



How Much Do Americans Pay for Fruits and Vegetables?

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Abstract

Americans do not consume recommended levels of fruits and vegetables. One argument is that they are expensive, especially when purchased fresh. This analysis uses A.C. Nielsen Homescan data on 1999 household food purchases from all types of retail outlets to estimate an annual retail price per pound for 69 forms of fruits and 85 forms of vegetables. Since many fruits and vegetables contain much that is nonedible in the purchase weight, cost per pound might not be a good indicator of cost per amount consumed. Therefore, this analysis also estimated the number of servings per pound of purchased item after excluding all parts of the fruits and vegetables not usually eaten. According to this formula, consumers can meet the recommendations of three servings of fruits and four servings of vegetables daily for 64 cents. Since this represents only 12 percent of daily food expenditures per person in 1999, consumers still have 88 percent of their food dollar left to purchase the other three food groups. (Even low-income households have 84 percent of their food dollar left.) Although cost differences among fresh and processed forms were generally small, our study also found that after adjusting for waste and serving size, 63 percent of fruits and 57 percent of vegetables were cheapest in their fresh form.

Keywords: Fruits, vegetables, fresh, processed, retail price, serving.

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Executive Summary

Americans consume only half as much fruit as recommended. Vegetable consumption, although close to recommendations, has a third of total servings coming from French fries, potato chips, and iceberg lettuce. One argument for not consuming more fruits and vegetables is that they are expensive, especially when purchased fresh. But how expensive are fruits and vegetables? Do fresh fruits and vegetables really cost more than their processed counterparts? And if so, does it hold for all fruits and vegetables, or only for some?

This analysis uses A.C. Nielsen Homescan data on 1999 household food purchases from all types of retail outlets to estimate an annual retail price per pound for 69 forms of fruits and 85 forms of vegetables. Since many fruits and vegetables contain much that is nonedible in the purchase weight, cost per pound might not be a good indicator of cost per amount consumed. This analysis also estimated the number of servings per pound of purchased item after excluding all parts of the fruits and vegetables not usually eaten. Our analysis also examined the costs of fruits and vegetables needed to meet the dietary recommendations. Among the 154 forms of fruits and vegetables we priced, more than half were estimated to cost 25 cents or less per serving. Consumers can meet the recommendations of three servings of fruits and four servings of vegetables daily for 64 cents. Since this represented only 12 percent of daily food expenditures per person in 1999, consumers still had 88 percent of their food dollar left to purchase the other three food groups. Even low-income households still had 84 percent left.

The study also found that after adjusting for waste and serving size, 63 percent of fruits and 57 percent of vegetables were least expensive in their fresh form. Even though fresh fruits and vegetables may be less expensive to eat than processed, for many fruits and vegetables the difference in price per serving between the least and most expensive versions was often less than 25 cents. For some, this price difference may be a small price to pay for the conveniences—such as longer shelf life, ease of preparation, and greater availability—associated with processed forms.

How Much Do Americans Pay for Fruits and Vegetables?

Introduction

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Despite the increasing knowledge about the health benefits of diets high in fruits and vegetables, data from the U.S. food supply show that, in 2000, Americans consumed only half as much fruit as recommended by the *Food Guide Pyramid* (FGP) for a 2,200-calorie diet. Vegetable consumption was close to recommendations, although French fries, potato chips, and iceberg lettuce—vegetable forms that are either high in fat or low in nutrients—constituted a third of total daily vegetable servings (Putnam et al., 2000).

The gap between the recommended amounts and the actual consumption of fruits and vegetables cannot be entirely attributed to consumer ignorance of the health benefits associated with their consumption. According to a survey by the Food Marketing Institute, among the nearly 70 percent of shoppers who believe their diet could be at least “somewhat” or “a lot healthier,” the most common response among all shoppers on how to improve the healthfulness of their diets was eating more fruits and vegetables (68 percent). This was three times as many people as those responding they would eat less fats and oils (22 percent) or less red meat (22 percent), less junk food (18 percent), or less sugar (17 percent) (Food Marketing Institute, 2000).

Nonetheless, consumers seem to find it difficult to eat more fruits and vegetables. Some also believe they are too expensive (Kurtzweil, 1997) or too expensive to serve every day, especially when purchased fresh (Raynor et al., 2002).

One of the problems consumers face is that few know what constitutes a FGP serving of fruits and vegetables (Hogbin and Hess, 1999). Many are confused because the serving size on the nutrition label often differs from the FGP serving size and both probably differ from the amount consumers typically consume. Consumers are therefore unable to accurately assess the cost of eating a FGP serving of fruits and vegetables and may erroneously believe that cost is a barrier. For example, they may balk at the idea of paying 97 cents for a pound of peaches, not realizing that they will be getting 4 FGP servings ($\frac{1}{2}$ cup) in a pound, which translates to 21 cents per serving. Consumers may cite cost as a barrier, when other factors such as taste, preferences, and availability may be more important (Shankar and Klassen, 2001). For example, Stewart et al. (2003) found that a marginal increase in income was not likely to induce low-income households (below 130 percent of the poverty line) to spend more on fruits and vegetables, possibly because they have higher priority needs or wants.

So, how expensive are fruits and vegetables? And do fresh fruits and vegetables really cost more than processed, as is widely believed? If so, does this hold for all fruits and vegetables, or only for some?

The purpose of this report then is twofold: to examine the purchase and serving prices of fresh and processed fruits and vegetables, and to calculate the cost of meeting fruit and vegetable recommendations in terms of the FGP.

Methodology

To determine the cost of fruits and vegetables, we used 1999 A.C. Nielsen Homescan data, which collect information from a sample of consumers on the foods they buy from all types of retail outlets (see box, “About the Data”). We restricted the data to the most common fresh fruits and vegetables, excluding more exotic items such as guava or bok choy. We included 25 different fresh fruits and 29 different fresh vegetables. For some of the fresh vegetables, we included more than one type of that vegetable, such as whole and baby carrots, and broccoli and broccoli florets. We then matched all the fresh fruits and vegetables with their plain (e.g., unsweetened, unflavored) processed counterparts. Some of the processed items included more than one form of that fruit or vegetable. For example, for processed cherries we included canned and frozen sweet and tart cherries, and for asparagus, we included cut and whole canned and frozen asparagus. We also included in the analysis one processed fruit (dried figs) and one processed vegetable (canned beets) for which we were unable to obtain fresh prices. We excluded fresh cranberries, all forms of lemons and limes, and dehydrated onions because they are not typically consumed as a serving, but rather used as an ingredient. We also excluded dried beans. The final sample consisted of 27 fruits and 30 vegetables, in 69 different forms of these fruits and 85 different forms of these vegetables (table 1).

Because the analysis included only plain processed versions, many popular items are excluded, such as tomato sauce, sweetened or flavored applesauce, fruits canned in syrup, frozen vegetables in sauces, and all mixtures of fruits or vegetables—such as carrots and peas or mixed melon balls. Our final sample accounted for 66 percent of all fruit retail sales (in dollars) and 59 percent of all vegetable sales. (Dried beans alone, which were not included in the analysis, accounted for 4.5 percent of all vegetable sales in dollars.)

For each item, we estimated the 1999 retail price per pound (weighted-average) by dividing the total dollars spent on that item by the total volume sold. This retail price per pound is the cost of *buying* fruits and vegetables. These prices represent the average price for all households’ purchases.

However, many fruits and vegetables contain much that is nonedible in the purchase weight. For example, we do not eat the cob and husk of fresh corn, or the rind on fresh watermelon. In addition, some edible parts are often removed during food preparation, such as stalks of celery or fresh broccoli. Among canned forms, the canning liquid was not counted as part of the serving except in the case of fruits packed in fruit juice, in which case the canning liquid—a fruit juice—was considered part of the fruit serving.

As a result of these corrections, a comparison of the price per pound may not be a good indicator of the cost per amount consumed. Therefore, for each item, we used conversion factors from the USDA Food and Nutrition Service’s *Food Buying Guide for Child Nutrition Programs, 2000*, to estimate the number of FGP servings obtained from a pound of the purchased item. These factors exclude all parts of the fruits and vegetables not usually eaten, such as the canning liquid in canned green beans (see box on how we estimated the number of servings). Using the number of servings per pound,

About the Data

We obtained retail prices using A.C. Nielsen Homescan data

for 1999. These data represent 7,195 households' food purchases at a variety of retail outlets nationwide, such as supermarkets, grocery stores, farmers' markets, mass merchandising outlets, and drugstores. Included households were in the sample for at least 10 months of the year. After a shopping occasion, households scanned each item purchased. The data captured only foods purchased at retail, not foods purchased at a foodservice outlet, such as restaurants or fast-food places.

