

# National Food Review

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## Future Foods





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## Future Foods

Food and food packaging is changing. This issue of the *National Food Review* focuses on two new technologies for packaging some familiar foods and one innovative, although plain, packaging method that saves consumers money.

After 20 years on the European market, ultra-high temperature (UHT) milk will be marketed extensively in the United States. Introduced at the 1982 World's Fair, UHT milk will be promoted throughout the country by the end of the year. UHT milk needs no refrigeration and can be stored at room temperature for up to 6 months. The article: UHT Milk: Nutrition, Safety, and Convenience begins on page 2.

Another technology off the drawing board after 20 years of research is retortable pouch technology—it's one that seals products in retort pouches that never need refrigeration. The U.S. Army was the first to experiment with putting foods in pouches and will begin replacing military "C" rations with them this year. An article that examines this new technology begins on page 5.

Generics consist of some familiar products in very plain wrappers, and they have steadily grown in number since their introduction in 1977. The generic appeal is price—usually 15 to 40 percent below the prices of private label (store brands) and branded competition. Read more about the "no-frills" food alternative beginning on page 7.

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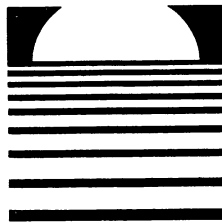
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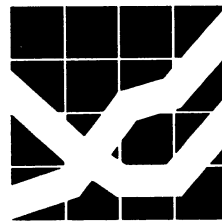
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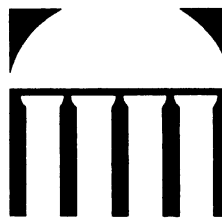
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# UHT Milk: Nutrition, Safety, and Convenience

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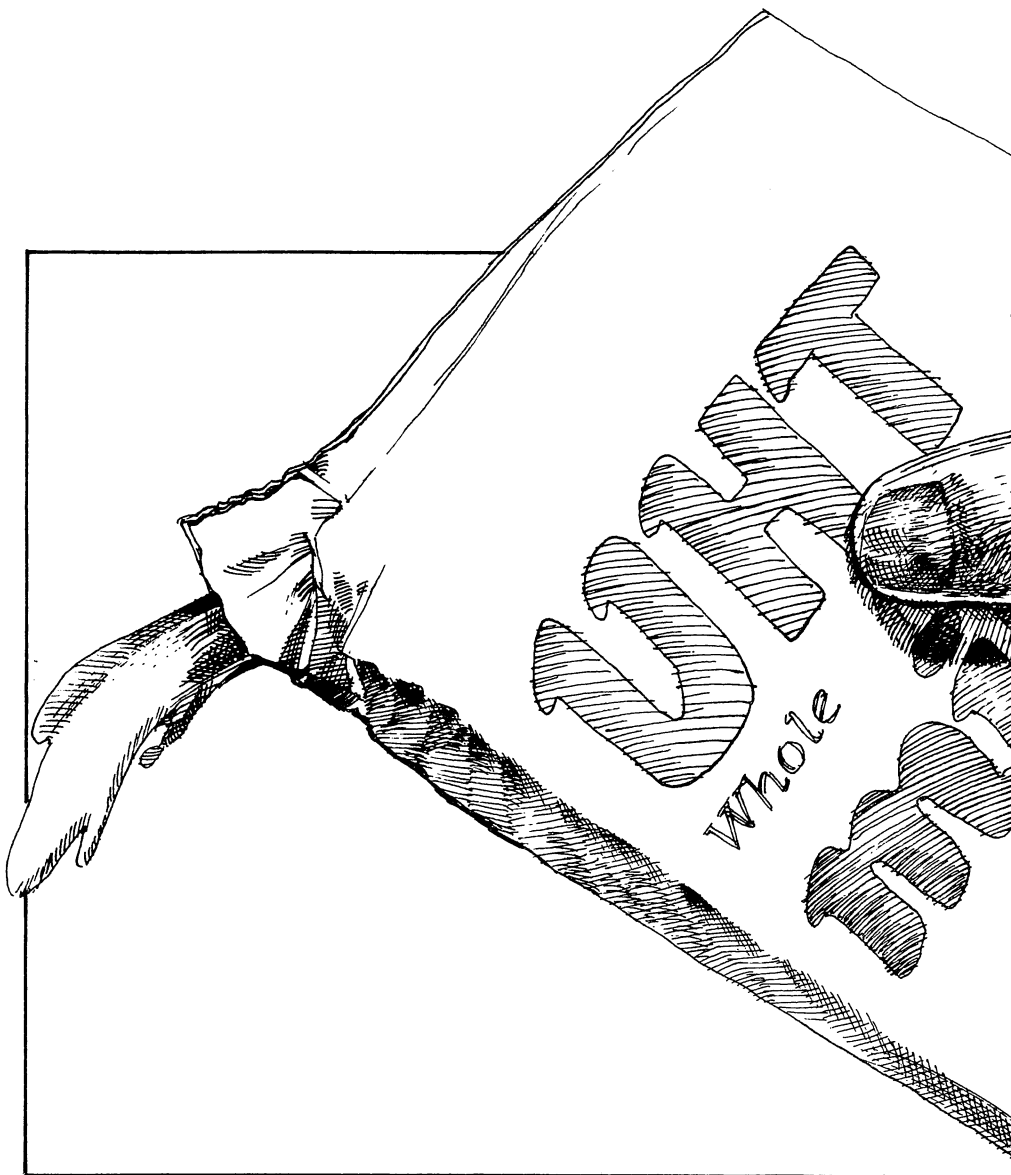
**A**fter 20 years on the European market, milk that needs no refrigeration has finally been introduced in the United States. Known as UHT (ultra-high temperature) milk, it can be stored on shelves anywhere at room temperature for up to 6 months. This shelf stability offers convenience to consumers, and, it eliminates expensive refrigerated storage for processors and reduces refrigerated transportation costs.

In UHT processing, milk is heated to 138°C (280°F) for a few seconds to destroy bacteria, and heat-resistant spores. Then, it is packaged in sterilized cartons made of layers of paperboard, foil, and polyethylene to keep it sterile and out of light.

In contrast, pasteurized milk is heated to 72°C (161°F) for a minimum of 15 seconds and is packaged in plastic jugs or waxed cardboard containers. However, after 14 to 20 days of refrigeration, the few surviving bacteria multiply enough to cause spoilage. Canned milk is heated for 20 to 40 minutes at 240°F, which allows a shelf life of 2 years or more. But the taste is different from that of normally pasteurized milk, and consumers generally do not interchange their uses. UHT milk's taste, especially flavored milks, is considered superior to canned milk by many consumers in taste panel tests. But, whether U.S. consumers will consider it a competitor with pasteurized-homogenized milk remains to be seen.

## Product Development

Modern UHT milk developed over several decades with the first high temperature processing plant in operation in Europe by 1913. However, a satisfactory container which would maintain the sterile quality of the milk had not been perfected. Next, producers began sterilizing the milk and container together: in the 1940s, bottles gave milk a fairly long shelf-life, and this process was adapted to cans in the 1950s. But because these milks were sterilized inside containers, their flavors couldn't compete with pasteurized milk. The real breakthrough for UHT milk—a container sterilized separately—was developed by a Swiss firm, Tetra Pak. And, in 1958, Tetra Pak began marketing UHT milk in Europe.



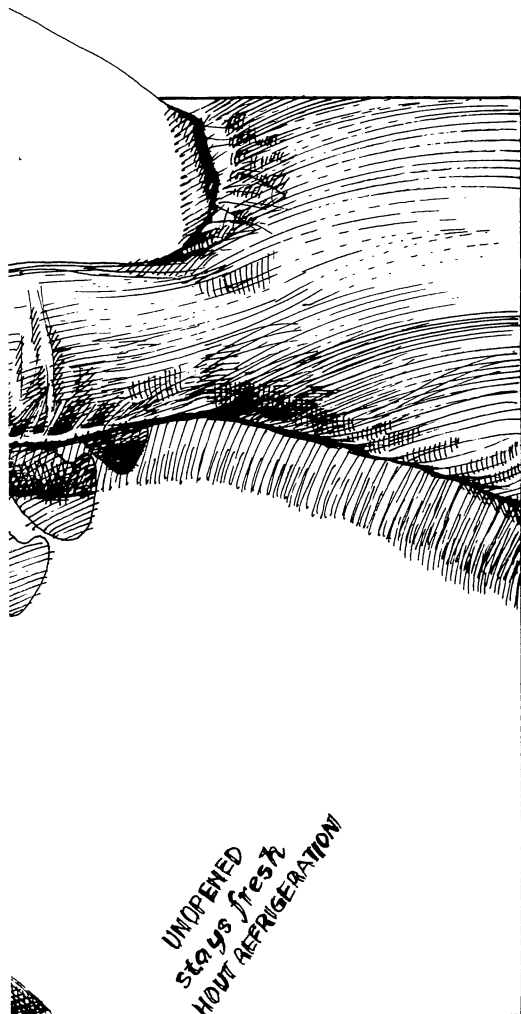
European market penetration of UHT milk was initially slow but has taken off dramatically during the last 5 years. In Italy and Germany, half the milk sold in 1980 was UHT. But in Great Britain, mostly because of government regulations, UHT milk sales are only about 2 to 3 percent of gross sales for all milk.

Right now, U.S. sales are somewhat limited. Most of the UHT milk processed in the United States is used for exports including Hawaii and Alaska, and in the shipping industry, in institutions such as nursing homes, and for some recreational uses. However, manufacturers are gearing up for U.S. grocery sales. In early 1982, new UHT processing plants in Savannah, Ga., and Oneida, N.Y., will join existing plants in Visalia, Calif., and Sumner, Wash.

## UHT Safety and Quality

Over a dozen firms manufacture UHT processing equipment called sterilizers, which use indirect or direct heat. With the indirect system, a heat exchanger separates the product from the heating medium (hot water or steam). The direct system injects steam into the milk which causes a higher heat transfer rate, thus reducing processing time while ensuring that all milk particles have reached the specified minimum temperature necessary for destruction of pathogens.

In February 1981, the U.S. Food and Drug Administration (FDA) approved the use of hydrogen peroxide to sterile aseptic containers separately from the milk.



Three possible safety problems with packaging are: migration of printing inks from the package exterior to the milk during long storage; possible deterioration of the polyethylene-lined interior of the package during long storage, thereby releasing contaminants from the lining itself into the milk; and a residue of hydrogen peroxide in the packaging material after sterilization. Current scientific knowledge indicates that none are real, or expected to become significant health threats.

Unlike pasteurized milk packages, most UHT containers do not contain free oxygen—they are anaerobic. For this reason, UHT packages could permit the growth of some harmful types of organisms, such as botulism, that only grow in the absence of oxygen. The time and temperature requirements for UHT processing will normally destroy these organisms, but a processing machinery malfunction or a contamination occurrence after the heat treatment stage might allow some of these organisms to survive.

Botulism is not normally found in milk and does not grow readily because of the oxygen in the head space in pasteurized milk containers. In addition, pasteurized milk spoils before the toxin is produced. For this reason, FDA regulations state that UHT milk must satisfy the sterilization requirements which apply to "thermally processed low-acid canned foods packaged in hermetically sealed containers," as well

as the requirements which apply to the composition of pasteurized milk.

### Flavor

A rancid or fruity flavor is indicative of a spoilage problem. These spoilage problems are usually caused by very heat-resistant organisms, or sometimes by heat-resistant enzymes produced by organisms which are themselves destroyed. The spoilage problems may be prevented by making sure that the raw milk is of a high quality. Although spoilage is generally a flavor or quality problem, it could be a signal contamination by an organism that is a health hazard.

The presence of dissolved oxygen in the final product is also linked with spoilage problems during storage. Oxidation has always been a problem for maintaining the flavor of fluid milk and is sometimes the result of exposure to light which degrades vitamin B<sub>2</sub> (riboflavin). Storage at higher-than-room temperature (above 80°F) may promote oxidation in UHT milk.

Oxidation is linked with spoilage in long-term storage. Paradoxically, a high level of dissolved oxygen has been found to eliminated the cabbagey flavor of sulfur residue which is often noted in the first 2 weeks. Other reports suggest that after 2 weeks of storage, the cabbagey flavor disappears,

**Table 1. Losses of Vitamins In Milk by Different Heating Procedures**

Heating Procedure	Losses (in percent) of				
	Vitamin B <sub>1</sub> Thiamine	Vitamin B <sub>6</sub>	Vitamin B <sub>12</sub>	Vitamin B <sub>9</sub> Folic Acid	Vitamin C
	Percent				
Pasteurization	10	0-5	10	5	5-15
UHT Treatment	5-15	10	10-20	10-20	10-20
Cooking	10-20	5-8	20	15	15-20
Sterilization (canned milk)	30-40	10-20	30-100	40-50	30-50

Source: North Carolina Conference Proceedings, page 34.

regardless of the initial level of dissolved oxygen.

A "cooked" flavor is another frequent complaint in flavor studies of UHT milk. This "cooked" flavor is often caused by "burn-on" during indirect heat treatment, when some of the milk burns to the sides of the stainless steel heat exchanger. Continued research into improved processing techniques is solving this problem.

Quality and safety of UHT can be successfully maintained through a program of

careful testing at the raw milk, processing, and postproduction stages. The accepted quality standard for UHT milk is spoilage of not more than 1 package in 1,000. Because the conditions under which UHT milk is produced are so different from pasteurized milk, testers must be aware that the problems for maintenance of quality and safety are also very different and require new procedures and standards.

#### Nutritional Quality

Any heating has the potential to alter the appearance, taste, texture, and nutrient content of foods. UHT processing breaks down the milk proteins, but studies show no reduction in nourishment. Several reports have been issued on feeding experiments that compared growth rates on a UHT diet versus pasteurized milk. Infants had greater weight and height increases on the UHT diet. A half dozen feeding trials with rats found no growth difference on an UHT milk versus pasteurized milk or raw milk. Another study using rats reported a 4-percent drop in net protein utilization from UHT milk. But in reviewing these studies, UHT researcher Burton concluded that UHT processing would not appreciably alter protein utilization by humans.

No significant changes have been found in the availability of minerals, lipids, carbohydrates, or heat-stable vitamins, such as vitamins D and E, riboflavin, or pantothenic acid. However, four of the B vitamins and vitamin C are diminished by heat. Pasteurization causes losses of around 0 to 15 percent (table 1), depending on the vitamin. UHT processing causes losses of 5 to 20 percent. Cooking losses tend to be slightly higher than for UHT. And older sterilization methods (such as canning) cause greater nutrient loss because of more severe heat stress.

Vitamin loss during storage occurs for both UHT and canned milk and appears to be a function of the length of storage time and/or the amount of oxygen. Vitamins B<sub>6</sub> and B<sub>12</sub> are generally reduced by 50 percent during 3 months of storage. Vitamin C and folic acid (B<sub>9</sub>) losses are closely related to the oxygen content of the milk after processing and may be as little as 10 percent

after 3 months of storage or as much as 100 percent depending upon the processing. Other vitamins remained quite stable.

Overall, UHT processing is comparable to pasteurization in causing little loss of nutritive value. Storage in light-proof containers impermeable to oxygen permits UHT milk to retain almost all its nutritional merit.

#### Costs

The relationship between UHT and pasteurized milk costs varies between countries and researchers do not agree on whether UHT will be less expensive in the United States. UHT milk is 15 to 30 percent cheaper than pasteurized milk in Germany, but more expensive in England, largely because of labor contract stipulations. In Canada, regulations prevent UHT milk from being shipped across province lines. This prevents plants from operating at the most efficient capacity to meet the demand of the small population in each province. However, several firms are starting to sign supply contracts with firms in neighboring provinces for distribution of UHT milk. And, this may lead to increased efficiency for UHT processing plants.

In the United States, UHT milk costs will depend greatly on costs of advertising to acquaint consumers with the new product and the ability to utilize the capacity of large-scale processing plants. In the meantime, firms are building plants or announcing plans to enter the UHT market.

Valley Fresh in Sumner, Wash., distributes four fruit juices in addition to milk and cream in 11 Western States, including Alaska. Dairymen, (a dairy cooperative) plans to begin shipping UHT milk all over the Eastern United States and as far west as the Rockies from its new plant in Savannah, Ga. this spring. Two other cooperatives, Land O'Lakes, in Wisconsin, and H. P. Hood/Agri-Mark, in Boston, Mass., have signed marketing agreements with Dairymen.

Some other factors which may affect production costs are:

- *Federal Milk Marketing Order prices for raw milk.* Under Federal Orders, the price is determined by the use—with

#### UHT Gets A Fair Start

What does UHT milk have in common with an ice cream cone? Well, both are dairy products and both were unveiled at World's Fairs—the ice cream cone in 1906 and UHT milk on May 1 at this year's World's Fair in Knoxville, Tenn. The UHT display will be presented by Dairymen, Inc., a regional milk marketing cooperative owned by approximately 8,000 dairy farmer members in the southeastern United States.

Most fairgoers will probably be getting their first tastes of UHT milk because, although it's not a new product, UHT milk is relatively new in the United States. The introduction is expected to be quite large, however, as 14 to 16 million visitors are expected.

Currently, Dairymen's UHT milk is processed at a new plant in Savannah, Ga., where 80,000 gallons of milk per day will be processed when the plant is operating at full force. This represents less than 3 percent of Dairymen's milk but the plant is designed for possible expansion.

If UHT milk catches on in the United States, other cooperatives are expected to follow suit in building their own processing facilities. The reactions of this year's fairgoers will, undoubtedly, act as barometer for the rest of the country. Milk producers are hoping UHT milk is accepted with the same enthusiasm as the ice cream cone!

## Retort Pouches: An Overview

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drinking-milk use receiving the highest price; and milk used in manufactured products, the lowest price. The difference in prices varies regionally with the smallest difference (10 percent) in the upper Midwest, and the greatest difference (25 percent) in Florida. Under current interpretations, UHT milk would most often be priced at drinking-use levels.

