids, should introduce new foods or ingredients individually, and should delay the introduction of foods that are particularly likely to provoke reactions.

Human milk and/or infant formula, rather than baby foods, are the main sources of nutrition during the first year of life. Cows’ milk should not be fed until the second year. The exact types and amounts of solid food fed to an infant are not crucial in terms of nutrition. However, to ensure good nutrition, parents should follow expert recommendations on the type of milk to feed, should allow the infant to decide how much to eat, should make sure that older infants receive some supplementary source of iron, should avoid excessive use of fruit juice, and should avoid applying adult dietary guidelines to infants.
Although the American Academy of Pediatrics recommends that all formulas fed to infants be fortified with iron, some health-care providers consider the use of low-iron formula to be acceptable during the second half of the first year if the baby is eating sufficient iron-fortified cereal or taking an iron supplement. Health-care providers may also recommend the use of low-iron formula in other situations—in infants with persistent “colic,” for example. Parents should discuss these situations with the infant’s health-care provider and should not switch their infant to a low-iron formula without the provider’s approval.

The issues involved in parents’ decisions about breast feeding versus formula feeding are beyond the scope of this report. However, it is worth noting here that the American Academy of Pediatrics and other experts strongly recommend breast feeding.

In most instances, this will be a pediatrician or family physician. In some health-care settings, however, advice on routine aspects of infant feeding may be given by a nurse practitioner, nurse midwife, or physician’s assistant. In other instances, and especially when special considerations (such as allergy or vegetarianism) limit the choice of foods, a registered dietitian may be involved in planning an infant’s diet.

The companies that sell conventional baby foods in glass jars recommend that their products not be frozen because the freezing process alters their texture. However, one company, Growing Healthy, sells frozen baby foods that are designed to be thawed in the microwave oven. Homemade baby foods can also be frozen and thawed. Many parents who make homemade baby food deliberately cook more than they can use in a single day and freeze the extra food in ice-cube trays, thawing individual cubes as needed.

The term “pasteurization” refers to a heat treatment that destroys disease-causing microorganisms. Most Americans are familiar with pasteurization primarily as a treatment applied to milk. The same type of process can also be used to ensure the microbiological safety of other foods, such as fruit juices.

If honey were used as an ingredient in commercial infant formulas or baby foods, any spores it contained could be killed by the same process. Ordinary cooking does not ensure the destruction of Clostridium botulinum spores, however.

Parents sometimes wonder whether it would be advisable to start cereal at an earlier age if the infant does not seem satisfied after breast or formula feedings. This situation should be discussed with the infant’s health-care provider. Although the introduction of solids before the age of four months is not generally recommended, some health-care providers do approve the early feeding of solids in selected cases.

In addition to their “single” ingredient, many of these foods contain water, which is used to create an appropriate consistency. Some also contain vitamin C, which is added to offset losses of this nutrient during processing. Water and vitamin C do not provoke allergic reactions, so parents need not be concerned about their presence in “single-ingredient” foods.
Appendix A: Nutrition Labeling of Baby-Food Products

Commercial baby foods carry Nutrition Facts labeling, just as adult foods do. However, the infant food label differs from the adult label in these ways:

- The serving sizes are those customarily eaten by infants rather than adults.
- The Daily Values referred to on the label are those for infants rather than adults.
- The label lists percentages of Daily Values only for protein, vitamins, and minerals. No percentages of Daily Values are listed for fat, saturated fat, or cholesterol because Daily Values for these nutrients have not been established for infants or children under the age of four years.
- Information about saturated fat and cholesterol and about the percentage of calories from fat is not included on the label. Parents should not attempt to limit the amounts of these food components in the diets of infants and toddlers under the age of two years.
**Sample Labels**

**Sweet Potatoes** (jarred baby food)

<table>
<thead>
<tr>
<th>Nutrition Facts</th>
<th>Amount per Serving</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Fat</strong></td>
<td>0 g</td>
</tr>
<tr>
<td><strong>Total Carb.</strong></td>
<td>17 g</td>
</tr>
<tr>
<td><strong>Sodium</strong></td>
<td>10 mg</td>
</tr>
<tr>
<td><strong>Fiber</strong></td>
<td>0 g</td>
</tr>
<tr>
<td><strong>Potassium</strong></td>
<td>230 mg</td>
</tr>
<tr>
<td><strong>Sugars</strong></td>
<td>8 g</td>
</tr>
<tr>
<td><strong>Calories</strong></td>
<td>80</td>
</tr>
<tr>
<td><strong>Protein</strong></td>
<td>0 g</td>
</tr>
</tbody>
</table>

% Daily Value
- Protein 2%
- Vitamin A 380%
- Vitamin C 0%
- Calcium 2%
- Iron 2%

**Infant Oatmeal Cereal** (calcium and iron fortified)

**Nutrition Facts**
Serving Size 1/4 cup (14 g)

<table>
<thead>
<tr>
<th>Servings per box 16</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amount Per Serving</strong></td>
</tr>
<tr>
<td>Calories</td>
</tr>
<tr>
<td>Total Fat</td>
</tr>
<tr>
<td>Sodium</td>
</tr>
<tr>
<td>Potassium</td>
</tr>
<tr>
<td><strong>Total Carbohydrate</strong></td>
</tr>
<tr>
<td>Dietary Fiber</td>
</tr>
<tr>
<td>Sugars</td>
</tr>
<tr>
<td><strong>Protein</strong></td>
</tr>
</tbody>
</table>