The analysis covered fruits and vegetables that are estimated in the National Food Supply, for which we were able to obtain prices (27 fruits, 30 vegetables—see table 1). For comparison, and to eliminate nutritional differences, we selected processed versions—canned, frozen, dried, or juice products—that were most similar to the fresh version. For example, to the extent possible, we priced only unsweetened fruit juice, canned fruit packed in water or juice, and plain frozen fruits and vegetables with no additional ingredients. As a result, popular products—such as canned tomato sauce, ketchup, frozen mixtures of peas and carrots, frozen mixed melon balls, canned fruit packed in syrup, sweetened juices, or sweetened applesauce—are not included in the analysis. We did not include fresh cranberries, all forms of lemons and limes, and dehydrated onions since they are more commonly used as a flavoring and are not usually consumed as a serving. We also excluded “specialty” products such as Portabello mushrooms, frozen shredded carrots, and any products labeled organic.

Some data limitations were related to using of the UPC code, where the descriptions were often so vague that many assumptions had to be made. For example, for some items, we assumed that the “regular” versions represented the plain version, such as canned mushrooms and sweet potatoes, whereas for other items additional descriptors were available. In addition, for some items, the description was too vague to be used, as when greens were described only as “greens.” Also, some fresh fruits and vegetables were measured in counts instead of pounds, and it was not always clear what that represented. Some items could not be reliably priced. For some items, such as grapes and bell peppers, it was not possible to separate out the different types (such as green or red), so all types had to be grouped together. Finally, time limitations prevented us from pricing dry beans, because of their enormous variety.

Where price appeared to differ among the same product, we separated out different cuts (whole, sliced, shredded, pieces). Juices were also differentiated by whether they were shelf-stable, refrigerated, or frozen. Including the different forms (fresh, canned, frozen, dried, and juice), the final sample included 85 vegetable items and 69 fruit items.

To estimate the price per pound, we divided the total weighted dollars spent for each item by the total weighted sales volume for each item. To estimate the price per serving, we used the Food and Nutrition Service's *Food Buying Guide for Child Nutrition Programs, 2000*, which provides

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information on the serving yield for most fruits and vegetables, in fresh or processed form. For example, according to the Guide, a pound of fresh pears yields 4.1 ½-cup servings of pear, a pound can of sliced green beans provides 8.2 ½-cup servings of drained green beans, and a 16-ounce container of frozen peaches provides 5.46 ¼-cup servings. We converted the Guide's servings to FGP-serving sizes (1 cup of raw, leafy vegetables; ½ cup of fresh, canned, or frozen fruits and vegetables; ¾ cup of juice; or ¼ cup of dried fruits or vegetables*). To estimate the price per serving, we divided the price per pound by the total number of servings per pound for the product. For example, the weighted-average retail price of fresh apricots was \$1.48 per pound and there are 5.95 ½-cup servings in each pound. Dividing \$1.48 by 5.95 results in a price per serving of 25 cents per serving for fresh apricots.

we then estimated a price per serving for each item. We refer to this price as the cost of *eating* fruits and vegetables.

All prices estimated for this report reflect national annual average prices for fresh and processed fruits and vegetables purchased at retail. The cost of fruits and vegetables consumed away from home—at restaurants or fast-food outlets, for example—is not included in the estimated prices. Furthermore, the estimated prices do not reflect the prices that any one individual paid for that particular fruit or vegetable. For example, where the item is purchased—a farmers' market versus a supermarket, or even what supermarket—will affect the price. Whether the item is on sale, whether the customer uses a coupon, and what brand the customer chooses will also affect the price. For fresh produce, in particular, seasonality is likely to have a large effect on both the price and the quantity purchased. In addition, economies of scale are often associated with purchasing larger containers, so that the per-pound cost of buying a 26-ounce can of tomatoes is usually lower than the per-pound cost of buying a 14.5-ounce can (as is the cost of eating a serving of said tomatoes). For this analysis, prices are averaged out throughout the year, across all types of retail outlets and package sizes and brands, yielding a weighted-average price.

*Note: Servings for fresh fruit are ½ cup even when the FGP servings are 1 piece of fruit. For collard greens, okra, and turnip greens, which are leafy vegetables, the FGP serving is 1 cup; the conversion factors for these vegetables is for ½ cup of cooked vegetable.

Table 1—Fruits and vegetables included in the study

Fruits		Vegetables		
Apples	Honeydew melon, fresh	Asparagus	Collard greens	Potatoes
Fresh	Kiwi fruit, fresh	Fresh	Fresh	Fresh
Canned ¹	Mangoes	Canned ⁵	Canned ⁶	Canned ⁶
Apples	Fresh	Cut/tips	Frozen ⁶	Frozen ⁶
Applesauce	Frozen ¹	Whole/spears	Corn, sweet	Dried ⁶
Juice ¹	Canned	Frozen ⁵	Fresh	Radishes, fresh
Shelf stable	Nectarines, fresh	Cut/tips	Canned, whole kernel ⁶	Spinach
Refrigerated	Oranges	Whole/spears	Frozen, whole kernel ⁶	Fresh
Frozen concentrate ²	Fresh	Beans, green	Cucumbers, fresh	Canned ⁶
Apricots	Canned, Mandarin ³	Fresh	Eggplant, fresh	Frozen ⁶
Fresh	Juice ¹	Canned ⁶	Kale	Squash
Canned ³	Shelf stable	Cut/sliced	Fresh	Fresh, zucchini
Dried	Refrigerated	Whole	Canned ⁶	Canned, summer ⁶
Avocados, fresh	Frozen concentrate ²	Frozen ⁶	Frozen ⁶	Frozen, zucchini ⁶
Bananas, fresh	Frozen, not concentrated	Cut/sliced	Lettuce, iceberg	Sweetpotatoes
Blackberries	Papayas	Whole	Lettuce, leaf⁷	Fresh
Fresh	Fresh	Beets, canned⁶	Lettuce, Romaine	Canned ⁵
Frozen ¹	Frozen ¹	Broccoli	Mushrooms⁸	Frozen ⁵
Canned	Canned	Fresh	Fresh	Tomatoes
Blueberries	Peaches	Whole	Whole	Fresh
Fresh	Fresh	Fleurets	Sliced	Regular sized
Frozen ¹	Frozen ¹	Frozen ⁶	Canned ⁵	Cherry/grape
Canned	Canned, Clingstone ³	Chopped/cut	Whole	Roma/plum
Cantaloupe, fresh	Pears	Spears	Sliced	Canned ⁶
Cherries	Fresh	Fleurets	Broken	Juice
Fresh	Canned ³	Brussels sprouts	Frozen ⁵	Turnip greens
Frozen ¹	Pineapple	Fresh	Mustard greens	Fresh
Tart	Fresh, whole	Canned ⁵	Fresh	Canned ⁵
Sweet	Canned ³	Cabbage, green	Canned ⁶	Frozen ⁶
Canned	Juice ^{1 4}	Fresh	Frozen ⁶	
Tart ³	Plums	Canned, sauerkraut ⁵	Okra	
Sweet	Fresh	Carrots	Fresh	
Cranberries, juice^{1 4}	Dried, prunes	Fresh	Canned ⁵	
Figs, dried	Juice ^{1 4}	Whole	Frozen ⁶	
Grapefruit	Raspberries	Baby	Onions	
Fresh	Fresh	Canned ⁶	Fresh	
Canned ³	Frozen ¹	Sliced/cut	Canned ⁵	
Juice ¹	Canned	Whole/other	Frozen, pearl ⁶	
Shelf stable	Strawberries	Frozen ⁶	Peas, green	
Refrigerated	Fresh	Cauliflower	Fresh	
Frozen concentrate ²	Frozen ¹	Fresh	Canned ⁶	
Grapes	Canned	Whole	Frozen ⁶	
Fresh	Tangelos, fresh	Fleurets	Peppers, bell, fresh	
Dried, raisins	Tangerines, fresh	Frozen ⁶		
Juice ¹	Watermelon, fresh	Fleurets		
Shelf stable		Cut		
Frozen concentrate ²		Celery, fresh		

¹ Unflavored/unsweetened.

² Reconstituted.

³ Packed in juice/water.

⁴ Shelf stable.

⁵ Regular type.

⁶ Plain.

⁷ Red and green leaf lettuce.

⁸ Excludes "specialty" types of mushrooms, like Portobello and Shitake.

What Are We Buying?