- **Container costs.** The laminated paper-board, aluminium foil, and polyethylene container is relatively expensive and cannot be formed into packages much larger than a quart with present technology. This may mean UHT packaging costs are 25 cents a gallon higher than the cost of plastic jugs used for pasteurized milk. Other unit processing costs should be about the same for large volumes regardless of processing method.
- **Transportation costs.** Savings will occur because refrigeration is not needed, trucks are larger, and deliveries are much less frequent—dictated by sales and not product shelf life. Savings will be greater at higher levels of consumer acceptance and higher volume sales.
- **Retailing costs.** Supermarkets will save by the elimination of expensive refrigeration and a reduction in handling costs. These savings may attract a wide variety of nonfood retailers, such as drug stores, to UHT products.
- **Consumer savings.** Consumers can benefit in several ways. Fewer extra trips to the supermarket to purchase milk may be needed and the UHT milk can be stored without refrigeration, which ultimately might be reflected in the purchase of smaller household refrigerators.

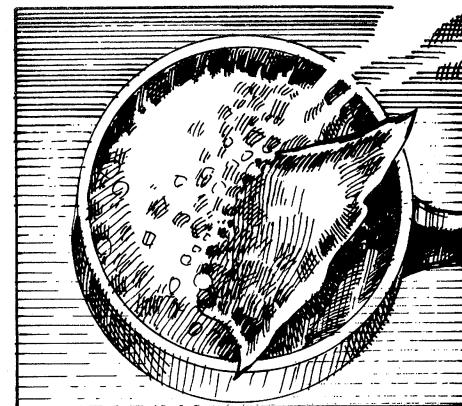
Milk spoilage in the home is reduced because of longer shelf-life. Milk will be available for recreational use where refrigeration or other cooling is impractical or not available. A wider range of fluid milk products may be available in more places. A storable milk makes it feasible—or far less costly—to serve specialty markets, such as lactose-reduced milk, low-sodium milk, or vending machine sales, and isolated or small markets.

Clearly, this old product with new processing and packaging will have to compete

hard with the well-established market for pasteurized milk in the United States. Consumers may notice a taste difference between UHT and pasteurized milk. However, price and convenience incentives may convince them to accept a slightly different flavor, and even develop a taste for it, as has been seen in other products, such as margarine or 2-percent-fat-milk. Also, UHT milk is starting to be sold in flavors (chocolate, vanilla, berry, banana) all over the world, building on the consumer tastes developed by the flavored yogurt market, and competing with the expanding soft drink market. ■

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**R**etortable pouch technology—a new boon to the food industry—is off the drawing board after 20 years of research by the government and private industry. The U.S. Army was the first to experiment with pouched foods, beginning in 1959. And pouches finally hit supermarket shelves in 1979, when the International Telephone and Telegraph Company (ITT) began marketing their "Continental Kitchens" line.

Today, peaches, potato salad, and sweet-and-sour pork top the list of pouched products. But, what is so special about potato salad from a pouch? Taste and time, according to some manufacturers. Food packaged in retort pouches tastes a lot fresher than food from a tin can. And, it's easily as good as the frozen variety, according to one company's spokesman.

Kraft is now the largest manufacturer of pouched foods with their "a la Carte" line which will be sold nationally after the product is introduced on a region-by-region basis.

Pouched food takes less time for consumers to prepare. Some items can be served cold or at room temperature. When heating is required, the pouch needs to be heated in boiling water for only about 5 minutes compared with 30 minutes for heating a similar frozen food. And, no refrigeration is required: pouches stay fresh stored at room temperatures for 17 months or longer.

The pouch itself is an opaque plastic bag made of three layers. The inside layer is made of polypropylene, a sterile plastic approved by the Food and Drug Administration (FDA). In the middle, there is a layer of aluminum that keeps light and oxygen out and moisture in. The outside ply is made from a polyester film about 1 millimeter thick, which gives the pouch its strength.

Pouches are so strong that, in tests conducted by the U.S. Army, soldiers stomped on them without breaking their seal. Puncturing is the only real problem. And, to lessen the chances of punctures, pouches come packaged in slim cardboard boxes.

#### Benefits of Pouched Foods

The retort process works about the same way as a pressure cooker. The food is processed at high temperatures, 250-300°F compared with 212-250°F for the traditional methods of cooking. But, processing retorted food takes less time. For example, in the canning process, 5-ounces of chicken a la king would be cooked in 35-45 minutes. The same food prepared for a retort pouch would only take 10-15 minutes.

The reduced processing time has important benefits. Natural sugars and starches in foods do not caramelize; heat-sensitive vitamins (four of the B vitamins and Vitamin C) and proteins are not lost in processing; and there is also less chance of over-cooking that lessens the flavor and nutritional quality of most foods.

Along with the reduced processing time, decreased energy costs are the other major benefit for food processors. According to one processor, pouches can save up to 50 percent of the energy needed to process frozen foods and up to 15 percent of the energy needed for canning.

Reynolds Metal Co. manufactures retort pouches and recently reported that 729 British Thermal Units (BTUs) of energy are required to produce an 8-ounce retortable pouch. Including the cardboard box, total energy use is 2,189 BTUs. This compares with 2,606 BTUs of energy needed to produce an 8-ounce aluminum frozen food container and its cardboard cover.

No need for refrigeration is another

energy saver, both in distribution and storage. Because retortable pouched foods have been thermally sterilized, they can be kept on the pantry shelf. Pouched foods have the same shelf-life as canned foods, which some experts contend is indefinite. However, several USDA tests have found that flavor deteriorates with age for both.

Another benefit: pouches weigh less and take up less room. For volume comparisons, an average 45-foot trailer can hold about 200,000 8-oz. cans. The same trailer can hold about 2.3 million 8-oz. preformed pouches. Consumers might find the pouches benefit their storage spaces as well.

#### Drawbacks

There are two major problems with retortable pouched foods: higher packaging costs and slower filling machines. The cost of packaging retort pouches is slightly higher than costs for the more traditional methods of packaging. Cost information is sketchy because manufacturers are reluctant to disclose such data to competitors, but one manufacturer stated that in 1980, a standard preformed 8-ounce pouch cost about 10 cents and the outer cardboard carton was about 7 cents. This compares with 8.6 cents for a standard three-piece, 8-ounce can including the label. But, the reduced energy costs in processing may take up some of this expense.

The problem food processors face in adopting this new technology is that old production lines are not compatible with retort processing. Slower filling machines must be used for retort pouches.

Filling lines for traditional cans and glass can handle from 120 to 400 containers per minute, current retort filling machines can only fill 30 to 60 pouches per minute. Higher speed machines are now being developed by equipment manufacturers. Some of the machines will be capable of filling up to 250 pouches per minute and may be available as soon as 1983. But it may be several years before they are widely used.

Another problem is the size of the pouch. With present technology, the largest pouch that can be produced only holds 16 ounces of food, a good size for use at-home but not for institutional use. To correct this, the U.S. Army Natick Research and Develop-

ment Laboratory, along with private companies, is perfecting institutional size pouches that can hold 5 to 10 pounds of food.

#### Outlook for Pouched Foods

The U.S. Army is also going to be one of the major users of pouch products, at least initially. Military "C" rations (canned and reconstituted foods eaten by troops out in the field) will be moving over for this new technology. In the early 1980's, the Department of Defense will replace "C" rations with "Meal, Ready-to-Eat (MRE)," a combination of foods in retortable pouches and trays (a similar technology). In 1982, the Department of Defense plans to purchase 40 million pouched servings to include in field rations.

In the long run, consumer acceptance will tell whether retort technology will catch on in the United States. One marketing study, done by the American Can Company, in Phoenix, Ariz., Miami, Fla., and Columbus, Ohio had very positive results. For the survey, shoppers who purchased retort pouch foods over a 3-month period were randomly called on the telephone. Positive response was considerable—about 75 percent of those surveyed said they would purchase retort products again.

Although it appears from this survey, and others done by retort manufacturers, that consumer acceptance will be high, some food manufacturing firms are reluctant to begin packaging retorted foods. The reason is probably the large capital investment needed to convert their production lines. Costs are estimated at \$300,000 per filling machine for retort pouches versus \$100,000 for standard filling machines. And, processors are understandably reluctant to invest in equipment that may soon become obsolete because of the likely introduction of newer high-speed machines in the not too distant future. Furthermore, high interest rates may be keeping firms from making investments at this time.

In the meantime, retort pouches will give some consumers a food innovation to consider buying. Ultimately, pouched foods may become as common as the frozen and canned varieties at the supermarket. ■



# The Effect of Generics on the Food Market Structure

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**G**enerics—products in plain packages whose stark labels read “GRAPE JELLY,” “PAPER TOWELS,” or “SHORTENING”—have steadily grown in number on supermarket shelves since being introduced to U.S. consumers in 1977. Sales of generic products have expanded while breaking all the rules of successful branded food marketing: extensive advertising, enticing packaging, and a manufacturer’s or retailer’s logo.

How have generics done it? Their appeal is price. Generic products are usually priced 15 to 40 percent below the private label (store brand) and branded competition. The phenomenal success of these no-frills alternatives has shaken up their product markets.

## Growth of Generics

U.S. food stores responded quickly to the introduction of generics. By October 1978, 12 percent of all supermarkets offered some generic items, according to Timothy Murphy, an industry analyst. That share has steadily increased—reaching 35 percent in 1979, and 51 percent in 1980. By January 1982, 80 percent of the Nation’s supermarkets were stocking some generics or generic equivalents. Generic equivalents, or neo-generics, are second-line private labels priced to compete with other stores’ generics. Together these products now account for 2 percent of food store sales, and an estimated \$4.4 billion in annual retail sales.

## Characteristics

Analysis of data purchased from the A.C. Nielsen Company by USDA sheds more light on the generic phenomenon. The Nielsen data provide estimates of national sales for about 50,000 food and beverage items that were shipped from grocery warehouses in April and May of 1979 and 1980. The data are based on a sample of stores which account for about 1 percent of national sales and are representative of U.S. supermarkets in size, ownership type, and geographic distribution. USDA economists eliminated about 40 product categories that were incomplete because a significant por-

tion of those products were shipped directly to stores by manufacturers.

The USDA analysis compared several characteristics for three groups of product categories: the total sample which contained 384 categories, the 128 product categories that had generics in April/May 1979, and the product categories that offered generics a year later. This last group contains 54 product categories in addition to those categories with generics in 1979. The products included in this analysis were packaged processed foods because information on labeling of fresh meats and produce was not available.

While around 50 percent of stores carried some generic item in 1980, any particular generic item on average was carried by only 8.1 percent of the stores in that year. This percent of stores expanded between 1979 and 1980 for each group presented in table 1. The higher percentage of stores, 10.5 percent on average, carrying generics that were introduced prior to 1979 reflects the fact that product categories in which generics

**Table 1. Average Percent of Stores Selling Any Particular Generic**

Product Categories	1979	1980	Change 1979-80
All (384)	1.5	3.9	2.3
Categories with generics in 1979 (128)	4.5	10.5	6.0
Categories with generics in 1980 (182)	3.1	8.1	5.0

Source: Computed by the authors from A.C. Nielsen data for April-May, 1979 and 1980. Totals in the tables may not add because of rounding.



were initially introduced have experienced greater penetration.

Private label items make up a larger share of sales in product categories with generics than in other markets. Table 2 shows that private label foods had an average market share of 24 percent in categories where generics were also offered, compared with a 16 percent share on average for all products. Conversely, the market shares of the leading brands, those with the largest national sales, were smaller in product categories with generics than for all categories.

Private label items and generics both appeal to consumers who are sensitive to price. Therefore, it seems natural that generics should enter markets in which private label brands have been successful. Their success indicates an interest by consumers in low price alternatives and a lower probability that firms would take actions to make entry difficult for generics.

The food product categories with generics are larger in terms of total dollar sales than categories which do not offer generics (table 3). Average sales were larger for the product categories that had generics in 1979 than for the categories with generics in 1980. This suggests that the introduction of generics occurred first in the most popular

products and is spreading to items that compose a smaller portion of consumers' food spending. Consumers are more willing to experiment with products which they will not be stuck with for a long time if they are not satisfied. These tend to be products they purchase frequently.

Some analysts suggest that introducing a new variety is easier in product categories which are growing rapidly. On the other hand, consumers have more purchasing experience on which to base price and quality comparisons in stable, long established categories. Furthermore, categories that are large in terms of total dollar sales tend to grow slowly. These two factors contribute to the presence of generics in slowly growing categories. The average percent increase in sales between 1979 and 1980 was smaller in those categories with generics in 1979 than for the whole sample. And, average sales growth of categories with generics in 1980 was only slightly larger than the growth of the total sample.

#### Impact of Generics

In general, the introduction of generics did not increase total sales in the product categories; they displaced private labels or brand items, or both.

Several studies have looked at the relative impact of generics on private label and branded products. An A. C. Nielsen Company study found that for their sample of 50 food and nonfood categories, the initial generic growth was predominantly at the expense of private label items. Between 1979 and 1980, the 1.1 percentage point rise in generics' sales share was offset by a 0.9 percentage point decline in the private label share and a 0.2 percentage point decline in the brands' share. Between 1980 and 1981, there was a 2.7 percent increase in the share of sales by generics. This was offset by declines in private label and branded shares that were proportional to their share of sales. A Selling Areas Marketing, Inc. (SAMI) study of changes in sales shares of generic, private label, and branded items between May 1980 and May 1981, reported in *Private Label*, also suggested a proportional loss.

The result from the Nielsen data analyzed by USDA for the food product categories with generics in 1979 was startlingly different. While the average generic market share rose 0.75 percentage points, the brands' share also increased by 0.60 points and private labels' share of sales fell 1.35 points. The average increase in the brands'

**Table 2. Average Market Shares for Largest Brands and Private Labels**

Product Categories	Leading Brand			Number 2 Brand			Number 3 Brand		Number 4 Brand	Private Label			Generics		
	1979	1980	Change 1979-80	1979	1980	Change 1979-80	Change 1979-80	Change 1979-80		1979	1980	Change 1978-80	1979	1980	Change 1979-80
All (384)	45.40	45.93	.53	15.31	15.20	-.10	.10	.08		16.97	15.98	-.99	.35	.77	.42
Categories with generics in 1979 (128)	35.27	36.31	1.04	14.66	14.17	-.49	-.02	-.08		26.37	25.02	-1.35	1.05	1.80	.75
Categories with generics in 1980 (182)	36.37	37.18	.81	14.33	13.76	-.57	.06	-.02		25.06	23.85	-1.21	.74	1.63	.89

Source: Computed by the authors from A. C. Nielsen data for April-May, 1979 and 1980.

share was almost the same for all products (0.57 points) as it was for the group with generics. This suggests that nearly all generic growth among processed food categories between 1979 and 1980 was at the expense of private label items.

The discrepancy between USDA's analysis and the other two studies may be due to several differences. The Nielsen study looked at a much smaller group of product categories. Their sample included paper

products and household supplies as well as food. Also, both the Nielsen and SAMI studies cover different time periods. It is not clear what impact these differences would have. Although the SAMI study and the USDA analysis looked at a similar group of products, SAMI included categories in which a large proportion of product sales did not pass through warehouses. Branded products in many of these categories experienced large declines in sales shares. Because there may not have been

similar declines for branded items delivered directly to stores, product categories characterized by direct store delivery were not included in the USDA analysis.

Distribution of sales among branded items in the USDA analysis was apparently affected by the presence of generic competition. Overall, the leading firm in each product category increased its share by 0.53 percentage points between 1979 and 1980 (table 2). The increase was higher, 1.04 percentage points, in products with generic competition. This was partially offset by declines in the second through fourth largest brands. Surprisingly, the combined share of the fifth and smaller brands fared relatively well where they compete with generics.

Several factors may help explain this apparent success of the fifth and smaller brands. It appears that some of these brands are regional leaders. Thus, although their share of national sales is small, within a limited geographic area they enjoy the same high quality image and dominant sales positions as the leading brands. Other small brands in the sample may offer variations of the product which do not compete directly with the generic items. Most importantly, some of the small brands may be

**Table 3. Two-Month Average Market Sales and Growth**

Product Categories	1979	1980	Growth 1979-80
	1,000 dollars		
All (384)	21,620	24,969	15.49%
Categories w/generics in 1979 (128)	43,406	49,531	14.11%
Categories w/generics in 1980 (182)	37,951	43,983	15.89%

Source: Computed by the authors from A. C. Nielsen data for April-May, 1979 and 1980, projected to U.S. totals.

**Table 4. Average Percent of Stores Selling the Largest Brands and Private Labels**

Product Categories	Leading Brand			Number 2 Brand			Number 3 Brand	Number 4 Brand	Private Label		
	1979	1980	Change 1979-80	1979	1980	Change 1979-80	Change 1979-80	Change 1979-80	1979	1980	Change 1978-80
All (384)	63.5	63.7	.2	39.6	38.8	-.8	-.7	.1	35.3	34.2	-1.2
Categories with generics in 1979 (128)	75.7	77.2	1.5	57.4	54.8	-2.5	-.4	-.7	63.4	62.2	-1.2
Categories with generics in 1980 (182)	73.5	74.4	.9	52.9	51.1	-1.7	-.5	-.4	58.3	56.9	-1.4

Source: Computed by the authors from A.C. Nielsen Data for April-May, 1979 and 1980.

new low-priced brands introduced by leading manufacturers to meet the generic competition. Sales growth for small brands due to these factors may have offset declines in the sales of other small brands within the combined category.

Industry analysts have suggested that generics replace some brands in stores. Already generics may be reducing the percent of outlets selling the second and fourth brands. The percent of stores carrying the leading brand increased an average 0.2 percentage points overall from 1979 to 1980 but increased by 1.5 percentage points in the product categories which had generics in 1979 (table 4). And, although the average sales share of the leading brand was lower in product categories with generics, the average percent of store carrying the largest selling brand was 77.2 percent in 1980 for those categories, compared with 63.7 percent of the stores overall.