% Daily Value
- Protein 8%
- Vitamin A 0%
- Vitamin C 0%
- Calcium 15%
- Iron 45%
- Thiamine 45%
- Riboflavin 45%
- Niacin 45%
Turkey with Broth (jarred baby food)

<table>
<thead>
<tr>
<th>Nutrition</th>
<th>Amount per Serving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Fat</td>
<td>6 g</td>
</tr>
<tr>
<td>Total Carb.</td>
<td>0 g</td>
</tr>
<tr>
<td>Sodium</td>
<td>40 mg</td>
</tr>
<tr>
<td>Fiber</td>
<td>0 g</td>
</tr>
<tr>
<td>Potassium</td>
<td>90 mg</td>
</tr>
<tr>
<td>Sugars</td>
<td>0 g</td>
</tr>
<tr>
<td>Protein</td>
<td>8 g</td>
</tr>
</tbody>
</table>

% Daily Value
Protein 50% • Vitamin A 0%
Vitamin C 0% • Calcium 2% • Iron 4%

Appendix B: Cost Comparisons

Table B1. Toddler Diced Fruit Versus Canned Fruit Packed in Juice

<table>
<thead>
<tr>
<th>Product</th>
<th>Size</th>
<th>Price ¹</th>
<th>Cost per pound</th>
<th>Cost per toddler-sized serving if you use all the servings in the container</th>
<th>Cost per toddler-sized serving if you use one serving and throw any leftovers away</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gerber Graduates Diced Peaches</td>
<td>4.5 oz.</td>
<td>$0.69</td>
<td>$2.45</td>
<td>$0.69</td>
<td>$0.69</td>
</tr>
<tr>
<td>Store brand canned sliced peaches (packed in juice)</td>
<td>8.25 oz.</td>
<td>$0.75</td>
<td>$1.50</td>
<td>$0.37</td>
<td>$0.75</td>
</tr>
<tr>
<td>Store brand canned sliced peaches (packed in juice)</td>
<td>16 oz.</td>
<td>$0.79</td>
<td>$0.79</td>
<td>$0.20</td>
<td>$0.79</td>
</tr>
</tbody>
</table>

¹Prices were determined in an A&P supermarket in a northern New Jersey suburb in 1996. The store-brand fruit was chosen for comparison because it was the least expensive of the regular juice-pack canned fruits available for sale. We didn’t use the Center for Science in the Public Interest’s data for this table because they used a national brand of canned peaches in their comparison, and we thought it would be fairer to use a lower-priced store-brand product.
Table B2. Baby Juice Versus Regular Vitamin C-Fortified 100% Apple Juice

<table>
<thead>
<tr>
<th>Product</th>
<th>Size</th>
<th>Price ²</th>
<th>Cost per quart</th>
<th>Cost per baby-sized serving if the family uses up the entire container</th>
<th>Cost per baby-sized serving if only the baby drinks apple juice ³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beech-Nut “Stage 1” apple juice ⁴</td>
<td>32 ounce bottle</td>
<td>$2.09</td>
<td>$2.09</td>
<td>$0.26</td>
<td>$0.30</td>
</tr>
<tr>
<td>National brand regular vitamin C-fortified apple juice</td>
<td>46 ounce bottle</td>
<td>$1.79</td>
<td>$1.25</td>
<td>$0.16</td>
<td>$0.26</td>
</tr>
<tr>
<td>National brand regular vitamin C-fortified apple juice</td>
<td>Three-pack of 8.45 ounce drink boxes (2 baby-sized servings per box)</td>
<td>$1.19</td>
<td>$1.50</td>
<td>$0.20</td>
<td>$0.20</td>
</tr>
<tr>
<td>Gerber “1st Foods” apple juice ⁴</td>
<td>Six-pack of 4 oz. bottles</td>
<td>$2.29</td>
<td>$3.05</td>
<td>—</td>
<td>$0.38</td>
</tr>
<tr>
<td>Juicy Juice vitamin C-fortified apple juice</td>
<td>Four-pack of 4.23 oz. drink boxes (1 baby-sized serving per box)</td>
<td>$1.29</td>
<td>$2.44</td>
<td>—</td>
<td>$0.32</td>
</tr>
</tbody>
</table>

¹All of the juices compared in this table are shelf-stable products (the kind that can be stored at room temperature until they are opened). Juice products of this type are microbiologically safe. However, fresh (perishable) apple juice may not be. Parents who purchase fresh apple juice should check product labels and buy only products labeled “pasteurized.”
Prices were determined (in 1996) in the same New Jersey supermarket that was used for table B1. The least expensive national brand of vitamin C–fortified regular juice was chosen for comparison because the store brand was not vitamin C–fortified and therefore was not equivalent, nutritionally, to the baby-food product.

An opened bottle of juice can be stored safely in the refrigerator for 7 days. During this time, a typical baby would drink 4 oz. of juice daily, for a total of 28 oz. of juice. Any juice remaining in the container would then be discarded. (If your baby drinks more than 4 oz. of juice daily, reread the section on “Juice Abuse.”)

Both Gerber and Beech-Nut sell apple juice in six-packs of single-serving bottles and in larger, quart-size bottles. In the store we visited, the large bottle of Beech-Nut juice was priced lower than the Gerber equivalent, while the Gerber six-pack was priced lower than the Beech-Nut equivalent. So we did what most parents would do: We chose the less expensive alternative in each case.

References


11. American Academy of Pediatrics Committee on Nutrition. Review of Safety and Suitability of