According to the Homescan data, consumers spent \$223 billion on food at retail stores in 1999. Expenditures on fruits and vegetables accounted for 7.6 percent and 7.7 percent of this total. Fresh fruits and vegetables accounted for more than half of all expenditures on fruits and vegetables, while canned vegetables and fruit juices accounted for almost one-third of expenditures. In comparison, consumers spent 9 percent on bakery products, 8 percent on red meat, 6 percent on carbonated soft drinks, 4.3 percent on cheese, 3.4 percent on breakfast cereals, and 3.2 percent on candy (table 2).

We ranked the 27 fruits and 30 vegetables in our sample according to quantity purchased, expenditures, and total servings purchased, regardless of the form in which they were purchased (fresh, canned, frozen, or juice). Again, totals include only the processed products that are plain, unflavored, and/or unsweetened (to the extent possible).

Among the 27 fruits, Americans spent the most money on oranges, bought the most pounds of bananas, and ate the most servings of apples (table 3). These three fruits were the top three in quantity and servings, and among the top four in expenditures (consumers spent more on grapes than apples). For most fruits (except for watermelon and plums), quantity, cost, and servings are closely related.

Among the 30 vegetables, potatoes accounted for the largest share of expenditures, pounds purchased, and servings eaten (table 4). Potato totals were more than three times as many pounds purchased, and nearly four times as many servings (but only 15 percent more dollars) as tomatoes, the second most popular vegetable in all three categories.

Potato totals were more than three times as many pounds purchased, and nearly four times as many servings as tomatoes, the second most popular vegetable.

Table 2—Expenditures on food purchased at retail outlets, 1999

Food Category	Dollars	% of total	Food Category	Dollars	% of total
All foods	222,862,762,989	100			
Meat, poultry, and fish	41,078,298,793	18.4	Salty snacks including nuts	9,082,146,112	4.1
Red meat	17,664,342,800	7.9	Potato chips and sticks	2,500,371,872	1.1
Cold cuts, hot dogs, and spreads	8,559,269,929	3.8	Nuts and seeds	2,073,034,267	0.9
Poultry	6,429,383,509	2.9	Corn chips	1,624,490,878	0.7
Fish and shellfish	4,718,826,619	2.1	Popcorn	969,086,339	0.4
Bacon and sausage	3,706,475,935	1.7	Miscellaneous	885,989,636	0.4
			Pretzels	582,217,099	0.3
Bakery, cereal, and grain products	38,005,481,355	17.1	Cheese products	446,956,021	0.2
Cakes, pies, cookies, and other sweet products	11,881,544,428	5.3			
Bread, rolls, bagels, biscuits, and muffins	9,148,486,715	4.1	Candy, gum, and mints	8,104,053,108	3.6
Cereal	7,496,772,893	3.4	Candy	7,163,102,158	3.2
Crackers, croutons, and bars	4,812,948,468	2.2	Gum	650,816,951	0.3
Rice, pasta, and noodles	2,410,965,454	1.1	Mints	175,090,160	0.1
Crusts, shells, and tortillas	1,280,885,167	0.6	Marshmallows	115,043,838	0.1
Barley, meal, grits, and flour	629,221,254	0.3			
Miscellaneous	344,656,975	0.2	Sauces, gravies, marinades, etc.	5,796,967,387	2.6
			Sauces	3,819,277,789	1.7
Dairy, eggs, and dairy/egg substitutes	30,560,579,959	13.7	Catsup, mustard, relish	859,817,937	0.4
Milk, cream, and milk/cream substitutes	10,535,389,250	4.7	Dips and spreads	451,324,196	0.2
Cheese	9,614,062,455	4.3	Gravy	364,609,882	0.2
Desserts, toppings, and yogurt	7,389,271,370	3.3	Vinegar and cooking wine	211,079,375	0.1
Eggs and egg mixes	1,584,148,655	0.7			
Butter	969,467,368	0.4	Salad dressings, cooking fats and oils	4,937,384,840	2.2
Sour cream	468,240,860	0.2	Salad dressing	2,284,275,202	1.0
			Margarine	1,264,788,199	0.6
Beverages other than juice	22,978,356,323	10.3	Cooking oil	1,215,793,487	0.5
Soft drinks	13,284,342,252	6.0	Shortening and lard	172,527,951	0.1
Coffee, tea, cocoa, and breakfast drinks	5,653,300,350	2.5			
Fruit drinks and cider	2,903,185,329	1.3	Sugar/sugar substitutes, syrups, jams, etc.	3,819,112,513	1.7
Water	1,047,754,065	0.5	Sugar	1,171,015,097	0.5
			Peanut butter	879,583,291	0.4
Prepared meals/foods and soups	21,824,493,722	9.8	Jams, jellies, etc.	588,370,669	0.3
Entrees	9,688,724,654	4.3	Syrup	518,034,553	0.2
Miscellaneous	5,160,473,481	2.3	Sugar substitutes	289,307,738	0.1
Soups and stews	4,058,105,056	1.8	Honey	172,445,256	0.1
Pizza	2,375,599,930	1.1			
Snacks	541,590,601	0.2	Baking ingredients, gelatin, and pudding	2,214,189,078	1.0
			Chocolate syrup and chips	528,776,413	0.2
Vegetables	17,078,081,999	7.7	Pudding, gelatin, and other desserts	1,300,739,961	0.6
Fresh vegetables	8,465,366,602	3.8	Frosting and icing	351,249,832	0.2
Canned vegetables	4,837,535,868	2.2			
Frozen vegetables	2,663,600,587	1.2	Baby food	547,893,734	0.2
Vegetable juice	575,116,743	0.3			
Dried vegetables	536,462,198	0.2			
Fruits	16,835,724,066	7.6			
Fresh fruit	8,610,268,154	3.9			
Fruit juices	5,532,993,792	2.5			
Canned fruit	1,575,493,542	0.7			
Dried fruit	938,922,676	0.4			
Frozen fruit	178,045,903	0.1			

Source: Nielsen HomeScan database.

Table 3—Fresh and processed fruits: Quantity purchased at retail outlets, expenditures, and servings, 1999

Item	Quantity purchased		Expenditures		Servings	
	Million pounds	Ranking	Million dollars	Ranking	Millions	Ranking
Apples	2,243.2	3	1,530.5	4	1,3026.0	1
Apricots	48.8	22	91.4	18	374.6	18
Avocados	91.8	17	94.5	17	376.2	17
Bananas	3,606.5	1	1,622.6	2	9,737.6	2
Blackberries ¹	5.9	26	21.6	24	31.8	26
Blueberries	86.9	18	136.3	16	511.5	15
Cantaloupes	696.3	7	422.5	7	1998.4	9
Cherries	100.3	16	173.4	14	415.1	16
Cranberries	50.4	21	37.1	23	134.7	22
Figs	0.2	27	0.6	27	1.7	27
Grapefruit	753.4	6	411.7	8	2,252.0	7
Grapes	1,323.4	4	1,541.9	3	6,877.6	4
Honeydew	118.3	15	79.7	19	289.9	19
Kiwi	55.5	20	49.9	22	232.4	21
Mangoes	65.0	19	50.8	21	246.3	20
Nectarines	209.4	13	215.6	13	1,120.3	12
Oranges	2,836.7	2	1,687.8	1	7,038.7	3
Papayas	20.9	24	16.3	26	89.1	24
Peaches	365.1	10	353.3	10	1,594.6	10
Pears	259.5	12	230.7	12	1,051.5	13
Pineapples	409.7	9	346.2	11	1,410.2	11
Plums/prunes	346.5	11	790.8	5	2,414.8	6
Raspberries	16.9	25	64.4	20	102.0	23
Strawberries	418.8	8	620.8	6	2,174.0	8
Tangelos	21.9	23	20.9	25	73.1	25
Tangerines	154.1	14	154.0	15	599.6	14
Watermelon	1,166.8	5	375.5	9	3,558.7	5
Total	15,472.4		11,140.9		57,732.5	

Note: Includes only plain, unflavored, and/or unsweetened (to the extent possible) processed products.

¹Excludes some fresh blackberries that were included in a category called 'other berries' that could not be separated by type of berry.

Source: Calculated by the authors using Nielsen HomeScan Database.