On the other hand, the percent of stores selling the second through fourth brands and private label items declined in the product categories with generics in 1979. However, only for the second and fourth brands was the decline substantially more in markets with generics than overall. In conclusion, in the USDA analysis the national leaders appear to be benefitting from the shakeup caused by the introduction of generics.

#### The Future of Generics

National opinion surveys by the Roper Organization show that more consumers are trying generics (63 percent in 1980, versus 48 percent in 1979). They are also becoming more discriminating in terms of product quality. Consumers apparently find that some generic items serve the purpose of the products as well as their branded competition. In 1980, 13 percent of the shoppers who had tried generics mentioned that some generics are as good or better than branded equivalents, while others are not. The Roper Organization reported that no shoppers had given this judicious mixed response in 1979.

The upheaval in the food industry, stimu-

lated by the introduction of generics, is continuing. Generics have most often entered markets with high private label shares. They have been least successful in markets in which one or two brands have a high market share, such as soft drinks and canned soups. Brands with high market shares may have been successful in building strong consumer loyalty. They may have sold at prices which other firms could not undercut sufficiently to attract customers. They may also benefit from patents or formula secrets which have given them an insurmountable quality advantage. The same factors which help them exclude generics are those which have enabled brands with large market shares to exclude private label and other competitors.

Some leading brands with large market shares appear to be potentially more vulnerable to serious erosion of their market shares than the above analysis would suggest. The SAMI study states that among the few retailers handling generic potato and corn chips, generics have captured 39.8 percent of the potato chips sales and 43.6 percent of the corn snacks sales. A trade publication reports that in 1980, generics in Canada's Loblaw stores did very well against such dominant brands as Pampers, Tide, Maxwell House, Kraft, Ritz, and Perrier water. In the future, generics may make substantial inroads into categories in which profit margins are generally high and production in relatively small quantities is not difficult.

On the other hand, the introduction of generics in a product category prods retailers to reevaluate the items they have been selling. Each item must justify itself in terms of its contribution to the retailer's profits. Some items will continue to be eliminated as they fail to meet this market test.

Several major retailers have introduced hybrids or neo-generics (Safeway's Scotch Buy, A&P's P&Q, and Kroger's Cost Cutter) to promote store loyalty. Neo-generics are priced below national brands and private labels to compete with generics. Yet they are similar to private label in that they display the store's name on their labels. These neo-generics give price-sensitive shoppers items that carry the store's

reputation for value. Neo-generics blur the distinction between generics and traditional private labels. Since industry analysts, including Nielsen, classify neo-generics as private labels they mask the trends and may make it appear in the future that generics are losing favor. In fact, it is unlikely that their share will decline.

Retailers have replaced the plethora of private label names with one or two well identified private label lines. They have clarified the price-quality relationships among the brands, private labels, and generic or neo-generic varieties that they sell. Generics and neo-generics have demonstrated that a clear image and rock-bottom prices attract a sizeable group of customers. In the process, generics and neo-generics have replaced many low quality private labels and become a permanent item on retailers' shelves. ■

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## Coupons: Part I

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Since the mid-1970's, cents off coupons have been the fastest growing form of food promotion and advertising. In 1974, coupons accounted for about 6 percent of total food advertising and promotion cost. By 1980, that figure had risen to 11 percent. Coupons have become a public and economic issue because of their high visibility and impact on the consumer food bill. They also play a role in how manufacturers and retailers interact. Coupons may also affect the demand for raw agricultural products, if they influence consumption habits.

This article describes the trends in coupon distribution and redemption over the past decade, and how coupons fit into the overall food promotion and advertising portfolio. This article also looks at which products account for the bulk of coupons in food stores and economic cost of coupons to consumers.

In the Summer *National Food Review*, a second article will examine the impact of coupons on retailers, manufacturers, and farmers.

### Coupon Trends

The number of manufacturers' coupons distributed for food and nonfood rose from 10 billion in 1965, to about 90 billion in 1980. The most rapid growth occurred between 1974 and 1980, when the number of coupons rose at a yearly rate of 20 percent.

Some of the initial growth may have been an attempt to bypass the price and wage controls in 1973/74. Coupons allowed manufacturers to lower the prices consumers paid without lowering published wholesale prices. However, there is no evidence that this was the specific motivation behind the couponing activity.

Not only the number but the value of food coupons has increased. When production and distribution costs are added to the coupon's face value, the value of coupons redeemed in food rose from an estimated \$220 million in 1974, to \$550 million in 1979. The 1979 figure approached \$900 million when coupons for nonfood items were used in food stores, and coupons for food sold in nonfood stores are included.

This impressive growth, however, needs to be viewed within the total promotion of food (see table 1). Coupons still comprise the smallest portion of the four major types of food advertising and promotion. Television and radio are the most important, accounting for over 40 percent of advertising expenditures in 1979, up from 32 percent a decade earlier. Newspaper and magazines accounted for about 25 percent. Consumer premiums also accounted for about 25 percent of total, down sharply from about 40 percent a decade earlier.

Trading stamps have declined substantially from 25 percent of direct consumer

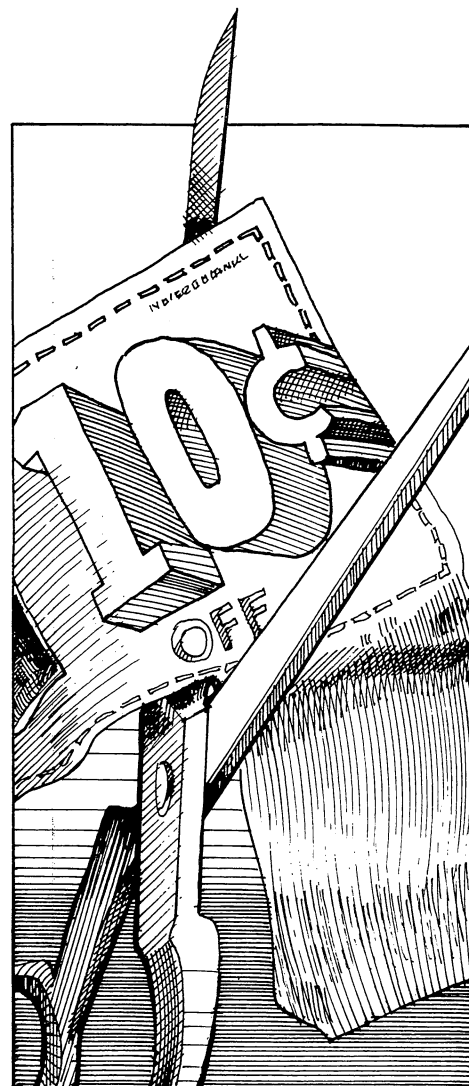


Table 1. Types of Food Advertising and Percentage of Total Advertising Costs—Selected Years

Type of food advertising:	1970		1974		1976		1978		1979	
	Mil. dol.	Percent	Mil. dol.	Percent	Mil. dol.	Percent	Mil. dol.	Percent	Mil. dol.	Percent
Coupons	154	6	223	8	350	10	490	11	546	11
Electronic	832	32	1,002	35	1,425	40	1,821	41	2,099	41
Printed	662	24	675	24	915	25	1,124	25	1,252	24
Premiums	1,048	39	887	31	835	24	1,057	24	1,219	24
Total	2,650	100	2,787	100	3,525	100	4,492	100	5,116	100

expenditures in 1970, to 8 percent in recent years. Trading stamps are given by some retailers on all products purchased, both brand and private label, to entice shoppers into a particular store and to build store loyalty. Coupons, particularly double couponing, appear to have replaced trading stamps. Since coupons are brand specific, they create brand loyalty rather than store loyalty.

Coupon redemption growth has not kept pace with the rate of growth in numbers of coupons distributed. Coupon redemptions doubled from 2 billion to 4 billion between 1974 and 1979, whereas distribution almost tripled resulting in a slight decline in the percent of coupons redeemed (redemption rate). In 1980, 1 of every 20 coupons was redeemed, compared with 1 out of 16 in 1974. This decline, however, is not significant in view of the rapid growth in distribution.

#### Manufacturer Coupon Redemption By Product

Coupons increase sales of their products relative to products without coupons because they lower prices for consumers, and the advertising accompanying them increases consumers' awareness about the product. Assessing the overall impacts of coupons on food system performance requires estimating the probable impact of coupons on the types of food that consumers are encouraged to buy.

There is no public information on coupon redemption or specific products. To overcome this lack of information, ERS conducted a survey of manufacturers' coupons received by a large grocery chain serving the Washington, D.C. and Baltimore, Md. areas. The 16,329 coupons counted and categorized amounted to about 2.5 percent of the coupons redeemed by the chain during the week of November 2-10, 1980. Here are the findings:

*Food Redemptions.* About 3 out of 5 of the coupons redeemed in these grocery stores were for food. The leading couponed food items were coffee, prepared foods, break-

**Table 2. Consumer Redemption of Manufacturers' Coupons, by Product, November 1980**

Product	Percentage of total coupons redeemed	Percentage of total value of all coupons	Average face value per coupons
	Percent	Percent	cents
Beverages			
Soft drinks	1.7	1.8	24.2
Coffee, tea, cocoa	6.7	13.1	45.6
Milk products (except ice cream)			
Milk, butter, cheese	2.9	2.0	16.3
Meat, fish, poultry, eggs			
unprocessed (fresh)	0.2	0.5	65.8
Canned & processed	4.5	4.9	24.8
Fruits & vegetables			
unprocessed (fresh)	0.2	0.3	28.5
Canned & frozen-(includes orange juice etc.)	3.9	2.9	17.8
Cereal & bakery products			
Bread & rolls	3.5	2.6	17.2
Cookies, crackers, chips & snacks	2.5	1.8	16.7
Breakfast cereal	9.9	6.9	15.9
Flour & Flour mixes	3.3	5.0	36.2
Rice, pasta	1.4	0.9	14.8
Sugar & sweets			
Sugar, syrup, jellies	1.2	0.7	14.7
Ice cream, dessert, candy	3.4	3.0	21.2
Soups, baby foods, prepared meals (NEC)	9.6	10.6	26.2
Seasonings & dressings			
Seasonings & spices	1.9	1.2	26.2
Oils & salad dressing	4.0	2.7	16.0
Food total	60.9	61.1	23.5
Tobacco	0.8	2.3	62.1
Pet food	7.8	9.3	28.1
Household supplies <sup>1</sup>	12.8	11.6	21.4
General merchandise <sup>2</sup>	17.3	15.7	21.4
Nonfood total	39.1	38.9	23.7
Total	100.0	100.0	23.5

<sup>1</sup>Include bags, wrap, cleaning supplies.

<sup>2</sup>Chairs, dishes, motor oils, toiletries, toothpaste, etc.

**Table 3. Manufacturer's Couponing Intensity Ratio for Food Products**

Item	Percent of total value of all coupons redeemed for food items	Estimated allocations of family food at home dollar	Manufacturer couponing intensity ratio
	Percent		
Beverages:			
Soft drinks	2.9	7.7	0.38
Coffee, tea, cocoa	21.4	3.7	5.78
Milk, butter, cheese	3.3	11.6	.28
Meat, fish, poultry, eggs:			
Not processed (fresh)	0.8	26.0	.03
Canned and processed	8.0	8.8	.90
Fruits and vegetables:			
Not processed (fresh)	0.5	6.7	.08
Canned and frozen (includes orange juices etc.)	4.7	7.4	.064
Cereal and bakery product:			
Bread and rolls	4.3	4.9	.88
cookies, crackers, chips & snacks	2.9	3.3	.88
Breakfast cereal	11.3	1.4	8.07
Flour and flour mixes	8.2	0.9	9.11
Rice, pasta	1.5	1.0	1.50
Sugar and sweets:			
Sugar, syrup, jellies	1.1	0.9	1.20
Ice cream, dessert, candy	4.9	5.8	1.20
Soups baby foods, prepared meals (NEC)	9.6	10.6	.88
Seasonings and dressings:			
Seasonings and spices	2.0	2.2	3.68
Oils and salad dressing	4.4	2.9	0.90
Total	100.0	100.0	1.52

Source: ERS survey.

Couponing's Growth in Food Marketing by Anthony E. Gallo, Larry G. Hamm, and James A. Zellner is available for \$3.25 by writing to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Ask for AER-486.

fast cereals, and cake mixes (see table 2). Together, these items accounted for about 60 percent of the value of coupons on food items, but only 10 percent of the consumer food budget.

Table 3 contains the breakdown of redeemed food coupons. Coffee, and a small amount of tea and cocoa, accounted for about 20 percent of the total value of coupons redeemed for food, about a tenth of the number of coupons redeemed. Soups, baby foods, and prepared meals accounted for about a sixth of both the value and number of coupons redeemed. Breakfast cereals also accounted for a sixth of coupon numbers, but only 11 percent of the total value of coupons redeemed for food because of the generally lower face values for cereal coupons.

The uneven distribution of couponing value by food category is even greater when the coupon distribution is adjusted for consumer food expenditure patterns. Table 3 lists the manufacturers' coupon redemption intensity (CRI) ratio for each product group. The CRI ratio is the percent of total value of redeemed coupons for each group divided by an estimated percent of a typical family's at-home food budget allocated for that product group.

The CRI ratio indicates the proportional importance of coupons. Coffee, tea, and cocoa, for instance, account for about 21 percent of the value of food coupons redeemed, yet they account for only about 3.5 percent of the consumers' food budget. Therefore, the CRI ratio is 5.8, which is quite high. A ratio of less than 1 indicates that value of coupons redeemed is less than the item's importance in the family's food budget.

For perishable and unbranded items such as fresh meat and produce, the CRI ratio is quite low—less than 0.10. But for breakfast cereals and cake mixes, the ratio is high—8 and 9, respectively. The CRI for soups, baby foods, and prepared foods is 3.7. Rice and pasta, sugar products, and salad oils also have a ratio greater than 1. Most other food items have a CRI less than 1.

Coupon redemption is unevenly divided among grocery products. Varying distribution rates, face values, and marketing strat-

egies for different product groups account for this distribution. This research shows that through coupons, consumers receive price reductions on food products that may be characterized as highly processed and differentiated.

Highly couponed foods also tend to be the most highly advertised in television and radio, magazines, Sunday supplements, and billboards. Coffee, prepared foods, breakfast cereals, ice cream, candy and desserts, and soft drinks account for the bulk of advertising in these media. With the exception of soft drinks, these foods are some of the most heavily couponed items.

The study found a strong correlation between the amounts of couponing and media advertising. When food items that are mainly delivered directly to stores by manufacturers are excluded, the correlation becomes even stronger. Direct store delivery may reduce the need to coordinate the use of advertising and couponing because manufacturers' sales forces have more direct access to retailers' shelves.

**Nonfood Redemptions.** Nonfood items, such as household supplies (bags, wrapping paper, and cleaning supplies), pet food, tobacco, and general merchandise, including health and beauty aids and school supplies, accounted for about 39 percent of coupons redeemed. An estimate of nonfood sales by this grocery chain is not available, but grocery chains' nonfood sales nationally are about 15 percent of total store sales. This percentage suggests that the rate of coupon redemption for nonfood items in grocery stores is about three times their relative importance in the total sales picture.

Pet foods have a disproportionately high share of coupon use. They usually account for about 2 percent of store sales, yet account for nearly 8 percent of coupons redeemed and 10 percent of their value. Household supplies and general merchandise account for an additional 30 percent of the value of redeemed coupons.

#### Retailer In-Ad Coupons

Retailer coupons that are part of store advertisements are a separate couponing

system. Retailers use coupons to promote their own private label products, produce, and fresh meat items. Retailer coupons that are printed inside a store's newspaper ads (called in-ad coupons), are also used to promote manufacturers' brand items. Manufacturers usually provided compensation, and, in some cases, advertising formats to retailers. Most often, manufacturers offer these in-ad coupons as part of an overall wholesale price reduction to retailers and as a major advertising campaign to attract shoppers.

In-ad coupons differ from manufacturers' coupons in that the retailer, not the manufacturer, offers the coupons, and the retailer does not get a handling fee for them. In addition, in-ad coupons are redeemable at only one store or chain of stores, and have a short redemption period, usually 1 week.

Because there are no handling fees and the coupons are offered for a limited time, these coupons do not flow through the normal handling channels. Consequently, little is known about retailer in-ad coupons. To obtain information about in-ad coupons, ERS surveyed 50 cities for 4 weeks in 1980 (see table 4).

Over the sample period, around 68 percent of in-ad coupons were for food items. The leading food categories—soups, baby and prepared foods, oils and salad dressings, canned fish, coffee, ice cream, candy and desserts, soft drinks, and processed fruits and vegetables—accounted for about 60 percent of the food retailer in-ad coupons. General supplies comprised the largest portion of the nonfood category—16 percent. The second largest nonfood category, accounting for 13 percent of all coupons redeemed, was household supplies, which are products normally sold in grocery stores.

#### Coupons and Consumers

The total expenditures (handling costs plus the face value) for manufacturers' coupons—\$1.3 billion—accounted for about 0.3 percent of total consumer expenditures

in 1980. There are relatively few coupons issued for larger items in the family food budget such as fresh meats, poultry, fish, eggs, and produce (see tables 2 and 3). Most coupons are for more highly processed foods and nonfoods.

The rapid growth of coupons indicates that they have achieved wide consumer acceptance. A 1977 ERS survey found that four out of every five households used coupons; other surveys taken since have shown about the same portion.

Widespread consumer acceptance of manufacturers' coupons is rooted in several factors. The sharp rise in the distribution of coupons, increasing their availability, has certainly increased redemption. But higher distribution would not necessarily result in more consumer use if consumers did not find coupons attractive.

Rapidly rising retail food prices, doubling between 1971 and 1979, also have led to more consumers using coupons to reduce food costs. The average face value of coupons increased during that period by two-thirds which, although less than price increases, nevertheless represents a price reduction to users.

Do nonusers subsidize users of coupons? Yes, because nonusers pay the printing, distributing, and handling costs of coupons without benefiting from their discounts. In the ERS sample, the nonuser would forego the average face value of the coupon, 23.5 cents. But in addition to this face value, the nonuser has saved the issuer 8.5 cents a coupon in handling cost.

The amount of nonuser subsidy, however, may be small or nonexistent. Coupons represent a minor portion of the overall food advertising and promotion bill. Likewise, in the absence of coupons, manufacturers might not correspondingly lower prices. Manufacturers could allocate coupon costs to more electronic printed, or premium promotion.

The 10 cents or 20 cents saved by using a coupon must be balanced against the time used to clip, sort, and remember to bring the coupon to the stores. For many nonusers, the cost of their time does not exceed the net benefits they could receive by redeeming coupons.



The net impact of manufacturers' coupons on consumers is difficult to judge. Such a judgment requires putting monetary values on such things as the consumers' time; the value to society of new and innovative food products which might not get consumer distribution without extensive use of coupons; and the biasing of consumer choice toward couponed products. The availability of retailer private label products, which do not carry coupon administrative costs, gives consumers some choice about whether they want to pay for the coupon system. There is no hard evidence that food prices would drop in the absence

of coupons because manufacturers could shift to other types of advertising.

#### Demographics of Coupon Use

Lower income Americans use coupons less frequently than other income groups. There are several possible reasons—they consume fewer products that offer coupons; they have access to fewer coupons; they are not aware of the possible savings; or feel the transactions are too complicated.

USDA data suggest expenditures per person for the leading couponed products are about the same for all income groups.

However, according to the Bureau of Labor Statistics, lower income consumers spend significantly less for reading materials. This is significant because 90 percent of coupons are distributed through newspapers and magazines. Also, companies that specialize in direct mail coupons tailor their lists to middle and upper middle income groups with large families. ■

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**Table 4. Percentage of Retailer's In-Ad Coupon Offers Redeemed in 50 Major Markets, 4 Selected Weeks, 1980<sup>1</sup>**

Coupons	Number				
	1,528	1,722	1,833	1,670	1,688
	Percent				
Breakfast cereals	4.0	3.1	2.6	3.4	
Flour mix products	6.2	1.8	3.8	5.0	4.1
Ice cream, candy, desserts	3.6	4.5	4.2	5.0	4.4
Oils and salad dressings	3.9	5.6	7.2	5.2	6.0
Soups, baby, and prepared foods	7.1	6.2	7.3	7.6	7.1
Soft drinks and noncarbonated beverages	2.8	8.8	10.2	4.9	6.9
Seasonings and spices	2.2	2.2	2.2	1.8	2.1
Cookies, crackers, chips, and snacks	3.5	3.0	4.3	3.3	3.6
Coffee, tea, cocoa	6.6	5.1	7.1	6.9	6.4
Sugar, sirup, jellies	2.0	1.9	1.7	2.4	2.0
Bread and rolls	2.2	3.3	2.3	2.2	2.5
Rice and pasta	0.9	0.6	0.3	1.0	0.7
Canned and processed meat, poultry fish	7.1	7.8	6.4	6.5	7.0
Milk, butter, cheese	3.1	1.6	2.7	2.0	2.4
Processed fruits and vegetables	6.5	7.3	4.2	4.7	5.7
Fresh fruit and vegetables	2.5	2.4	1.9	1.7	2.1
Unprocessed meat, poultry, fish	1.8	3.3	0.8	1.4	1.7
Total food	68.1	68.8	71.1	64.3	68.2
Pet food	1.1	3.3	1.9	2.8	2.3
Tobacco	.1	—	—	—	—
Household supplies	14.9	11.9	13.3	12.6	13.1
General supplies	15.8	16.0	13.7	20.3	16.4
Total Nonfood	31.9	31.2	28.9	35.7	31.8
Total	100.0	100.0	100.0	100.0	100.0

<sup>1</sup>ERS Survey of in-ad coupons in newspapers.

# The Changing Food Mix in the Nation's Schools

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**F**ood service in the Nation's elementary and secondary schools represents a substantial outlet for agricultural products. In 1980, approximately 4.4 billion school lunches were served, about 70 percent more than in 1963. This increase was due primarily to regulatory changes which made it easier for schools and students to participate in programs administered by USDA's Food and Nutrition Service under the National School Lunch and Child Nutrition Acts.

Though school district consolidation led to an 11.4-percent decrease in the number of schools nationwide between 1963 and 1980, the number of schools participating in the National School Lunch Program (NSLP) increased 35 percent. By 1980, over 80 percent of all U.S. schools participated in the NSLP, up from only 53 percent in 1963. This upward trend was even more pronounced in terms of student participation, which increased 65 percent while student enrollment grew only 5.5 percent. And, 57 percent of the Nation's school children participated in the NSLP in 1980, up from only 36 percent in 1963.

These increases in the rates of participation were, to a large extent, related to changes in Federal program regulations which encouraged schools and students, particularly those in low-income areas, to participate in the NSLP and the School Breakfast Program. Following are some of the more important program changes in this period.

- The Child Nutrition Act of 1966 provided nonfood assistance (equipment, etc.) to help schools serving low-income areas establish, maintain, and expand foodservice programs. The Act established the School Breakfast Program and permitted additional remuneration to schools classified as "severe need" in that program. More than 600 million school breakfasts were served in 1980; approximately 85 percent of these meals were served free or at a reduced price.

- A 1970 law required school districts that participated in the NSLP to serve free or reduced-price lunches to all children from families with incomes at or below the federally defined poverty level, thereby, converting the school lunch program into an entitlement. For reduced-price meals,

schools could charge a maximum of 20 cents—a figure that did not change until the 1981-82 school year when it increased to 40 cents.

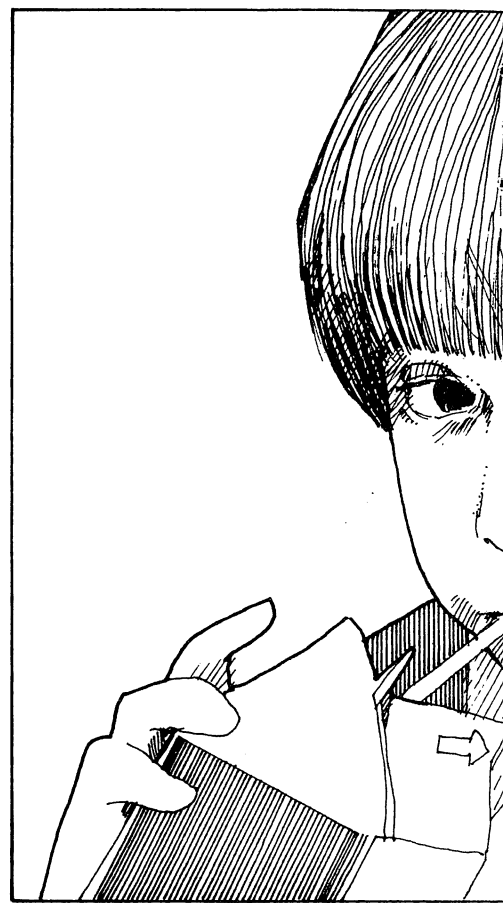
- A 1972 law set a separate income eligibility standard for reduced-price lunches of up to 125 percent of poverty. The income cut-off points were later raised to highs of 125 percent and 195 percent of poverty for free and reduced-price lunches, respectively, further increasing the number of eligible students.

- The same 1972 law also changed the basis for Federal NSLP funding from grant-in-aid to performance, based on the number of meals served; this prompted States to step up outreach efforts.

The big increase in participation among students from low-income families occurred in the early 1970's. The proportion of school lunches served free or at a reduced price was 10 percent in 1963, 40 percent in 1975, 45 percent in 1980, and 49 percent in 1981. The number of such meals in 1981 was up 700 percent from 1963. By 1981, 41 percent of all school lunches were served free and 8 percent at a reduced price.

The funding based on performance amendment in 1972 provided funds on a sliding scale that enabled schools to offer subsidized meals to all children. Schools received \$1.13 from USDA for each free lunch they served in 1980; 95 cents for each reduced-price lunch; and 29.5 cents for each full-price lunch. The Federal subsidies for school lunches were \$3.1 billion in 1980, up from only \$576 million in 1970.

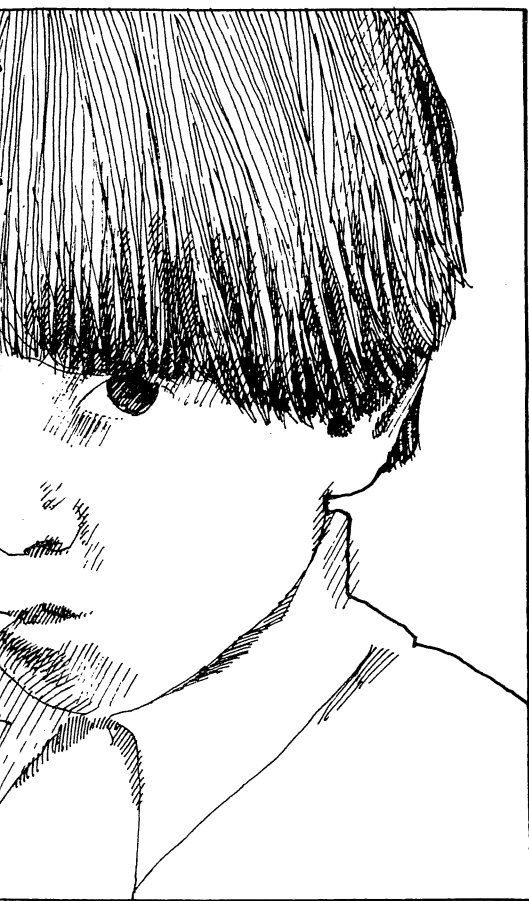
In addition to inducing higher rates of participation, these program changes also affected the distribution of meal costs. Whereas the cost per lunch, including the value of donated commodities, increased an estimated 127 percent between 1963 and 1980, the Federal input rose more than 300 percent. State and local payments increased 152 percent. Despite a rise in the average price of full-priced lunches, the overall contribution from children, relative to the total cost, actually declined due to the substantially higher number of free and reduced-price meals.



## Trends in Food Use

Growth in the school market has probably equaled or surpassed that of other segments of the foodservice industry, except for fast foods. Unlike the limited menus at fast food places, however, the variety of food served in the Nation's schools encompasses nearly every food produced on American farms.

After adjusting for inflation, the real value of purchased and donated foods received by schools increased 36 percent between 1962-63 and 1974-75, the most recent period for which detailed product information is available. A significant increase in the quantity of food, the use of more processed, relatively expensive foods, and heavier demand for convenience foods explain the substantial rise in the real value of food received. In 1975, schools received significantly greater quantities of high-unit-cost foods such as beef, prepared foods, and



sweet baked goods. Use of milk, eggs, and bread as a proportion of all food declined. In recent years, a few school districts have been experimenting with menus that use minimally processed or natural foods and complementary protein dishes (see "Natural Twist to the School Lunch Program" in this issue).

The total quantity of food received by schools in 1975 was 8.1 billion pounds, up 35 percent from 1963. Essentially, the school market required more food because of increases in school and student participation in the NSLP. However, students in 1975 also were served 17 percent more, on a per pupil basis, than their counterparts in 1963. The primary reason for the quantity-per-pupil increase was the aging of the school population. By 1975, the baby boom children born in the late fifties and early sixties created a population bulge in secondary schools where the recommended serving

sizes are larger. Enrollment in elementary schools decreased 3 percent between 1963 and 1975, whereas the secondary school population increased 26 percent.

#### Dairy Products

The quantity and real value of dairy products (excluding butter) delivered to the Nation's schools rose 28 percent and 29 percent, respectively, between 1963 and 1975. A rise in the number of students participating in school feeding programs as well as an 11-percent increase in the quantity of dairy foods available per pupil, from 98 pounds to 109 pounds, largely accounted for the increased value. Double servings of milk were permitted with free or reduced-price meals during this period. Students who paid full price for a meal could buy additional milk for a nominal charge. Since the median age of the school population increased between survey years, more students (particularly teenage males) may have consumed double servings in 1975.

Nevertheless, the dairy group's share of the school food market actually declined over the 12-year period. The quantity of dairy foods as a proportion of the quantity of all food in the school market dropped from 50.5 to 47.9 percent. With very high growth rates in the 1950's, the dairy group constituted one-half of the market by 1963. With such a large share of the market, its subsequent slower than average rate of growth was not unexpected.

Dairy foods accounted for 32 cents out of every dollar's worth of food used in the Nation's schools in 1975; fluid milk alone accounted for 25 cents. Cheese accounted for 4 cents out of every dollar spent, ice cream for 2 cents, and nonfat dry milk for 1 cent. Use of cheese more than doubled between 1963 and 1975 because of the popularity of menu items such as pizza, cheeseburgers, and submarine sandwiches. The Federal Government donated 85 percent of the cheese used by schools in both survey years.

A one-half print serving of fluid milk is one of the requirements for a meal served under the NSLP. Among common foods,

milk and cheese are the richest sources of calcium. Data from the Health and Human Services Department's Health and Nutrition Examination Survey suggest that the calcium intakes of students who participate in at least one school feeding program typically exceed 100 percent of the Recommended Dietary Allowance (RDA) appropriate to the age of the child.

This is significant in light of data from USDA's 1977 Nationwide Food Consumption Survey (NFCS) which show that average calcium intakes for both sexes in the school-age population, except children aged 6-8 years, fall below their respective calcium RDA. The overriding implication of these two findings is that the diets of most children who do not regularly eat a school meal are woefully deficient in calcium. The NFCS data also show that soft drink consumption among children and teenagers has increased considerably.

#### Meat, Poultry, and Fish

The amount of meat, poultry, and fish used by schools increased about 60 percent between 1963 and 1975; per pupil consumption rose nearly 40 percent. Use of beef, particularly ground beef, and lunchmeats more than doubled. The quantity of federally donated ground beef increased more than 600 percent between survey years, and constituted 81 percent of the total supply in 1975 compared with 23 percent in 1963. Hamburger is popular, versatile, and easily handled in large quantities.

The marked increase in the use of lunchmeats was also largely due to Federal donations which accounted for nearly 40 percent of the total in 1975; little, if any, lunchmeat was donated in 1963. Lunchmeat menu items such as hot dogs and submarine and bologna sandwiches are popular with children and easily handled by schools with limited foodservice facilities. Use of seafood and poultry increased 38 percent and 22 percent, respectively. Use of pork, veal, and lamb declined.

The meat-poultry-fish group, with an estimated value of \$567 million in 1975, ranked as the second most expensive food group—behind dairy products—in the school market; it accounted for 22 cents out

**Table 1. Quality and Value of Food Delivered to Schools, 1962-63 and 1974-75**

Kind of Food	Quantity						Value			
	Total			Per Pupil <sup>1</sup>			Percent of all food		Percent of all food	
	1963	1975	Percent change	1963	1975	Percent change	1963	1975	1963	1975
	Mil. lbs.			lbs.						
All food	6004.5	8105.4	35.0%	194.4	227.5	17.0%	100.0%	100.0%	100.0%	100.0%
Dairy products	3032.3	3886.1	28.2	98.2	109.0	11.0	50.5	47.9	36.8	31.9
Fluid milk	2860.5	3583.2	23.5	92.6	100.5	8.5	47.6	44.2	30.9	25.0
Cheese	61.2	131.2	114.4	2.0	3.7	85.0	1.0	1.6	2.4	3.7
Ice cream	81.0	88.2	9.0	2.6	2.5	-3.8	1.3	1.1	2.9	2.0
Nonfat dry milk	24.6	31.0	26.0	.8	.9	12.5	.4	.4	.5	.7
Meat, poultry, fish	481.2	773.7	60.8	15.6	21.7	39.1	8.0	9.5	21.2	21.9
Beef	168.8	368.5	118.3	5.4	10.4	92.6	2.8	4.5	8.0	10.7
Poultry	136.4	166.3	21.9	4.4	4.6	4.5	2.2	2.0	4.3	3.8
Lunchmeats	58.3	118.9	103.9	1.9	3.3	73.6	.9	1.4	2.6	3.3
Seafood	48.4	66.9	38.2	1.6	1.9	18.8	.8	.8	2.3	2.2
Pork	65.1	51.3	-21.2	2.1	1.4	-33.3	1.1	.6	3.6	1.7
Veal, lamb	4.1	1.7	-58.5	.1	—	NA	—	—	.3	.1
Fruits and vegetables	1321.6	1674.9	26.7	42.8	47.0	9.8	22.0	20.7	16.0	18.4
Vegetables	626.7	780.8	24.6	20.3	21.8	7.4	10.4	9.6	7.7	8.1
Fruits	407.8	564.3	38.4	13.2	15.9	20.5	6.8	7.0	5.8	6.3
Potatoes, sweet potatoes	287.1	329.8	14.9	9.3	9.3	—	4.8	4.1	2.5	4.0
Prepared foods	39.7	340.5	757.7	1.3	9.5	630.8	.7	4.2	.6	7.2
Bakery products	313.7	431.0	37.4	10.2	12.1	18.6	5.2	5.3	6.9	6.6
Bread	164.8	138.2	-16.1	5.3	3.9	-26.4	2.7	1.7	2.6	1.5
Other bakery items	148.9	292.8	96.6	4.9	8.2	67.3	2.5	3.6	4.3	5.1
Fats and oils	159.8	167.0	4.5	5.2	4.7	-9.6	2.7	2.1	7.0	3.3
Sugars and sweets	157.8	147.7	-6.4	5.1	4.1	-19.6	2.6	1.8	4.5	3.0
Grains and cereals	230.6	264.4	14.7	7.5	7.4	-1.3	3.8	3.3	2.6	2.4
Condiments seasonings	66.9	110.3	64.8	2.2	3.1	40.9	1.1	1.3	1.2	1.4
Juices, ades, drinks	41.8	158.1	278.2	1.4	4.4	214.3	.7	2.0	.2	1.4
Eggs	56.5	33.8	-40.2	1.8	.9	-50.0	.9	.4	1.6	.7
Peanut butter	16.1	32.8	103.7	.5	.9	80.0	.3	.4	.6	.6
Coffee, tea, cocoa	49.0	29.7	-39.4	1.6	.8	-50.0	.8	.4	.8	.5
Soups	27.1	44.5	64.2	.9	1.3	44.4	.5	.5	.5	.4

— = Less than 0.05 percent.