Table 4—Fresh and processed vegetables: Quantity purchased at retail outlets, expenditures, and servings, 1999

Item	Quantity purchased		Expenditures		Servings	
	Million pounds	Ranking	Million dollars	Ranking	Millions	Ranking
Asparagus	127.5	18	211.0	14	316.4	21
Beans, green	997.5	5	594.0	6	4,320.1	5
Beets	43.0	22	28.0	23	124.4	23
Broccoli	429.9	10	433.7	9	3,325.4	8
Brussels sprouts	32.4	23	43.1	22	156.8	22
Cabbage	464.5	9	195.9	15	3,666.1	6
Carrots	997.3	6	796.3	3	5,668.2	4
Cauliflower	156.0	17	174.9	17	980.4	15
Celery	350.0	12	281.0	12	2,135.2	12
Collard greens	20.0	25	18.5	25	57.3	26
Corn, sweet	1,096.8	4	726.3	4	3,434.5	7
Cucumber	368.1	11	276.3	13	2,282.3	11
Eggplant	26.0	24	25.3	24	87.2	24
Kale ¹	5.3	30	4.7	30	24.5	30
Lettuce, iceberg	621.2	7	484.1	8	3,230.4	9
Lettuce, red leaf/green leaf	82.2	20	86.9	20	446.1	20
Lettuce, romaine, fresh	109.2	19	128.0	19	854.5	17
Mushrooms	220.0	15	527.6	7	1,778.2	13
Mustard greens ¹	9.3	29	8.5	29	45.0	27
Okra ¹	13.3	27	18.0	26	65.6	25
Onions	1,292.0	3	717.2	5	6,007.0	3
Peas, green	525.7	8	340.3	11	1,741.2	14
Pepper, bell	342.4	13	381.5	10	2,516.5	10
Potatoes	4,964.9	1	1,717.6	1	26,226.8	1
Radishes	76.2	21	62.0	21	582.9	18
Spinach	172.1	16	162.5	18	555.7	19
Squash, summer	10.9	28	12.8	28	40.4	29
Sweetpotatoes	291.2	14	176.8	16	937.8	16
Tomatoes	1,618.5	2	1,495.1	2	6,970.3	2
Turnip greens ¹	16.3	26	13.7	27	45.0	28
Total	15,479.7		10,141.7		78,622.1	

Note: Includes only plain, unflavored (to the extent possible) processed products.

¹Excludes some fresh greens that were included in a category called 'other vegetables' that could not be separated by specific vegetable.

Source: Calculated by the authors using Nielsen HomeScan Database.

How Expensive Are Fruits and Vegetables?

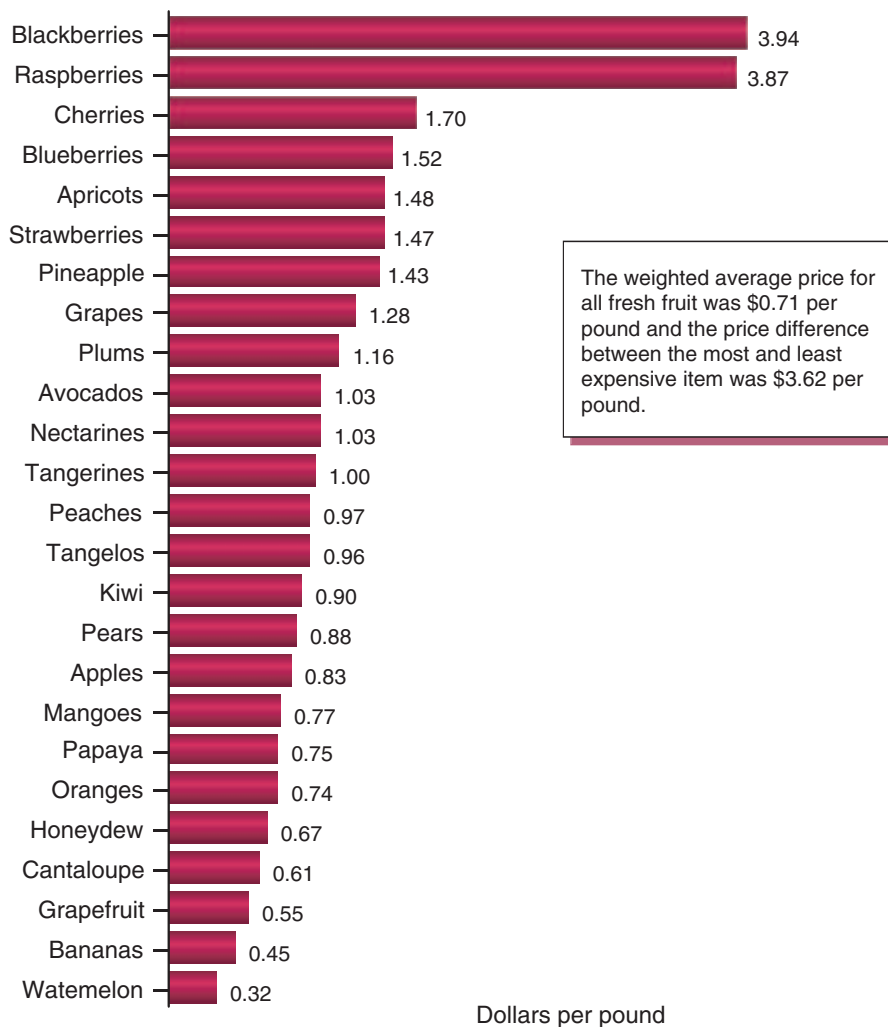
Prices for fruits and vegetables—in fresh and processed forms—vary widely. Fruit prices ranged from 32 cents per pound for fresh watermelon to \$4.00 per pound for prunes. Among vegetables, prices ranged from 31 cents per pound for fresh potatoes to \$4.57 per pound for frozen asparagus spears.

Purchase Price Versus Serving Price - Fruit

Among the 25 different types of **fresh** fruit, prices ranged from 32 cents per pound for watermelon to \$3.94 per pound for blackberries, with a weighted-average price of 71 cents per pound and a median price of 97 cents (fig. 1a). Only grapefruit, bananas, and the three types of melons cost less than the weighted-average price. However, these five fruits accounted for 56 percent of fresh fruit pounds purchased in 1999.

Figure 1a

How much does fresh fruit cost to buy?



Source: Nielsen HomeScan data, 1999.

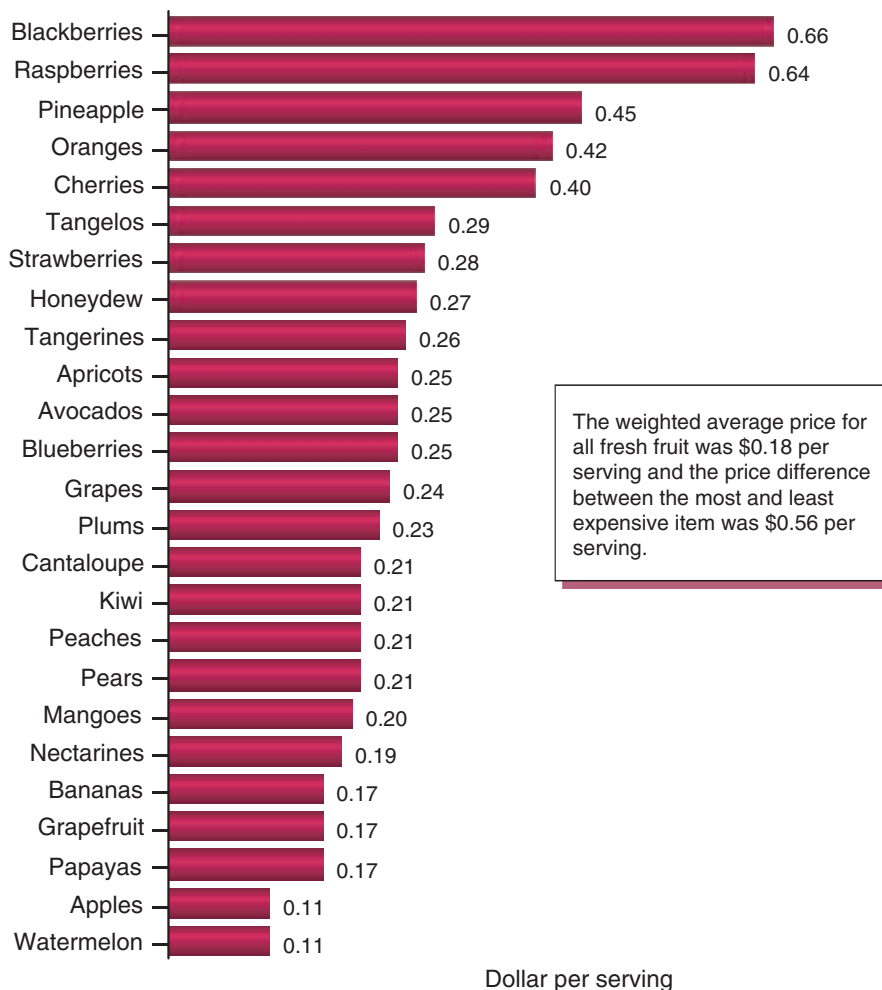
After adjusting for waste and serving size (because a pound provides anywhere from 2 to 14 servings), the price per serving for fresh fruits drops to a range of 11 cents a serving for apples and watermelon to 66 cents a serving for blackberries (fig. 1b). Almost two-thirds of the fresh fruits, 16 out of 25, cost 25 cents or less per serving, and only 2 of the 25 cost more than 50 cents per serving. The weighted-average price per serving for all fresh fruits was 18 cents per serving. Due to their very low serving yield per pound, oranges and honeydew were among the top 10 most expensive fruits per serving, despite being among the 10 least expensive fresh fruits at retail.

The sample included 16 different types and forms of **canned** fruit, including two types of canned cherries. Prices for canned fruit ranged from 66 cents for a pound of unsweetened applesauce to \$2.71 for a pound of canned blackberries, with a weighted-average price of 90 cents per pound (fig. 2a). As with fresh fruit, only three canned fruits cost less than the weighted-average price, but they accounted for over 70 percent of total canned purchases. Three-fourths of the canned fruits (12 out of 16) cost less than

Almost two-thirds of the fresh fruits, 16 out of 25, cost 25 cents or less per serving

Figure 1b

How much does fresh fruit cost to eat?

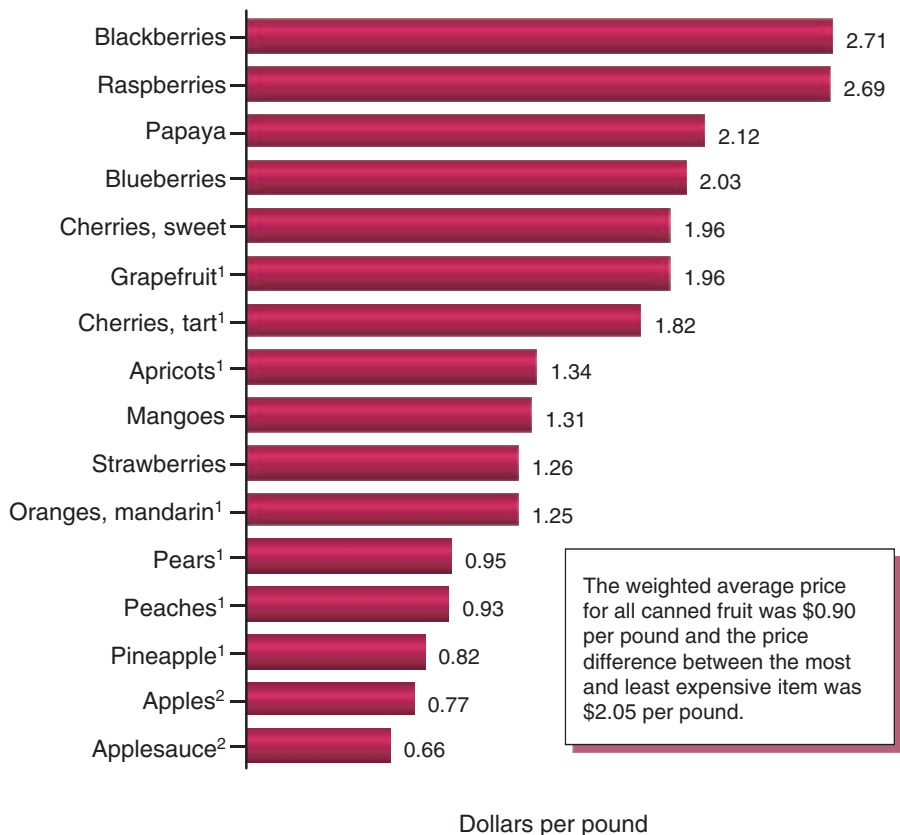


The weighted average price for all fresh fruit was \$0.18 per serving and the price difference between the most and least expensive item was \$0.56 per serving.

Source: Nielsen HomeScan data, 1999. Converted to servings using factors obtained from *The Food Buying Guide for Child Nutrition Programs*, U.S. Department of Agriculture, Food and Nutrition Service, revised November 2001.

Figure 2a

How much does canned fruit cost to buy?



¹Packed in juice or water. ²Unsweetened/unflavored.
 Source: Nielsen HomeScan data, 1999.

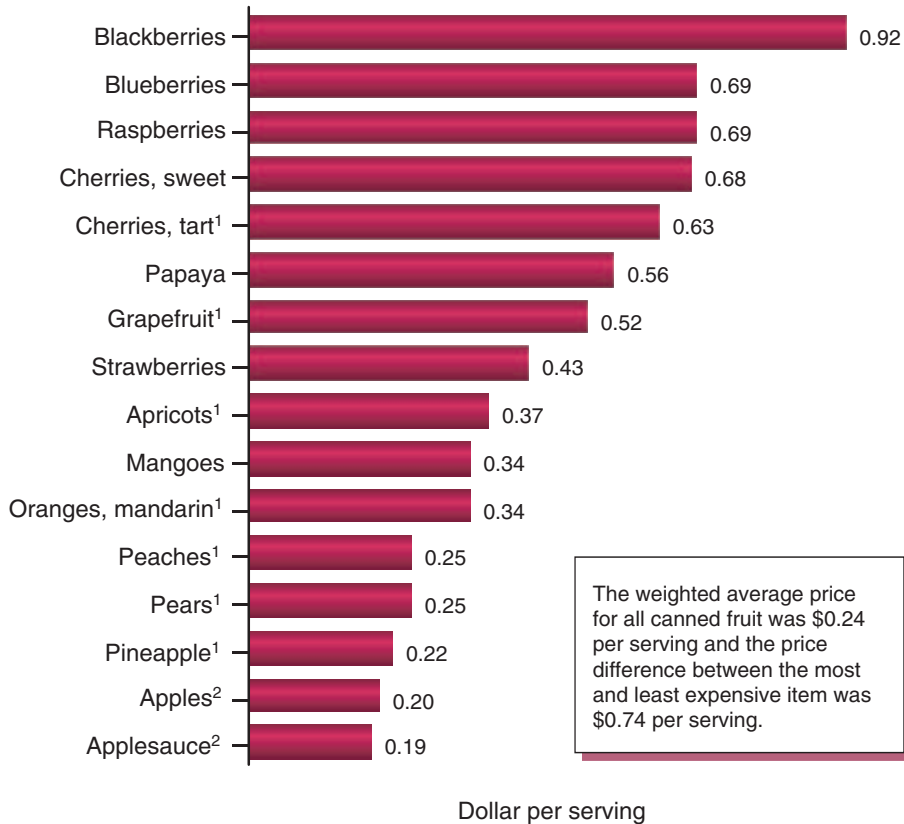
\$2.00 per pound. Canned fruits ranged in price from 19 cents per serving for unsweetened applesauce to 92 cents for canned blackberries (fig. 2b). Even though only 5 of the 16 canned fruits were priced at 25 cents or less per serving, the weighted-average price for all canned fruit was 24 cents per serving. This was due to the high volume of less expensive canned fruit (canned apples/applesauce, pineapples, peaches, and pears).

Our nine different types of **frozen** fruits ranged in price from \$1.24 for a pound of frozen papaya to \$3.39 for a pound of frozen raspberries, with a weighted-average price of \$2.04 per pound (fig. 3a). Four of the nine types of frozen fruit were below the weighted-average price and five were above. The four cheapest frozen fruits accounted for nearly three quarters of all frozen fruit purchased. Frozen fruit are the most expensive form of fruits by serving, with a weighted-average price of 51 cents per serving (fig. 3b). Interestingly, frozen raspberries, the most expensive frozen fruit to buy, dropped to fifth cheapest to eat, at 54 cents per serving.

Counting shelf-stable, refrigerated, and frozen versions for each of the seven fruit **juices** separately, prices for the 15 items ranged from 36 cents per pint for unsweetened, frozen apple juice to 74 cents per pint for shelf-stable cranberry juice, with a weighted-average price of 53 cents per pint (fig 4a). Price per serving varied little among the different fruit juices (fig. 4b), with

Figure 2b

How much does canned fruit cost to eat?