NA = Not ascertained.

<sup>1</sup>Data based on average daily attendance.



of every dollar spent. Ground beef (41 percent of total quantity), poultry (21 percent), and lunchmeats (15 percent) were the three leading constituents of the meat-poultry-fish group in terms of quantity and value.

### Fruits and Vegetables

The fruit and vegetable group ranked second in importance in terms of quantity and third in terms of value in both survey years. In 1975, per pupil consumption of fruits and vegetables was 47 pounds.

The fruit and vegetables group's share of the market in terms of quantity fell between 1963 and 1975; in particular, the quantity of

potatoes and other vegetables relative to that of all food declined. However, a shift to higher priced, processed potato products, an increase in the use of fresh (up 60 percent) and frozen (up 300 percent) vegetables as well as a significant jump in fruit consumption raised the group's share of the food dollar from 16.0 cents in 1963 to 18.4 cents in 1975.

The total quantity of fruit and consumption per pupil rose 40 percent and 20 percent, respectively, possibly due to increasing emphasis on the use of vitamin A and C foods. The mix of fruit changed—fresh fruit doubled in quantity; fresh citrus tripled;

and canned fruit increased a modest 14 percent. Per pupil consumption of canned fruit actually declined between survey years; nevertheless, canned fruit constituted 61 percent of the overall fruit supply. In 1975, the Federal Government donated only half as much canned fruit as it did in 1963.

### Prepared Foods

The relative importance of fully prepared foods in the school market increased significantly between 1963 and 1975, a reflection of the national trend toward purchase of convenience. The prepared foods group, which ranked fourteenth in terms of quantity and twelfth in value among food groups in 1963, jumped to fifth and fourth positions, respectively, by 1975.

The most popular prepared foods, listed in descending order by quantity in million pounds, were: pizza (44.9 million pounds); meat, poultry, and seafood items such as meatloaf, fried chicken, and breaded fish (43.3); baked beans (39.2); meat and pasta combination (39.2); meat mixtures such as chili, sloppy joes, barbecue, and stew (33.6); vegetable salads such as coleslaw and potato salad (23.8); burgers (17.3); hot dogs (15.9); tortillas and tacos (14.7); and cold meat sandwiches such as submarines (11.5). These foods were fully prepared or assembled before delivery to schools.

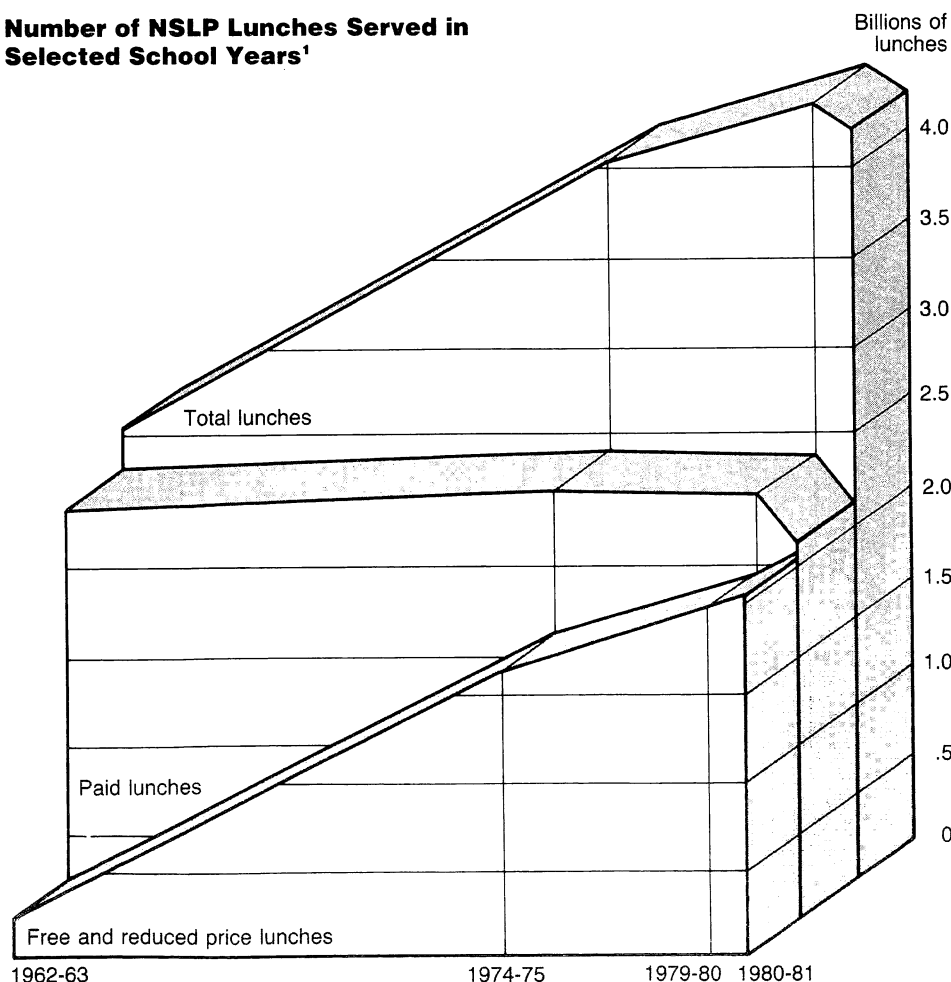
### Bakery Products

Per-pupil consumption of bakery products was 12.1 pounds in 1975, up 19 percent from 1963. Per capita consumption of bread, the principal bakery item in 1963, declined by more than 25 percent between survey years. In 1975, rolls and buns for hamburgers, hot dogs, and submarines were more popular. Use of sweet baked goods—cakes, pies, doughnuts, brownies, and cookies—more than tripled.

### Sugars and Sweets

The schools received 4.1 pounds per student of sugars and sweets in 1975, down 20 percent from 1963. With the 1974 jump in sugar prices, the amount of refined sugar (the major item in this group) dropped 10 percent per student; increased use of corn syrup and molasses only partially offset the

**Number of NSLP Lunches Served in Selected School Years<sup>1</sup>**



<sup>1</sup>Data includes U.S. territories and excludes day care facilities and nursery schools.

# A Natural Twist to the School Lunch Program

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decline. High sugar prices also led to a significant decline in use of jellies, candies, and miscellaneous sweets.

The survey data do not permit an accurate assessment of overall change in student consumption of refined and processed sugars. Declines in use of sugar/sweets and canned fruit (usually packed in heavy syrup), on a per pupil basis, were countered by a three-fold rise in consumption of sweet baked goods and a significant increase in use of sugared fruit drinks and ades.

## Fats and Oils

Per pupil consumption of fats and oils, including butter, declined 10 percent between survey years. Substitution of margarine for butter was a major reason for the significant decline in the relative value of the fats and oils group from 7 cents of every dollar's worth of food in 1963 to only 3 cents in 1975. Per pupil consumption of butter and shortening/lard declined 52 percent and 42 percent, respectively. Use of salad and cooking oils and salad dressings increased significantly because of rising consumption of french fries, batter-fried fish, green salads, and so forth.

## Grains and Cereals

With only a 15-percent increase in the quantity of grain and cereal products going to schools, per capita consumption in 1975 was down slightly from 1963. Per pupil consumption of rice declined 50 percent, while spaghetti and noodle consumption rose nearly 40 percent.

## Beverages and Miscellaneous Foods

Beverages and miscellaneous foods such as condiments, eggs, peanut butter, and soups did not comprise a large part of the school market as individual items, but had an aggregate value of over \$139 million in 1975.

Per pupil consumption of condiments and seasonings—mainly, catsup, pickles, salt, mustard, relish, and barbecue sauces—was 3.1 pounds in 1975, up 41 percent from 1963.

Per pupil consumption of juices, ades,

and drinks more than tripled between survey years. Use of citrus juices quadrupled, while per pupil consumption of noncitrus juices actually declined 15 percent. In 1975, the Federal Government donated about 45 percent of the juice. Little, if any, was donated in 1963. Fruit drinks and punches constituted over 25 percent of the juice-ade-drink group in 1975.

Use of peanut butter doubled between 1963 and 1975, while use of eggs declined by 40 percent. Soup consumption was up considerably. Coffee, tea, and cocoa consumption was down; these products were received by schools but were not part of the NSLP's meal pattern.

## Conclusions

Emphasis under school lunch and other child feeding programs now has a nutritional focus, although market support for food surpluses remains an important feature. Changes in regulations in support of the primary program focus apparently have been successful in increasing school and student participation between 1963 and 1980 and increasing total quantity and value of foods used by schools. More recent changes in program regulations and direction, including those in the Omnibus Reconciliation Act of 1981, will bring further shifts in the size and nature of the market for food in schools—an area for further study. ■

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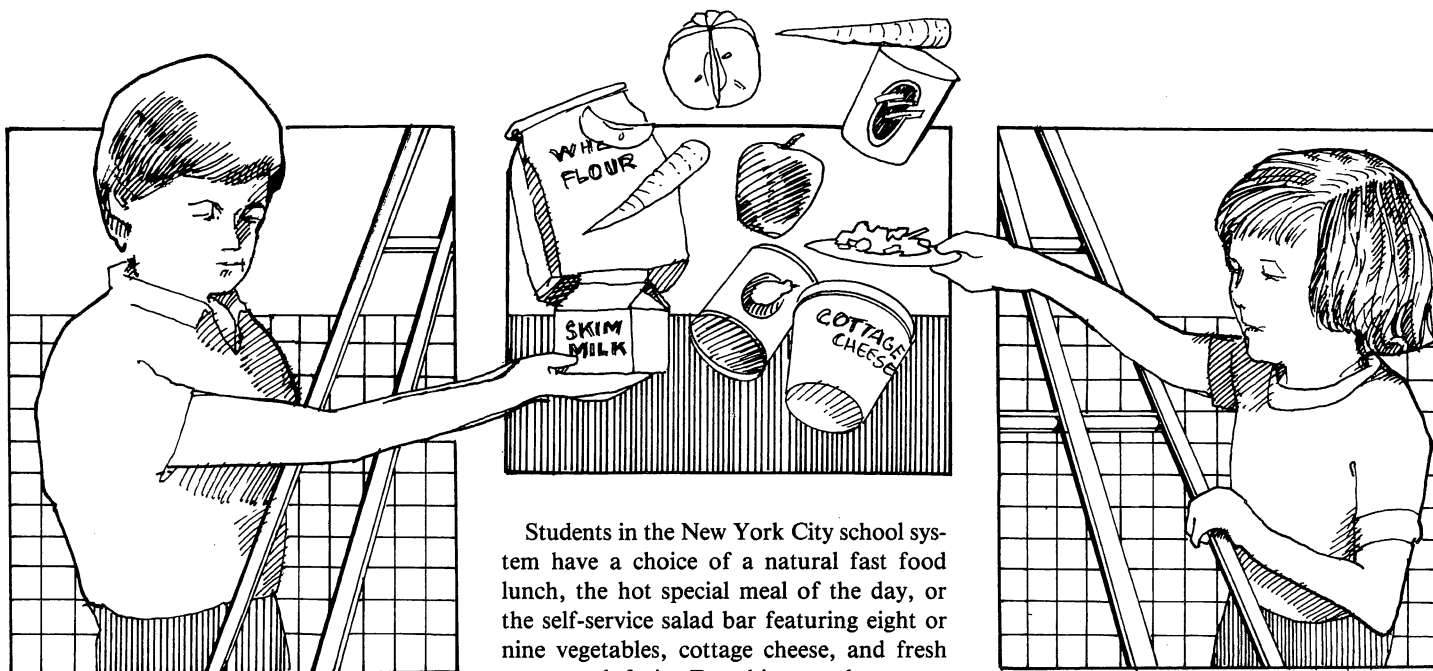
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Natural foods—that are minimally processed and contain no artificial preservatives or additives—are inching their way from specialty stores to supermarkets and into school lunch programs.

As knowledge about the relationship of diet to health grows, more emphasis is being placed on using natural, additive-free foods in the school lunch program. The National School Lunch Program (NSLP), developed in 1947, traditionally consisted of a meal prepared from the four basic food groups. At that time, there were fewer concerns about additives, preservatives, and synthetic chemicals; and little or no emphasis was placed on restricting the levels of fats and sugars. But in 1980, USDA's Food and Nutrition Service (FNS), the agency responsible for administering the program, made a significant change in the guidelines of the NSLP.

Using nutrition research compiled over the last decade, FNS officials rewrote the guidelines to reduce the levels of starch, sugar, and fat in school lunches (see figure 1). To vary the types of starches in students' diets, schools were encouraged not to serve bread at every meal, but to offer bread-alternates such as enriched or whole-grain rice, macaroni, noodles, and other pasta products, as well as cereals such as bulgar and corn-grits. For fats, the guidelines encouraged schools to serve lowfat milk, skim milk, or buttermilk in addition to whole milk and flavored milks. Schools which do not offer a choice of foods were encouraged not to serve meat (ground, diced, pieces) more than three times per week.

More recently, legislation has been introduced in Congress that would amend the National School Lunch Act and set up new guidelines for nutritionally superior lunches. The guidelines would require: reducing salt, fat, and sugar levels in foods; serving unflavored, low-fat milk; at least 2 ounces of meat, poultry, or fish, or the nutritional equivalent of these in cheese, legumes, or a combination (1½ ounces for children under 8 years); two or more vegetables or a salad or both; whole-grain breads and pasta; fresh fruit or canned fruit packed in water or any other desert that does not contain refined sugar.



Students in the New York City school system have a choice of a natural fast food lunch, the hot special meal of the day, or the self-service salad bar featuring eight or nine vegetables, cottage cheese, and fresh or canned fruit. For this, an elementary school student pays 60 cents and the Federal Government reimburses the school system \$1.09 plus about 11 cents worth of donated commodities. Junior and senior high school students pay about 72 cents.

All school systems must comply with government regulations in order to qualify for Federal funding. And, the new guidelines add more variety to school lunches for about the same expenditure. Protein requirements, once strictly fulfilled only by meat, fish, and eggs, now allow a mixture of meat with 30 percent textured vegetable protein, such as soybean flour, to fulfill the protein requirement. Complementary protein meals (see figure 2) can fulfill the protein requirements without meat, poultry, or fish.

In 1981, USDA and the New York State Education Department granted funds to New York City to conduct complementary protein projects in 17 elementary, junior high, and high schools. USDA's Nutrition, Education, and Training Program (NET) provides funds for nutrition education materials and activities. NET also provides funds for training teachers and food service personnel. The protein projects includes four to six menu variations such as minestrone soup, brown rice pudding, and vegetarian chili served in a taco. Due to its success, this project will expand to 40 other New York City schools when the funds become available.

But, changes in school lunch programs have also occurred on State and local levels. The most innovative change was made in New York City in 1977, by school food program administrator Elizabeth Cagen. Cagen promoted making meals from scratch, as much as possible, and using USDA-donated commodities to do so. And, she was successful in getting donated commodities such as unbleached, enriched, or whole wheat flour and brown rice to meet the needs of a natural diet.

The New York City program also restricts the use of sugar. All fruits used are canned either in light syrup or in their own juices. Cakes and ice cream have 33 percent and 50 percent less sugar, respectively, than they did a decade ago. Cookies are prepared with minimal sugar and salt content. No artificial flavors, colors, or monosodium glutamate are allowed in the New York City lunches. Producers were found who would make gelatin with natural coloring and reduced sweeteners and provide soup bases without monosodium glutamate.

To entice more children to eat school lunches and also to reduce waste in the lunches that are purchased by students, the New York City school system also features low fat, low salt, and low sugar versions of fast food—fried chicken, french fries, hamburgers, and cheeseburgers on buns made from unbleached flour.

The Nutra Breakfast and Lunch Program was introduced in 1976 into the Fulton County Schools, which include schools in Atlanta, Ga. The program features whole foods, low in fat, sugar, and salt with no artificial coloring, additives, and preservatives or refined carbohydrates. Breads are freshly baked, using unbleached whole wheat and soy flours. Natural sweeteners such as honey, molasses, raisins, carob, and dried fruits are used in cakes and cookies. Raw vegetables and fresh fruit are served. Kindergarteners are also served nutritious snacks such as raw carrot sticks with dip.

The Nutra Lunch Program has been the basis for other such nutrition education programs in schools in other parts of the country. For example, schools in Crystal Lake, Ill. have eliminated refined sugar, refined flours, and commercially prepared bakery goods which contain preservatives and other additives. Also eliminated are prepared meats and hot dogs, that contain additives and preservatives, and foods containing high saturated fats and all foods with artificial additives and flavorings. Breakfast cereals with high sugar content and candy are no longer served. Instead, honey and pure maple syrup are used in place of refined sugars; whole grain flours are used in bakery goods; and carob is substituted for chocolate.

The Crystal Lake lunch program also

serves yogurt and 2-percent butterfat milk, brown rice and wheat germ, whole grain pasta products, and fresh fruits and vegetables. Fresh meats include a specially prepared nutra-dog made from ground meat and chopped vegetables, which replaces the more traditional hot dog. Natural gelatins and natural food colorings are also used.

A private elementary school in Maryland designed a 2-week nutrition education and training program that included serving vegetarian meals in the lunch room. A nutritionist designed lacto-ovo (cheese and egg) vegetarian meals to meet the school lunch requirements. The school found the vegetarian menus decreased costs, increased the variety of foods, and increased student participation. The school is continuing its vegetarian menu and stressing reduced sugar and salt content of foods.

In 1978, the public school system in Santa

Cruz, Calif., became the Nation's first to experiment with tofu, an inexpensive protein made from curdled soybean milk. In 1981, USDA granted temporary approval to the Santa Cruz school system to serve tofu as a primary meat replacer in its 8,000 daily school meals. The approval has since expired, and reapproval is being sought. Tofu is now federally reimbursable only if it is used with either eggs, cheese, or beans which qualify as complete proteins. Santa Cruz claims that the soybean product has helped cut the program budget from \$1.5 million in 1980 to \$1.2 million in 1981. Use of the tofu has been a big part of the savings because it sells for 45 cents a pound compared with beef which goes for \$1.68 and cheese for \$1.27 a pound in that area. The Santa Cruz school system intends to make even more use of soy products which are less expensive than animal products.

Successes such as these in food programs are due, in part, to the combined efforts of teachers, students, parents, and food service management. Some schools allow student involvement in planning menus, designing lunch rooms, learning about food nutrition, and encourage parents to eat in the lunch room with their children.

Nutrition newsletters are another effort to get parents involved in nutrition education. In many school districts, newsletters sent home may contain recipes, food tips, school food highlights, and short articles on nutrition. Food tasting parties are another method tried by the New York City school district to get parents involved and encourage them to provide nutritious meals and snacks in the home.

The future looks bright for the NSLP as more foods are allowed into the program which are just as nutritious yet cost less than those foods that are presently used. These foods appear to be popular with the children and as one youngster from the New York lunch program put it, "It's much better than what we used to get." ■

## Figure 1. Present School Lunch Requirements

### Meat/Meat Alternate

Two ounces of the following or a combination of two or more to give an equivalent quantity:

- Lean meat, poultry, or fish
- Cheese
- Large eggs
- Cooked, dry beans or peas
- Peanut butter

### Vegetable/Fruit Component

Two or more servings of vegetables or fruits or both.

### Bread/Bread Alternate

Servings of bread or bread alternate

A serving is:

- One slice of whole-grain or enriched bread
- A biscuit, roll, muffin, etc., whole-grain or enriched
- ½ cup of cooked, whole grain or enriched rice
- ½ cup of macaroni, noodles, other whole-grain or enriched pasta products, or other cereal grains, such as bulgar or corn

### Milk

A serving of fluid milk\*

- Unflavored lowfat milk
- Unflavored skim milk
- Unflavored buttermilk

\*Does not prohibit offering other milks, such as whole milk or flavored milk along with one or more of the above.

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# Review of 1981 Food Spending and Income

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**F**ood expenditures in 1981 were about \$337 billion, approximately 11 percent above those of 1980. However, only about 2.3 percent of this increase was due to higher volume. The remainder reflected an 8.7-percent increase in prices.

Personal Consumption Expenditures (PCE) for food rose each of the four quarters of 1981, in contrast to 1980 when expenditures fell during the last half of the year. By the fourth quarter of 1981, food expenditures were about 9.3 percent above the fourth quarter of 1980, but still below the nearly 10-percent advance in disposable personal income (DPI).

When adjusted for inflation, expenditures rose each quarter of 1981, with two sharp increases during the first two quarters, followed by two minor increases during the final two quarters of the year. Per person spending in 1981 rose to \$1,464, up about 10 percent from the previous year. Real per person spending in 1981 rose 1.3 percent.

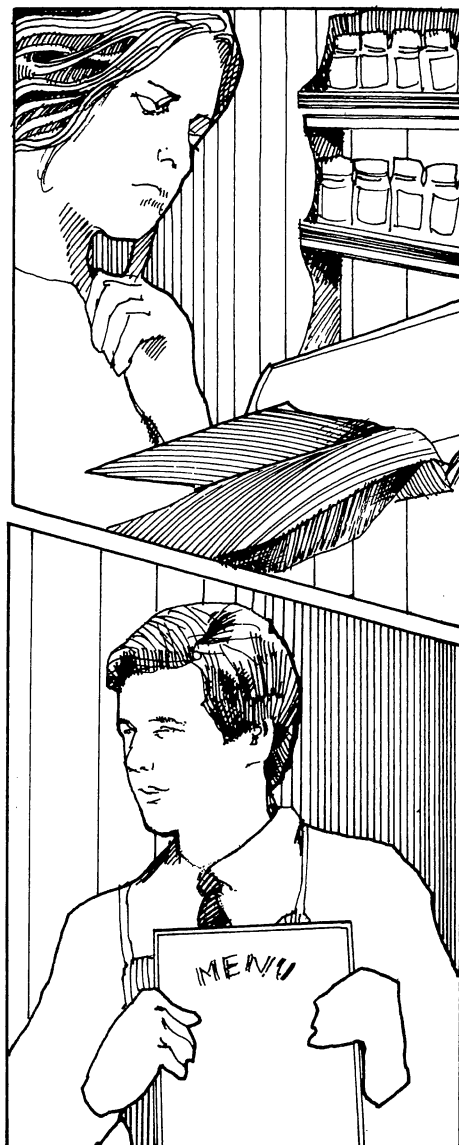
The portion of DPI allocated to food rose from 16.6 percent in 1980 to 16.7 percent in 1981 because average food expenditures for the year rose more sharply than DPI. During the first quarter of the year, this indicator reached 16.8 percent, but fell to 16.7 percent in the third quarter, and 16.6 percent in the fourth quarter as DPI advances exceeded food spending increases.

## Food-At-Home

PCE for food-at-home averaged about \$247 billion in 1981, or 11 percent above 1980. Expenditures rose at about 2½ percent for each of the first three quarters, but only about 1½ percent in the fourth quarter as food prices stabilized. For the fourth quarter, grocery store food expenditures reached an annual level of \$254 billion, about 9 percent above fourth-quarter 1980.

When adjusted for inflation, expenditures were only 2 percent above 1980. Real volume increases in the Nation's grocery stores rose sharply during the winter and spring quarters, and then rose only fractionally during the summer and fall.

Per person spending averaged \$1,074 for the four quarters of the year, but reached the \$1,100 mark by the fourth quarter. But, when adjusted for inflation, per capita food



expenditures remained flat during the last three quarters of the year.

About an eighth (12.3 percent) of DPI was allocated to food-at-home expenditures for 1981, slightly higher than the 12.2-percent expenditure of 1980.

## Food-Away-From-Home

Food spending (excluding business expenses) in the Nation's eating places averaged about \$90 billion in 1981, or over 11½ percent above 1980. Only 2½ percent of this increase was due to higher volume—the

**Table 1. Allocation of Disposable Personal Income (DPI): 1981**

Item	1981 Percent
Total personal consumption expenditures	92.2
Nondurables	36.9
Food, beverages, and other	
Groceries <sup>1</sup>	22.0
Food exc. alcoholic beverages	16.7
At home	12.3
Away from home	4.5
Alcoholic beverages	2.3
At home	1.4
Away from home	0.8
Cleaning and household supplies	1.1
Toiletries	0.8
Tobacco	1.1
Drugs	1.0
Clothing and shoes	5.7
Gas and oil	4.7
Fuel oil and coal	1.0
Other	2.4
Durables	11.5
Moter vehicles and parts	4.9
Furniture and household equipment	4.6
Other	2.0
Services	43.8
Housing	15.2
Household operation	6.3
Transportation	3.4
Personal care	0.9
Medical care	8.4
Personal business service	4.9
Recreational services	1.9
Other	2.8
Saving rate	5.3
Disposable personal income	100.0

<sup>1</sup>Contains some items not normally purchased in grocery stores.

**Table 2. Personal Consumption Expenditures (PCE): 1980 and 1981**

Item	1980	1981	1980	1981	1980	1981	1980	1981
	PCE Current (Billion Dollars)	PCE Current (Billion Dollars)	PCE Constant (Billion Dollars)	PCE Constant (Billion Dollars)	Per Capita PCE Current (Billion Dollars)	Per Capita PCE Current (Billion Dollars)	Per Capita PCE Constant (Billion Dollars)	Per Capita PCE Constant (Billion Dollars)
Total personal consumption expenditures	1672.8	1858.2	935.1	959.1	7346.4	8082.4	4106.8	4172.0
Nondurables	675.7	743.4	358.4	367.4	2967.5	3233.5	1573.8	1598.0
Food, beverages, and other groceries <sup>1</sup>	400.6	443.4	211.9	215.7	1759.2	1928.5	930.6	938.4
Food exc. alcoholic beverages	302.9	336.7	153.8	157.3	1330.1	1464.4	675.4	684.1
At home	222.5	246.9	113.7	116.1	977.1	1073.9	499.2	505.2
Away from home	80.4	89.8	40.1	41.1	353.0	390.6	176.2	178.9
Alcoholic beverages	42.8	45.4	27.7	27.4	187.9	197.5	121.6	119.0
At home	27.2	28.4	17.5	17.1	119.7	123.5	76.8	74.3
Away from home	15.5	17.0	10.2	10.3	68.3	74.1	44.8	44.7
Cleaning and household supplies	19.5	21.7	8.5	8.6	85.8	94.2	37.4	37.3
Toiletries	15.0	16.5	8.5	8.5	65.7	71.9	37.3	37.0
Tobacco	20.4	23.1	13.4	14.0	89.7	100.4	59.0	61.0
Drugs	17.7	19.6	11.2	11.1	77.9	85.3	49.0	48.2
Clothing and shoes	104.8	115.9	78.0	83.6	460.2	504.0	342.6	363.8
Gas and oil	89.0	94.5	26.2	25.1	390.9	411.1	115.2	109.4
Fuel oil and coal	19.8	21.0	4.2	3.6	87.0	91.2	18.5	15.9
Other	43.8	49.1	26.9	28.1	192.2	213.4	118.0	122.2
Durables	211.9	232.0	135.8	139.4	930.4	1009.2	596.5	606.3
Motor vehicles and parts	89.9	98.2	53.8	54.1	394.9	427.0	236.4	235.2
Furniture and household equipment	84.6	92.7	58.9	61.1	371.5	403.2	258.8	265.9
Other	37.3	41.2	23.1	24.2	163.9	179.1	101.4	105.1
Services	785.2	882.7	440.9	452.4	3448.5	389.7	1936.5	1967.7
Housing	272.0	306.7	164.2	170.2	1194.7	1334.1	721.3	740.4
Household operation	111.6	126.3	61.5	62.6	490.3	549.4	270.1	272.1
Transportation	64.1	68.8	34.8	34.6	281.4	299.3	152.7	150.7
Personal care	16.8	17.7	8.2	8.0	73.7	77.1	36.2	34.6
Medical care	143.6	169.5	73.3	77.0	630.5	737.3	322.0	335.0
Personal business service	90.8	99.3	50.0	50.5	398.8	431.8	219.4	219.6
Recreational services	35.0	37.9	22.9	23.4	153.7	164.9	100.8	101.6
Other	51.3	56.5	26.0	26.2	225.4	245.9	114.0	113.8
Savings	101.3	106.6	NA	NA				
Disposable personal income	1821.7	2015.4	1018.4	1040.2	8000.4	8766.4	4472.6	4524.6

NA = Not Applicable

Source: U.S. Department of Commerce

**Table 3. Personal Consumption Expenditures (PCE): Quarterly, Seasonally Adjusted At An Annual Rate**

Item	1981			
	I	II	III	IV
	Billion Dollars (Current)			
Total personal consumption expenditures	1810.1	1829.1	1883.1	1909.5
Nondurables	726.0	735.3	751.3	760.9
Food, beverages, and other groceries <sup>1</sup>	431.4	438.1	448.2	455.8
Food exc. alcoholic beverages	327.4	332.8	340.5	345.9
At home	238.5	244.2	250.9	253.9
Away from home	88.9	88.6	89.7	92.0
Alcoholic beverages	45.0	44.9	46.0	45.7
At home	28.3	27.7	28.9	28.6
Away from home	16.7	17.2	17.1	17.1
Cleaning and household supplies	20.8	21.4	22.0	22.4
Toiletries	16.1	16.4	16.7	17.0
Tobacco	22.0	22.5	23.1	24.8
Drugs	19.1	19.4	19.7	20.2
Clothing and shoes	113.4	115.8	117.5	116.8
Gas and oil	93.5	92.4	95.1	97.1
Fuel oil and coal	20.5	21.0	21.3	21.0
Other	48.1	48.8	49.4	50.0
Durables	238.3	227.3	236.2	226.4
Motor vehicles and parts	105.4	93.4	101.6	92.3
Furniture and household equipment	92.3	92.4	93.2	93.0
Other	40.6	41.6	41.4	41.1
Services	845.8	866.5	896.4	922.2
Housing	293.6	302.1	310.9	320.3
Household operation	118.1	123.4	130.5	133.1
Transportation	67.6	67.9	69.6	70.1
Personal care	17.4	17.6	17.7	18.1
Medical care	159.9	165.6	172.9	179.5
Personal business service	95.3	97.1	100.2	104.5
Recreational services	37.3	37.5	38.1	38.8
Other	56.6	55.2	56.5	57.8
Savings	88.9	106.6	106.9	124.1
Disposable personal income	1947.8	1985.6	2042.0	2086.4

<sup>1</sup>Contains some items not normally purchased in grocery stores.

remainder reflected inflation. However, in 1980, expenditures showed no increase at all.

Expenditures shot up sharply during the winter quarter and then fell in the spring. By the fourth quarter, expenditures reached \$92 billion at a seasonally adjusted annual rate.

Per person spending for eating out averaged \$391 for the year, and even when adjusted for inflation, showed a 1½-percent increase above the depressed level of 1980. Nevertheless, real per person spending—a measure of volume in the Nation's restaurants—was only fractionally higher than in 1979. These changes fairly well paralleled movements in real per capita DPI. About 4½ percent of DPI was allocated to food-away-from-home.

#### Other Groceries and Alcoholic Beverages

- PCE for alcoholic beverages averaged about \$45 billion in 1981, or roughly 2.3 percent of DPI. Expenditures on alcoholic drinks rose about 9½ percent above 1980's level, while packaged alcoholic beverages (for use at-home) rose only 4½ percent. When adjusted for price increases, at-home drinking declined while away-from-home stayed about the same as in 1980.

- Among other groceries, only tobacco products showed a gain, after adjusting for higher prices. Over \$23 billion was spent on these products in 1981.

- Cleaning and household supplies averaged about \$22 billion for the year, while toiletries averaged about \$16.5 billion.

#### Other PCE

- Durable goods purchased for 1981 averaged \$232 billion, up 9½ percent, of which 2½ percent was due to inflation.

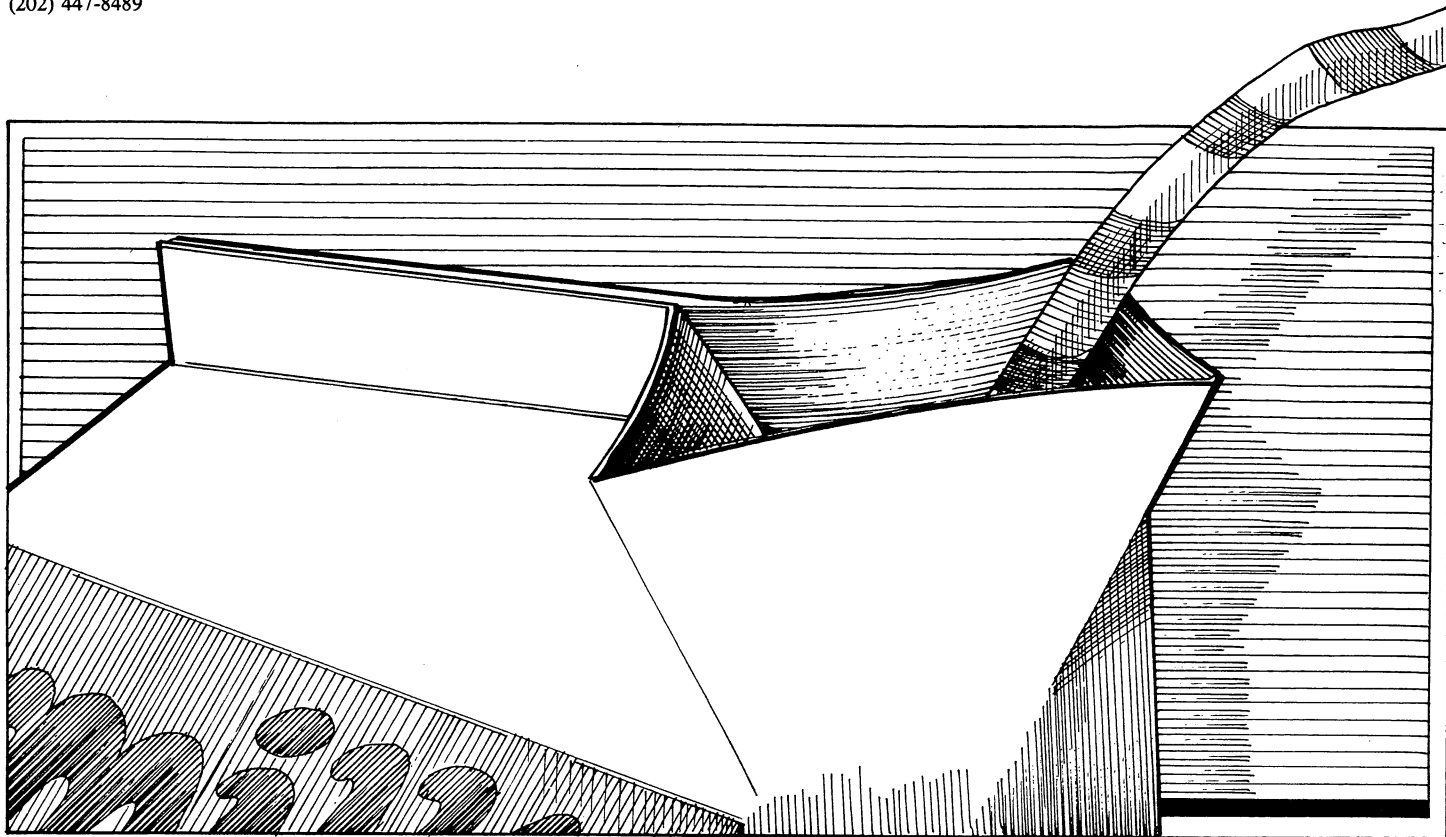
- PCE for services were 12½ percent higher, of which about 10 percent was due to inflation.