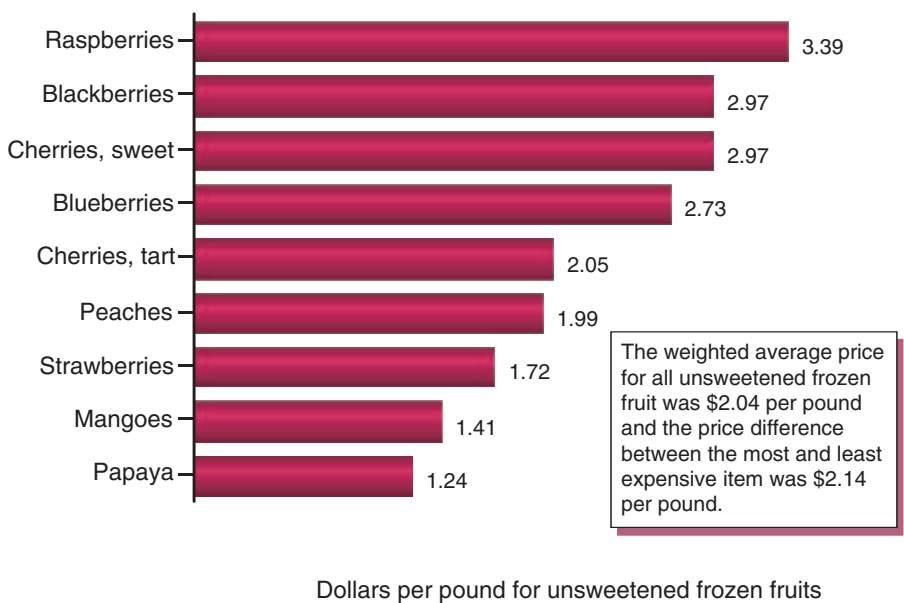


¹Packed in juice or water. ²Unsweetened/unflavored.

Source: Nielsen HomeScan data, 1999. Converted to servings using factors obtained from *The Food Buying Guide for Child Nutrition Programs*, U.S. Department of Agriculture, Food and Nutrition Service, revised November 2001.

Figure 3a

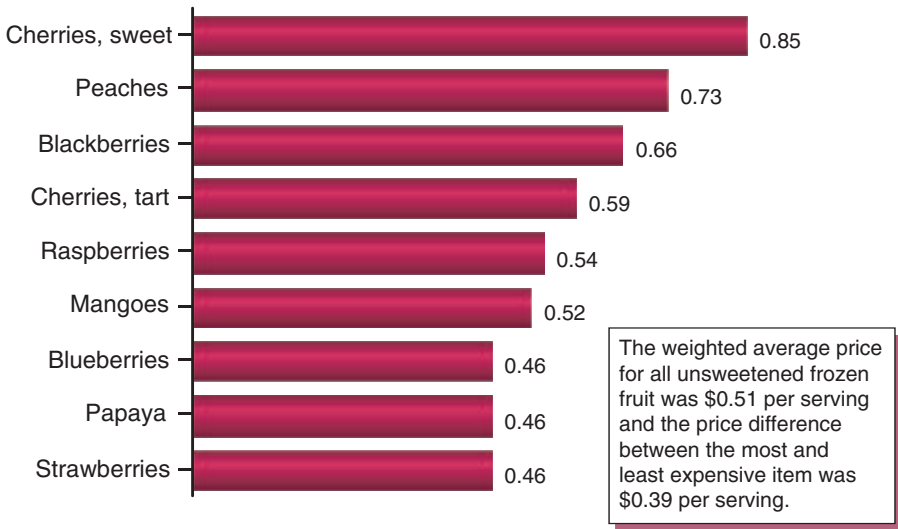
How much does frozen fruit cost to buy?



Source: Nielsen HomeScan data, 1999.

Figure 3b

How much does frozen fruit cost to eat?

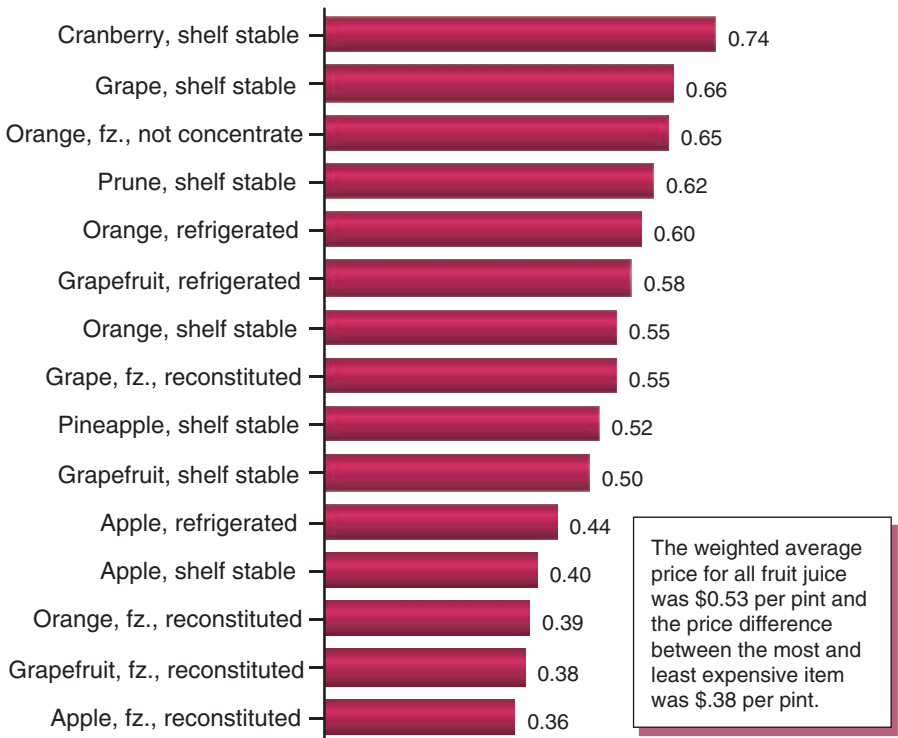


Dollar per serving for unsweetened frozen fruits

Source: Nielsen HomeScan data, 1999. Converted to servings using factors obtained from *The Food Buying Guide for Child Nutrition Programs*, U.S. Department of Agriculture, Food and Nutrition Service, revised November 2001.

Figure 4a

How much does juice cost to buy?

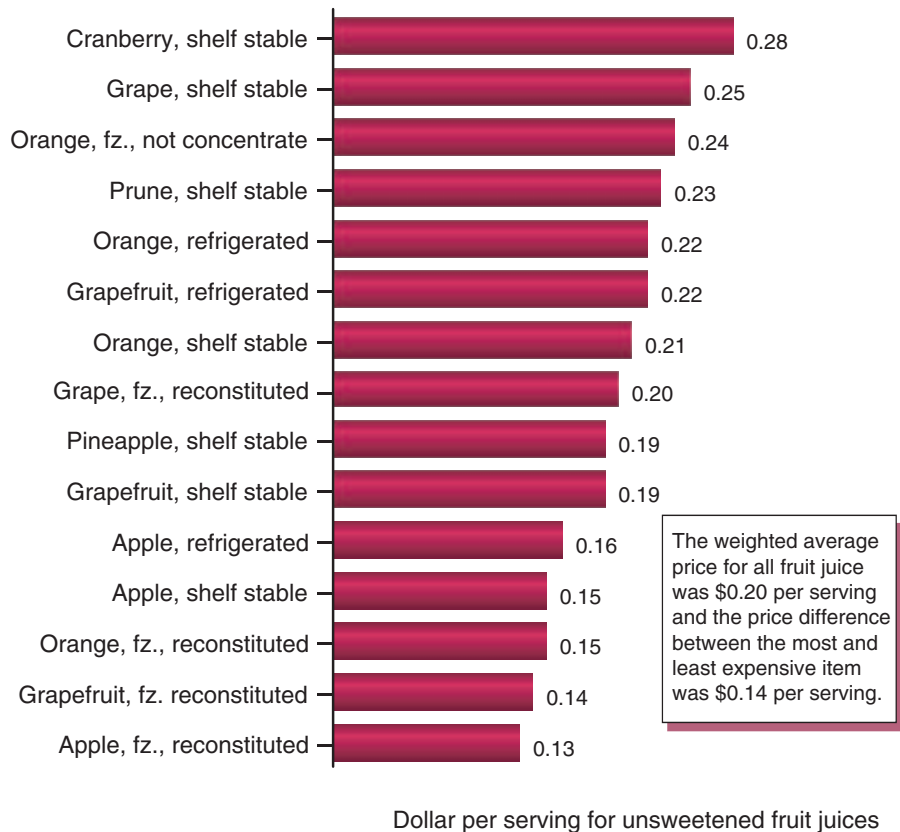


Dollar per pint for unsweetened fruit juices

Source: Nielsen HomeScan data, 1999.

Figure 4b

How much does juice cost to drink?



Source: Nielsen HomeScan data, 1999. Converted to servings using factors obtained from *The Food Buying Guide for Child Nutrition Programs*, U.S. Department of Agriculture, Food and Nutrition Service, revised November 2001.

frozen apple juice (13 cents a serving) the cheapest and cranberry juice (28 cents) the most expensive. The weighted-average price for all unsweetened fruit juice was 20 cents per serving.