- The savings rate for the year was 5.3 percent, compared with 5.6 percent a year earlier.

- In the overall allocation of DPI, consumers showed no major shifts other than for medical expenses, which rose from 7.9 to 8.4 percent. ■

# Domestic Food Programs

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**U**SDA's Food and Nutrition Service (FNS) administers five child nutrition programs aimed at providing day-care and school age children with nutritious meals and snacks. The National School Lunch Program and the School Breakfast Program are the largest programs in terms of Federal expenditures. Both, however, provide over 93 percent of their meals during the school year. The Special Milk Program provides assistance to summer camps during the summer vacation period; the Child Care Food Program provides continuous meal service throughout the year; and the Summer Food Service Program provides meal service in needy areas during June, July, and August.

## Special Milk Program

The Special Milk Program (SMP), initiated in 1954, enables schools and institutions to provide milk to children free or at a reduced price. The SMP has been funded as a child nutrition program since fiscal 1962. Previously, it was financed from Commodity

Credit Corporation (CCC) funds. The CCC acquires agricultural commodities under price support and surplus removal operations and donates them through FNS to various food assistance programs.

Schools and institutions that are eligible to participate in the SMP include:

- Public and nonprofit private schools of high school grade or under;
- Summer camps; and
- Licensed, nonprofit residential and nonresidential child care institutions, such as nursery schools, child care centers, settlement houses, and orphanages.

However, the Omnibus Reconciliation Act of 1981 (P.L. 97-35) limited eligibility to schools which do not participate in the National School Lunch, School Breakfast, or Child Care Food Programs. Further, private schools whose average yearly tuition exceeds \$1,500 per child cannot participate in the Special Milk or Child Care Food Programs or any other child nutrition program.

In October 1981, a total of 8,421 schools and child care institutions participated in the SMP, compared with 84,608 in October 1980. The tighter eligibility criteria cut

Federal expenditures in SMP in October 1981 to \$2.6 million from \$14 million a year earlier.

In July 1981, 3,038 summer camps supplied 16.4 million half pints of milk to children. About 6 percent of this milk was served free to needy children. Federal expenditures for this period amounted to approximately \$894,000.

The SMP is administered by FNS at the Federal level, while the State educational agency administers it in most States. However, FNS will directly administer the program if State regulations prohibit educational agencies from disbursing funds to private schools or institutions, or if the agencies are not willing to operate the program. During fiscal 1981, FNS administered the SMP in 19 States.

Schools and child care institutions are reimbursed by USDA for a part of the cost of all milk served to children. The reimbursement rate for milk served to nonneedy children from July 1, 1981 to June 30, 1982

is 9 cents per half pint. This rate is adjusted annually to reflect changes in the Producer Price Index for fresh processed milk.

Local officials have the option of providing free milk to needy children. Eligibility for free milk extends to children whose family income does not exceed 130 percent of the Office of Management and Budget's (OMB) nonfarm income poverty level.

USDA reimburses schools for the actual cost of each half pint of milk served to eligible children. The cost of a free half pint of milk served from July 1, 1981 to June 30, 1982 is expected to be about 16 cents.

USDA offers unflavored or flavored whole milk, lowfat milk, skim milk, and cultured buttermilk to participants of the SMP. All milk must contain specified amounts of vitamins A and D.

#### Child Care Food Program

The Child Care Food Program (CCFP) provides cash and donated foods to child care centers, and to family and group day care homes so that they can serve nourishing, well-balanced meals to children. These child care facilities must be either public or private nonprofit facilities and be licensed or approved by Federal, State, or local agencies.

Child care centers, other than family or group day care homes, are reimbursed by USDA based on the type of meal served. From September 1, 1981 through June 30, 1982, the meal reimbursement rates are 109.25 cents, 69.25 cents, and 10.5 cents for each free, reduced-price, and paid lunch or supper, respectively. The centers also receive 11 cents in commodities for each lunch or supper served. Similarly, the rates for breakfasts are 57 cents, 28.5 cents, and 8.25 cents. No commodity assistance is given for breakfast.

Child care centers are also reimbursed for the cost of obtaining and preparing supplements (snacks), depending on the type of supplement served. Currently, child care centers receive 30 cents for each supplement served free, 15 cents for those at a reduced price, and 2.75 cents for each paid supplement. These rates will be adjusted on July 1, 1982.

Family and group day care homes are

reimbursed for meal service only if children are eligible for free or reduced-price meals. Income eligibility guidelines for free and reduced-price meals under the CCFP are the same as those for the National School Lunch Program.

Eligibility for free meals for the 1981/82 and 1982/83 school years is set at 130 per-

cent of the OMB nonfarm income poverty level. The income eligibility guidelines for free meals for the 1983/84 school year and beyond will be the same as the gross income eligibility standards in the Food Stamp Program. For any school year, eligibility for reduced-price meals is established at up to 185 percent of the OMB poverty level.

#### Domestic Food Programs Update

Federal expenditures for the Food Stamp Program increased from \$8.7 billion in fiscal 1980 to \$10.6 billion in fiscal 1981 and represented 67 percent of total outlays for USDA food assistance programs.

An average of 22.4 million persons received food stamp benefits during fiscal 1981. The average monthly benefit per person amounted to \$39.45, compared with \$34.35 during fiscal 1980.

Food Stamp Program participation averaged 22.2 million persons in the July-September quarter of 1981, compared with 22 million in the same months in 1980. Federal expenditures totaled \$2.6 million, about 19 percent above those during July-September 1980.

Slightly more than 1.9 million persons received benefits under the Special Supplemental Food Program for Women, Infants, and Children (WIC) during the third quarter of 1981. Expenditures were approximately \$216 million, of which food costs accounted for \$168 million, while the remaining \$48 million were for administrative expenses. These included certification for eligibility of participants, monitoring functions, food delivery and warehousing, nutrition education, financial management, clinic operations, and administration by the State agencies.

During the July-September quarter of 1981, the Commodity Supplemental Food Program supplied commodities valued at

\$5.9 million to an average of 119,000 persons. Eligibility for this program extends to low-income pregnant, postpartum, and breast-feeding women, and children age 6 and under.

The Needy Family Program served an average of 87,000 families in the third quarter of 1981 with \$6.7 million in commodity assistance.

Participants in the Nutrition Program for the Elderly received \$18.4 million in assistance during the third quarter; about 59 percent of this was in cash, and 41 percent was in commodities.

Federal cash expenditures for the child nutrition programs rose from \$3.1 billion in fiscal 1980, to \$3.2 billion in 1981 as participation continued to increase, led by the Child Care Food Program which grew 17 percent. Participation declined slightly in the National School Lunch Program, which is still the largest program, and in the Summer Food Service Program.

Of the nearly 475 million lunches served under the National School Lunch Program in July-September 1981, about 233 million were free or reduced-price lunches and the remaining 243 million were full price lunches.

Participants in the School Breakfast Program received 76 million breakfasts in the third quarter of 1981. Of this amount, 84 percent were served free and 5 percent were served at a reduced price.

The Omnibus Reconciliation Act of 1981 reduced the upper age limit for participation in the CCFP from 18 to 12 years. However, children of migrant workers can participate in the program until they are age 15. In addition, there is no age limit for handicapped children as long as they are in institutions that serve meals primarily to children under age 19.

Over 112,000 children joined the CCFP during fiscal 1981 as the peak number of child care institutions participating in the program rose from 45,200 in fiscal 1980 to 65,100. Nearly 542 million meals were served in fiscal 1981. About 91 percent of

these meals were served free or at a reduced price.

Federal expenditures for the CCFP amounted to \$292 million in fiscal 1981; \$288 million was spent for meals and nearly \$4 million for food service equipment. The Omnibus Reconciliation Act of 1981 eliminated food service equipment assistance in the CCFP, effective last October.

#### Summer Food Service Program

The Summer Food Service Program (SFSP) provides children in economically depressed areas with free meals during the summer months. Under the program, spon-

sors receive cash assistance to defray operating costs, and for training and technical assistance.

Sponsors of the SFSP must be either public or private nonprofit school food authorities or local, municipal, or country governments. In addition, residential summer camps can sponsor the program.

The Omnibus Reconciliation Act of 1981 limits program operation to areas in which 50 percent of the children served meals meet the income eligibility criteria for free and reduced-price meals under the National School Lunch Program. Previously, the SFSP operated in areas where at least 33 percent of the children served meals were eligible for free or reduced-price lunches.

Meals served under the SFSP must meet minimum USDA requirements, similar to those for the National School Lunch and School Breakfast Programs, to ensure that children receive nourishing meals.

Sponsors participating in the SFSP can have food prepared at the site, at a central kitchen serving several sites, or by a commercial food service management company.

USDA reimburses sponsors up to specific maximum rates for the actual costs of food and for food preparation labor and service. The maximum reimbursement rates for this summer are 74.75 cents for each breakfast served, 134.25 cents for each lunch, and 35.25 cents for each midmorning or midafternoon snack. These rates are adjusted annually based on changes in the Consumer Price Index for food away from home for all urban consumers.

Sponsors are also reimbursed for a part of their administrative expenses: 5.5 cents for each breakfast, 10.5 cents for each lunch, and 2.75 cents for each snack. Special sites (generally those in rural areas or those preparing food on site) receive slightly higher rates: breakfasts, lunches, and snacks are 7, 12.75, and 3.5 cents, respectively.

Slightly more than 91 million free meals were served to children through the SFSP during 1981. Federal reimbursements were \$108 million, representing a 22.9-percent decline since the SFSP became a separate program in 1976. New regulations to cut Federal expenditures by reducing fraud and abuse may have caused this decline. ■

#### Federal Cost of USDA Food Programs, Calendar Years (50 States and District of Columbia Only)

Program	1978	1979	1980	1980 3	4	1	1981 2	3 <sup>1</sup>
			Million	Dollars				
Food stamps								
Total issued	8347	7111	8997	2263	2252	2847	2808	2687
Bonus stamps	5261	7108	8997	2263	2252	2847	2808	2687
Food distribution <sup>2</sup>								
Needy families	13.7	22.2	24.3	6.9	6.7	6.7	6.7	6.7
Schools <sup>3</sup>	577	720	910	155	236	304	241	152
Other <sup>4</sup>	64	85	107	28	21	26	28	33
Child nutrition <sup>5</sup>								
School lunch	1877	2101	2393	308	776	776	570	272
School breakfast	191	243	308	42	102	106	81	41
Special food <sup>6</sup>	246	288	335	138	68	75	98	160
Special milk	139	146	139	19	35	36	27	9
WIC <sup>7</sup>	422	569	783	183	233	233	209	216
Total <sup>8</sup>	8790	11283	13998	3143	3729	4409	4068	3577

<sup>1</sup>Preliminary.

<sup>2</sup>Cost of food delivered to state distribution centers.

<sup>3</sup>Includes child care centers and camps participating in the Child Care and Summer Food Service programs.

<sup>4</sup>Supplemental food, institutions, elderly persons.

<sup>5</sup>Excludes non-food assistance.

<sup>6</sup>Divided into Child Care Food Program and Summer Food Service Program in fiscal 1976.

<sup>7</sup>Special Supplemental Food Program for Women, Infants, and Children.

<sup>8</sup>Excludes those food stamps paid for by the recipient. May not add due to rounding.



# Revising Food Safety Policy: Issues For Debate

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**F**ood processing often means using chemical preservatives, stabilizers, colorings, flavorings, and other additives. However, food additives have come under close scrutiny recently as scientists, using more sensitive testing techniques, increasingly link additives with the potential to cause a higher incidence of cancer or other long-term adverse health effects.

In 1978, a scientific study suggested a direct link between sodium nitrate and nitrite, additives widely used in the processing of cured meat and poultry products, and the incidence of cancer of the lymphatic system in test animals. Existing laws mandated the removal of nitrate and nitrite from commercial use, after confirmation of the study results.

Banning the additives, however, could not be accomplished without severe physical and economic consequences, largely due to the absence of a safe and acceptable substitute. The nitrite controversy served to point out many inherent problems with the current food safety legislation and provided a test of the accepted "policy" toward carcinogens in foods.

This article examines the nitrite issue within the broader concerns of an effective national food safety policy. With the nitrite issue, the accepted practice of banning additives found to cause cancer became the focal point for debate. The legal, scientific, and economic issues surrounding the controversy may be generalized to provide a framework for discussion of the current food regulatory laws.

## Food Safety Regulations

Federal food safety policy is largely embodied in a number of regulations governing physical or chemical changes in processed foods. Several Federal agencies are responsible for ensuring compliance with the food safety laws. The Food and Drug Administration (FDA) of the Department of Health and Human Services has the major responsibility for the safety and wholesomeness of the Nation's food supply. Red meat, poultry, and egg products, which are subject to the Federal meat and poultry inspection systems, come under the auspices of USDA. The Department of Commerce conducts a

voluntary inspection program to ensure that health standards are maintained in plants preparing fish products.

FDA and USDA control the use of chemicals and drugs that may be added to foods. The laws governing added substances are strict. However, over the years they have become increasingly complex as Congress has passed amendments to create different categories of chemical additives. The use of a substance dictates how it may be classified. For example, additives that preserve or flavor foods are classified as food additives, while those that color foods are classified as color additives.

The Federal Food, Drug, and Cosmetic Act (FDCA) of 1938 is the most encompassing regulation governing the use of food and color additives. The most stringent aspects of the law, however, were added in 1958 and 1960 with the Food Additives Amendment (P.L. 85-929) and the Color Additives Amendment (P.L. 86-618), respectively.

Food or color additives not approved by FDA and USDA before 1958 are subject to the controversial Delaney Clause. Enacted as part of the Food Additive Amendment of 1958, and extended in scope through the Color Additive Amendment of 1960, the Delaney Clause provides that "...no additive shall be deemed safe if found to induce cancer when ingested by man or animal, if it is found, after tests that are appropriate for the evaluation of the safety of food additives, to induce cancer in man or animal...". The clause essentially prohibits the use of a food or color additive found, regardless of the dose, to cause cancer in man or animal.

Additives used in red meat products with prior-sanctioned (pre-1958) status are subject to the Federal Meat Inspection Act (FMIA) which considers a product adulterated if "...it bears or contains any poisonous or deleterious substances which may render it injurious to health." Identical standards are applied to additives used in poultry and egg production under the Poultry Products Inspection Act (PPIA) and Egg Inspection Act (EIA).

The FMIA, PPIA, and EIA are similar to the Delaney Clause in that they disallow the use, in any amount, of an added substance

found to cause harm to humans.

In the case of naturally occurring substances, a product is not adulterated if "...the quantity of such substance...does not ordinarily render it injurious to health." Recognizing that certain natural contaminants are unavoidable in food, FDA has established maximum allowable levels for these substances. In other words, Congress has established a standard for naturally occurring, or other unavoidable, substances based on acceptable dosage.

## Policy Issues

Much of the criticism of the current food safety legislation centers around the inflexibility of the regulations, which mandate the withdrawal of any food or color additive found, regardless of the dose, to cause cancer in man or animal. The legislation does not allow for weighing the benefits of an additive against the possible risks it may present.

Nitrite serves as an example of an additive which provides important benefits and for which no single substitute now exists. The addition of nitrite to processed meat and poultry serves three major functions. Nitrite significantly alters the flavor of pork loins, frankfurters, and other pork products. Nitrite also delays the development of oxidative rancidity and prevents a "warmed-over" flavor in cured meats, which makes uncured meats unacceptable when reheated. Secondly, nitrite serves a largely aesthetic function, since the reaction of nitrite with muscle pigments results in the characteristic cured meat color. In addition, proper levels of nitrite in the presence of sodium chloride in cured meats prevents the development of the *Clostridium botulinum* bacteria, which under certain conditions, can result in the food poisoning known as botulism. A ban on the use of nitrite, in effect, would have involved a choice between the long-term adverse effects (such as cancer) associated with its consumption and the more immediate danger of botulism.

Since the passage of the Delaney Clause in 1958, the development of more sensitive laboratory methods have enabled the measurement of ever smaller amounts of contaminants and carcinogens in foods. Ad-

vanced techniques permit the measurement of a substance as small as one part per trillion, meaning that one gram of the contaminant is contained in one trillion grams of food. The zero tolerance level for carcinogenic additives in food, in combination with more sensitive detection techniques, means that increasing numbers of additives could be banned from use. In addition, such a standard makes it more difficult to find new and safe additives to take the place of those withdrawn from use.

The controversy surrounding earlier attempts at banning substances such as cyclamates and saccharin, as well as nitrite, has resulted in large expenditures of both private and public funds. In addition, banning additives currently in use may result in the development and use of relatively more expensive substitutes. Greater costs for production inputs may be translated into higher food prices. The need to develop new and safe additives may also increase the costs of production, again resulting in higher food prices.

The realization that a completely risk-free environment is unattainable is apparent in the standards which permit maximum levels of naturally occurring contaminants in the food supply. Aflatoxin, for example, is a potent carcinogen produced by a mold when it grows on certain foods, particularly corn, nuts, and nut products. Aflatoxin is, however, permitted in foods up to 20 parts per billion. Some advocates of change in the current legislation suggest that similar standards be applied to added substances, resulting in a more consistent food safety policy. Proponents of the current policy that distinguishes between naturally occurring and added substances argue that food additives linked to cancer are avoidable and should be eliminated from foods.

In addition, the current safety standard is stricter for additives than for traditional food commodities. Under the existing legislation, it is extremely difficult to ban basic food commodities because of their perceived importance in the food supply. Inherent in this practice, therefore, is a weighing of the benefits associated with a food product, the historical safety record, and the potential risks.

Proponents of the current legislation maintain that carcinogens should be avoided wherever possible because the level of consumption at which harmful effects occur is not known. An indeterminant level of risk, they argue, would make any policy which attempts to balance benefits and risks impractical. Many scientists and consumer groups argue for retention of the differing policy on the grounds that added carcinogens are avoidable and should be eliminated from foods.

#### **A Risk-Assessment Policy**

Proposals to amend the current food safety legislation, in general, center around the use of risk assessment in deciding whether to approve the use of a new additive. (See following article on The Food Safety Amendments of 1981.) Such a policy implies the ability of scientists to measure the health risks associated with consumption of an additive—a difficult task. The 1978 nitrite study indicated the potential for disagreement among scientists on experiment design and the interpretation of results from animal experiments. Further, estimates of health risks presented by an additive must consider a number of complicated issues.

Any quantitative estimate of the risk of cancer in humans may be misleading because of the underlying broad assumptions regarding sensitivity and exposure. For example, it is assumed that humans and several species of experimental animals have the same sensitivity to a cancer-causing substance. Further, the risks of cancer are assumed to be spread evenly throughout the population.

Current scientific techniques, therefore, do not permit the accurate measurement of the relationship between dose and risk. If such measurements were possible, it might logically lead to a policy which permits individuals to choose their particular exposure to risk based on accurate information.

#### **Cost-Benefit Analysis and Food Safety Regulation**

Risk assessment is not the only policy that advocates of changes in the present food safety laws are suggesting. As public

concern over the proliferation of Federal regulation grows, and as budgetary constraints limit the availability of expenditures for health and safety, the need to select the most efficient policy becomes critical. Cost-benefit analysis, a tool of applied economics, may provide a valuable method for decisionmakers in government. Cost benefit analysis involves the summation of the gains or positive benefits associated with a change, compared to the total costs of producing the change, plus any potential losses or negative effects induced by the change. In the Bill discussed in the following article, cost-benefit analysis would be applied to those additives that have a long history of use and no feasible substitute.

Straightforward application of cost-benefit analysis may not be possible in the case of food safety issues. The inability to derive numerical estimates of the risk of cancer or even to accurately determine the impact of a policy in terms of human illness or death have been discussed. Furthermore, intangibles such as the psychological benefits associated with a safer environment or the "cost" of being subjected to increased risk, cannot be quantified.

Despite its inherent difficulties, some form of cost-benefit analysis may serve as a foundation for the consideration of alternative food safety regulations. Its use as a formal part of the decision process, may help assure the development of policies that are efficient and equitable.

#### **Future Debate**

The controversy surrounding the nitrite issue has demonstrated the need for improved scientific, as well as economic, research. Policy is not costless, whether it takes the form of government regulation or nonintervention. The selection of the most effective policy option, then becomes particularly critical as inflation and budgetary pressures increase.

The emotional nature of the food safety issue will undoubtedly lead to continued debate regarding the development of an optimal policy. Recognition of the need for and identification of the questions to be addressed by research is indeed an initial step toward the formulation of such a policy. ■

# Legislation—The Food Safety Amendments of 1981

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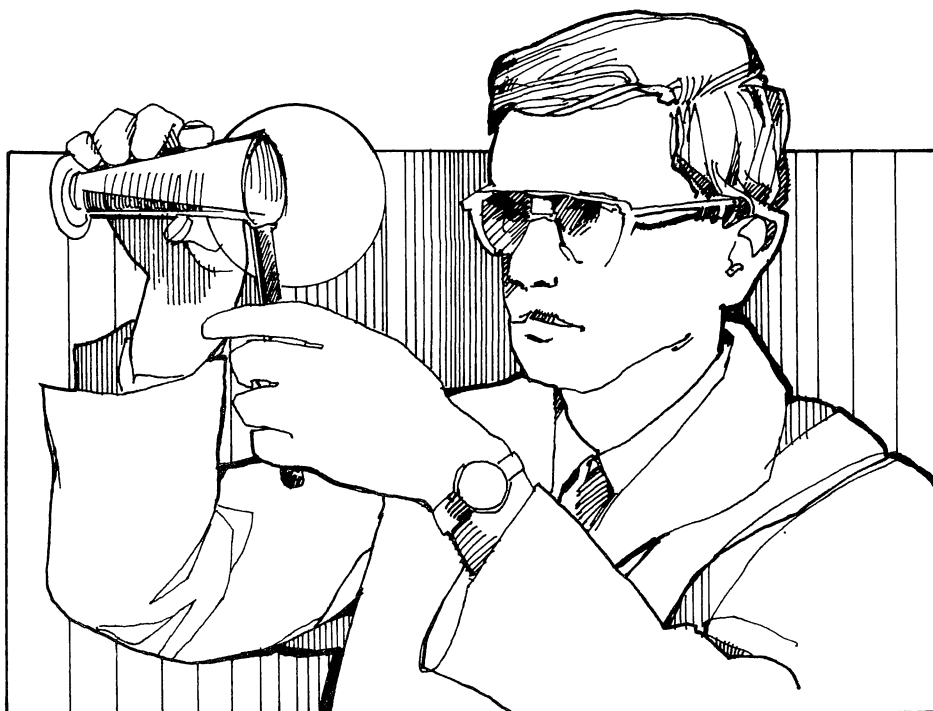
**T**he Federal Food, Drug, and Cosmetic Act (FDCA) is the basic food and drug law of the United States. It is intended to assure consumers that foods are pure and wholesome, safe to eat, and produced under sanitary conditions. But the original Act, written in 1938, may be amended this year. The Food Safety Amendments of 1981 were introduced simultaneously in June 1981 in the Senate (S. 1442) by Orrin Hatch (R-Utah), and in the House (H.R. 4014) by Kika de la Garza (D-Tex). Both Bills are in committee now for discussion and possible changes.

The amendments contain many extensive changes for food safety laws, most of which are enforced by the Food and Drug Administration (FDA) of the Department of Health and Human Services (HHS). But, the Poultry Products Inspection Act, the Meat Inspection Act, and the Egg Products Inspection Act, administered by USDA, would also be affected by the changes.

One of the major changes would be a modification of the FDCA's Delaney Clause, which was added in 1958. The Delaney Clause prohibits the use of any food additive found to induce cancer in animals or people. The Delaney Clause does not apply to food additives that the FDA approved before 1958. The amendments would modify the Delaney Clause to allow the use of carcinogenic (cancer-causing) additives that do not pose a significant risk to health.

Senator Hatch explained that recent advances in analytical chemistry and technology allow scientists to detect miniscule traces of contaminants or carcinogens never detectable before. "The intent of the amendments," Hatch said, "is to assure food safety decisions are based on real risks to health. We don't want to ban food or color additives that, while they may show up in the lab as possible carcinogens, are useful and proven to cause no significant risk to human health."

The amendments also seek to guarantee that the FDA consider other harmful effects to the food supply when removing an additive or animal drug from the market. The



amendments would provide for external peer review and also impose time constraints for the FDA to administer rulings. The Bill would free substances used to package, transport, and hold foods from the elaborate food additive clearance process.

Highlights of the Food Safety Amendments of 1981 are:

- **Definition of Safe.** The amendments would insert an extra stipulation—"the absence of a significant risk under the intended conditions of use of a substance"—in front of the current definition of safe which "has reference to the health of man or animal."

When determining if a substance is safe, the FDA would examine all relevant factors. This includes an assessment of the nature and extent of the risks from using the substance, taking into account all data judged by food safety experts to be valid and appropriate. The FDA would be required to justify its position if ruling a substance unsafe for consumption.

- **Food Contact Substances.** Food contact substances would no longer be treated as food additives but, instead, undergo a new premarket notification process. The Bill defines food contact substance as any substance used in packing, packaging, transporting, or holding food, or a substance used in food contact surfaces that has no technical or physical effect in food.

Currently, these "indirect additives" are subject to the same clearance process as food additives. Under the new system, manufacturers of food contact substances would be required to submit a notification statement to FDA before marketing their substance. The statement would include the substance's intended use, a summary of the data on how much of the substance or its constituents may be picked up in the food, and a summary of the data supporting the manufacturer's conclusion that the substance is safe for its intended use. Unless the FDA finds that the substance would present a significant risk, or that the data were inadequate to permit a decision, the notification automatically becomes effective in 90 days and the substance may be marketed.

The Bill would allow food contact substances that are not reasonably expected to become a component of the food to be used without a notification statement. Food contact substances that had been cleared earlier or were generally recognized as safe would not need another notification statement.

- **Basic or Traditional Foods.** The proposed amendments would also exclude basic or traditional foods from the definition of a food additive and from the regulations governing the use of food additives. The Bill

defines basic and traditional food as "any raw agricultural commodity, including spices, with a history of significant food use in the United States" and those commodities that have been processed by methods

that do not significantly change their properties.

• *Food Safety Committee.* An independent food safety committee would be established to provide peer review and scientific

## More On Food Safety

On February 9, 1982, Congressman Albert Gore, Jr. (D-Tenn) introduced a bill that also amends the FDCA, though less drastically than the Bill introduced by Senator Hatch. Gore's Bill (H.R. 5491) also lessens the zero tolerance level of the Delaney Clause. "Safe," when applying to food additives, color additives, and new animal drugs would mean "a reasonable certainty that the risks of a substance under the intended conditions of use are insignificant." Gore's Bill would also exclude basic or traditional foods from the definition and restrictions placed on food additives. In the section of the FDCA governing adulterated foods, basic or traditional foods would not be considered added substances. H.R. 5491 relaxes the definition of food additives to mean any of the nonexempt substances that become a "component of food in greater than *de minimis* (minimal) amounts."

Under the Gore Bill, the Delaney Clause would not apply to a food additive where:

- the FDA determines that the risk of cancer from exposure to the additive is insignificant;
- the additive has a substantial history of use and no practicable substitute; or
- the risks to human health from using the additive are acceptable, given the benefits from the additive on the nutritional value and availability of food, and the uses of the additive for dietary management.

Gore's Bill would establish a food science committee identical to the food safety committee of S. 1442. The Secretary of HHS would refer matters to the committee upon his own initiative or at the request of any interested person. Unlike S. 1442, however, referral to the food science committee is not mandatory for cases involving the Delaney

Clause. The Gore Bill does not set time limits in which the FDA or the committee must act.

Gore's Bill would allow a 5-year phaseout period for a substance that violates the food safety laws, provided continued use would not harm the public health. The duration and conditions of the continued use would depend on:

- the severity of the health risks;
- the effects of limitation on nutritional value, cost, and availability of food; and
- whether there was a practicable substitute.

This continued use can be extended 5 additional years if the FDA determines there is still no practicable substitute.

Food safety legislation continues to receive attention from Congress and the Administration. This spring, the staffs of Senators Hatch and Kennedy (D-Mass) wrote a working draft of a compromise food safety Bill that addresses many of the issues in the Hatch Bill. The staff working draft has been distributed for comment, but it has not been introduced as proposed legislation at this writing. The White House Cabinet Council on Human Resources is also pondering the need for revisions in our current food safety laws. The Working Group on Food Safety, chaired by Assistant Secretary of Agriculture C. W. McMillan, was established last spring to assist the Cabinet Council develop proposed changes to the food safety laws. In May 1982, the Working Group presented the summary of its tentative suggestions to members of Congress and representatives of the food industry and consumer groups. The purpose of the presentation was to allow the Working Group to incorporate the views of these interested parties into its final report to the Cabinet Council.

advice on proposed FDA actions on food additives, new animal drugs, and color additives. While the FDA must consider the committee's recommendations, the agency is not bound by them. This standing committee would be under the auspices of the National Academy of Sciences, the Federation of American Societies of Experimental Biology, or another appropriate scientific body. If no scientific group agrees to compose the committee the Secretary of HHS can select the members.

Referral of matters to the food safety committee would be at the request of the Secretary of HHS or any involved person. However, when the FDA is contemplating prohibiting a food additive, new animal drug, or color additive because it is a suspected carcinogen, the food committee is required to issue a report and recommendations.

• *Exemptions From the Delaney Clause.* The Delaney Clause states "that no additive shall be deemed to be safe if it is found to induce cancer when ingested by man or animal." The Delaney Clause does not apply to additives that are prior sanctioned (approved before 1958), natural constituents, or food contaminants. Also excluded are substances added to animal feed that do not adversely affect the animal or remain in the edible parts of the animal or in its milk or eggs.

Under the amendments, the Delaney Clause would be changed to allow the FDA to exempt food and color additives if the agency finds "that the use of the additive under the prescribed conditions does not present a significant risk to health." Similarly, if traces of a carcinogen added to animal feed were found in an animal product but did not present a significant risk, then the substance would not be considered unsafe. The FDA would be able to exempt new animal drugs from the Delaney Clause using the same criteria.

Before the FDA denies a petition for a new food additive, color additive, or animal drug because it causes cancer, the agency would have to prepare a summary of the data, refer the matter to the food safety committee, and provide an opportunity for the petitioner and other interested persons to submit information to the committee.

The FDA must follow these same steps when repealing a currently used additive or drug, or when imposing new limits on its use.

- *Consideration of Factors Other Than Risk.* Under the amendments, the FDA must consider additional factors when deciding to repeal a regulation or to impose new limits on the use of a food additive or color additive that has a substantial history of use and no reasonably practicable substitute:

- the feasibility and effect of informing consumers about the risk associated with the additive, and
- the consequences of the restrictions on consumer cost, availability, and acceptability of food. For food additives, the FDA would also need to take into account the nutritional and dietary effects. For example, an additive such as the sugar substitute, saccharin, allows diabetics to eat sweet-tasting foods.

Under S. 1442, consideration of these same factors would apply to the FDA's decisions about the safety of a new animal drug.

- *Interim Regulations.* The amendments allow the FDA to adopt interim regulations when questions are raised about the safety or effects of an approved food additive, color additive, or new animal drug on the basis of new, inconclusive information. The Secretary of HHS must determine that there is a reasonable certainty that the substance is not of immediate harm. The interim regulation permits continued use of the additive or drug while further testing is done.

Similarly, the Bill would allow FDA to permit the expanded use of a previously approved food additive on an interim basis when it appears that such use is safe. The petitioner must supply additional information so the FDA can decide whether to grant permanent approval for the expanded use.

- *Greater Discretion in Setting Tolerances.* Currently, the FDA sets maximum levels for poisonous or harmful contaminants that are required in the production of food or that cannot be avoided by good manufacturing practices. Pesticides, food additives, color additives, or new animal

drugs are not classified as contaminants under the FDCA. The Bill would make setting tolerances for contaminants discretionary rather than mandatory.

In setting a tolerance level, the FDA must consult with the food safety committee and consider the limitation's effect on the cost and availability of the food. The FDA would specify the analytical procedure for determining compliance with the tolerance level. The Bill would also permit anyone involved in an enforcement proceeding, including a seizure, injunction, or criminal prosecution, to request the court to determine if the substance should be permitted in foods, given the Bill's new guidelines. If so, the court could establish a tolerance level.

- *Time Limits for Filing and Reviewing Petitions.* The amendments also seek to improve the procedure for filing food additive and color additive petitions and to shorten the time for action on the petitions. The FDA would be required to institute pre-filing discussions with petitioners to determine what data and information their petitions should contain.

The Bill also stipulates that within 30 days after receiving a petition, the FDA must formally file this request for a regulation unless the agency finds the petition inadequate. Once a petition to approve a new additive, to amend uses already allowed for an additive, or to repeal an additive entirely, has been referred to the food safety committee, the committee has up to 120 days to issue a report and recommendations. The HHS Secretary would have another 60 days before acting to consider the committee's report and all other evidence. The same time limits apply to petitions dealing with new animal drugs.

- *New Animal Drugs.* Many of the Bill's changes that deal with new animal drugs are the same as those made to the food additive and color additive sections of the FDCA—speedier review process, referral to the food safety committee, and the use of the concept of significant risk. In deciding whether to revoke an animal drug, the FDA would be required to determine whether the existing conditions of use can be safely modified or limited.

Under S. 1442, the FDA would not have

to publish the approval of an animal drug in the *Federal Register*, but rather "make publicly available" the name and address of the applicant, the conditions of use, and any restrictions for the drug.

The Bill eliminates the requirement for individual product licenses and, instead, limits registration to the establishment or firm that actually mixes the drugs into animal feed. The one-time registration statement would identify the location and trade name of the establishment, the name of the owner, and, if known, for what species of animals the drugs are to be mixed. If any information in the registration statement changes, the establishment is required to inform the FDA.

The Bill also repeals the provision for batch-by-batch certification of five specific antibiotics. Most of the production of these five antibiotics is used in medicated feeds to ensure against certain illnesses. Medicated feeds and the drugs in them have never required certification. Only a small amount of the total production of these antibiotics is administered in individual doses to sick animals.

- *Conforming Changes of Other Food Safety Acts.* The USDA decides what food and color additives approved by the FDA may be used in meat, poultry, and egg products as well as the proper use of the additives. The amendments would not change the jurisdiction of USDA and FDA, but would revise the poultry, meat, and egg inspection acts to conform to the changes made in the FDCA. Safety decisions would be based on an assessment of the nature and extent of risks. If USDA wanted to prohibit the use of an additive or pesticide, it would have to follow the same procedures as the FDA.

The Bill would also authorize the Secretaries of Agriculture and HHS to gradually eliminate a substance whose safety has been questioned, providing continued use would not be dangerous. This provision is designed to allow time for the industry to find substitute ingredients or alter their processing techniques before the substance is removed from the market. ■

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