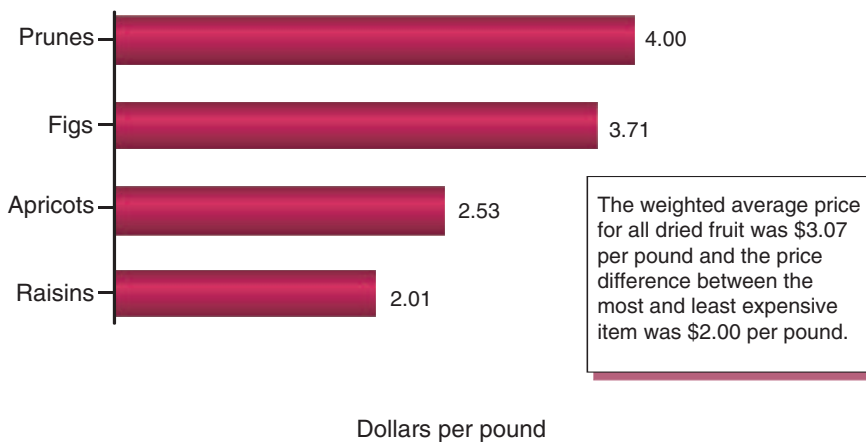
Retail prices for the four types of **dried** fruit included in our sample ranged from \$2.01 per pound for raisins to \$4.00 per pound for prunes, with a weighted-average price of \$3.07 (fig. 5a). However, retail prices for dried fruit are deceiving. Because the serving size for dried fruit is much smaller than the serving size for other fruits (¼ cup versus ½ cup for other fruit and ¾ cup for juice), the cost per serving becomes reasonable, ranging from 16 cents per serving for raisins to 38 cents for prunes (fig. 5b). This is cheaper than the price per serving for most canned and all frozen fruits.

In summary, although retail prices for fruits might appear high on a per-pound basis, few people may realize that a pound provides 3-5 servings for most fruits. Therefore, the price per serving is considerably lower. In 1999, it was possible to eat a serving of any of the 69 forms of fruits included in our analysis for less than a dollar. In fact, 37 of the fruit items cost 25 cents or less per serving, 54 items cost under 50 cents, and only 2 of the 69 fruit items cost more than 75 cents per serving.

It was possible to eat a serving of any of the 69 forms of fruits included in our analysis for less than a dollar.

Figure 5a

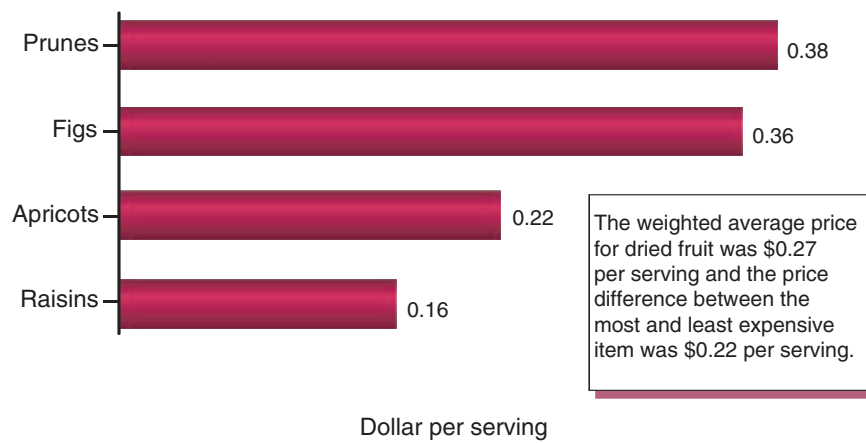
How much does dried fruit cost to buy?



Source: Nielsen HomeScan data, 1999.

Figure 5b

How much does dried fruit cost to eat?



Source: Nielsen HomeScan data, 1999. Converted to servings using factors obtained from *The Food Buying Guide for Child Nutrition Programs*, U.S. Department of Agriculture, Food and Nutrition Service, revised November 2001.

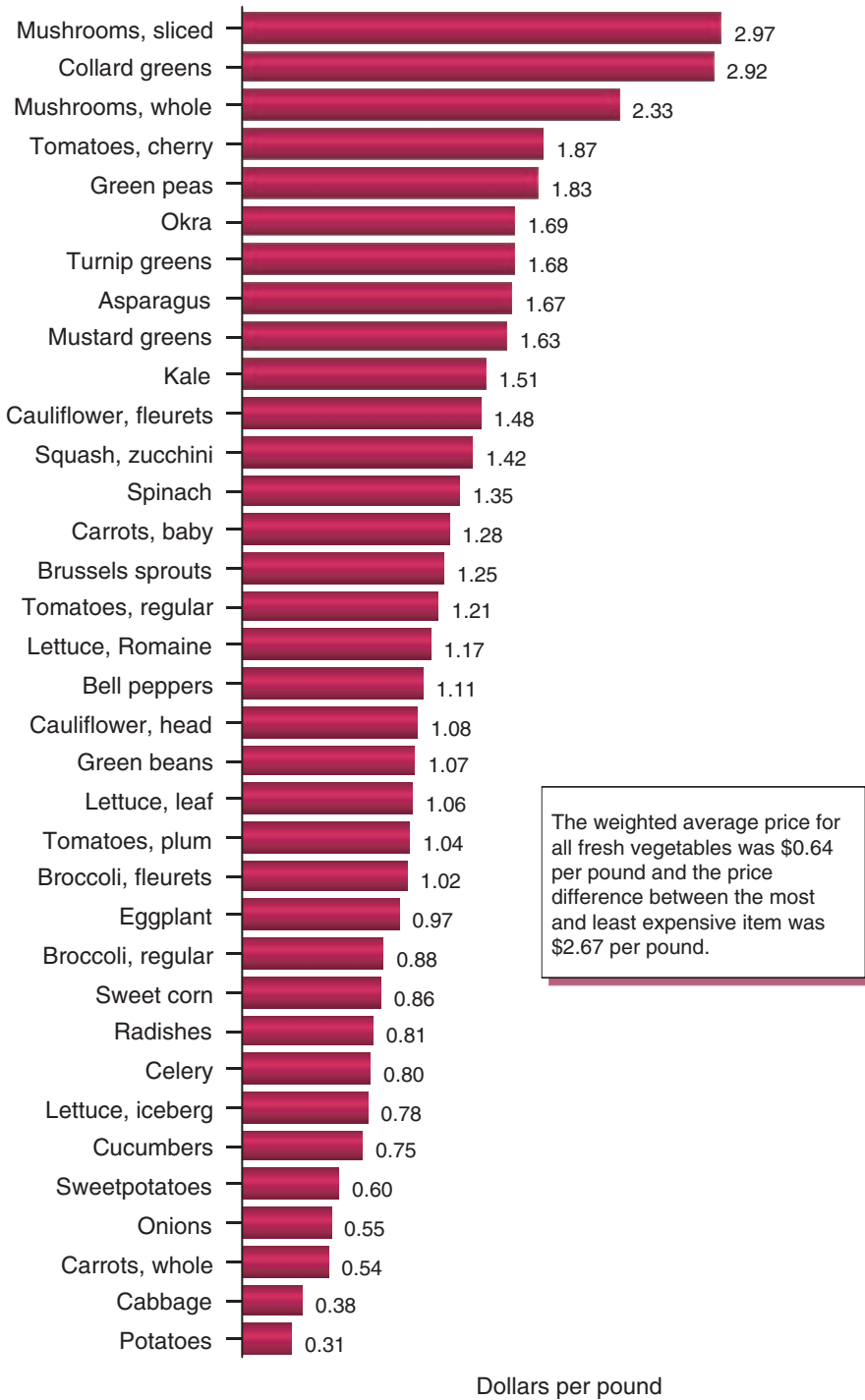
Purchase Price Versus Serving Price - Vegetables

Among the 35 **fresh** vegetable items included in the analysis, retail prices ranged from 31 cents per pound for potatoes to \$2.97 per pound for fresh, sliced mushrooms (fig. 6a). The weighted-average price for all fresh vegetables was 64 cents per pound. Only 5 of the 35 fresh vegetables were priced below the weighted-average price, 12 were priced below \$1.00 per pound, and all but 3 cost less than \$2.00 per pound. The five cheapest vegetables—potatoes, cabbage, whole carrots, onions, and sweet potatoes—accounted for 62 percent of all fresh vegetable purchases by weight.

Per serving, prices ranged from 4 cents for cabbage to 91 cents for shelled green peas, with a weighted-average price of 12 cents per serving (fig. 6b). More than two-thirds of the 35 fresh vegetables cost 25 cents or less per

Figure 6a

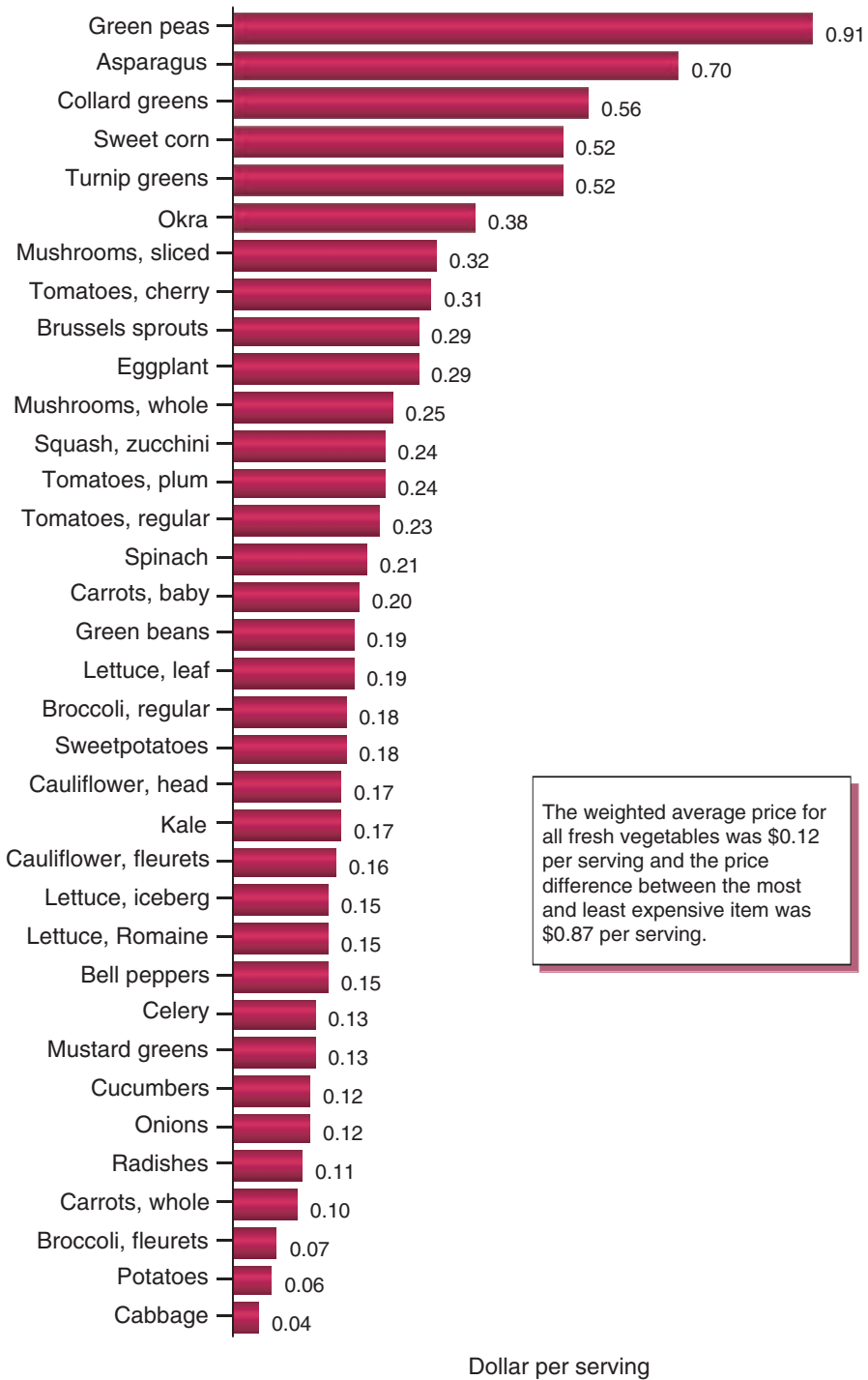
How much do fresh vegetables cost to buy?



Source: Nielsen HomeScan data, 1999.

Figure 6b

How much do fresh vegetables cost to eat?



The weighted average price for all fresh vegetables was \$0.12 per serving and the price difference between the most and least expensive item was \$0.87 per serving.

Source: Nielsen HomeScan data, 1999. Converted to servings using factors obtained from *The Food Buying Guide for Child Nutrition Programs*, U.S. Department of Agriculture, Food and Nutrition Service, revised November 2001.

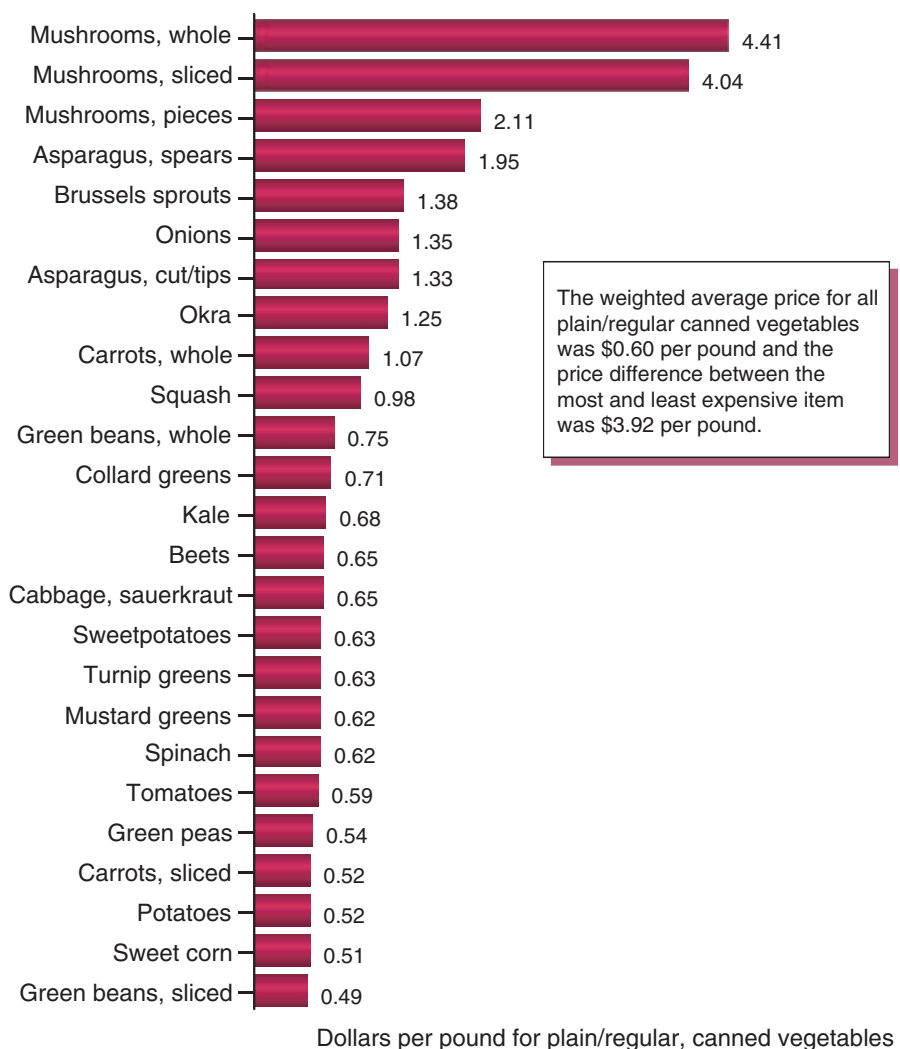
serving. A salad containing one cup of fresh Romaine lettuce leaves, ¼ cup of sliced onions, ½ cup of cucumbers, and ¼ cup of sliced carrots costs a total of 43 cents and provides 3 FGP servings. For an additional 50 cents, you could add a serving each of tomatoes and mushrooms.

Among the 25 plain/regular **canned** vegetable items, retail prices ranged from 49 cents per pound for canned, sliced green beans to \$4.41 per pound for canned, whole mushrooms (fig. 7a). The weighted-average price for all canned vegetable items was 60 cents per pound. Only 6 of the 25 canned vegetables priced below the weighted-average price, although 15 priced at or below 75 cents per pound. Only mushrooms (three types) were priced above \$2.00 per pound. As with fresh vegetables, the canned vegetables priced below the weighted-average price accounted for a majority of sold weight (85 percent).

Per serving, plain/regular canned vegetables ranged from 12 cents a serving for canned, sliced green beans to 76 cents for canned, whole mushrooms, with

Figure 7a

How much do canned vegetables cost to buy?



Source: Nielsen HomeScan data, 1999.

A salad containing one cup of fresh Romaine lettuce leaves, ¼ cup of sliced onions, ½ cup of cucumbers, and ¼ cup of sliced carrots costs a total of 43 cents and provides 3 FGP servings.

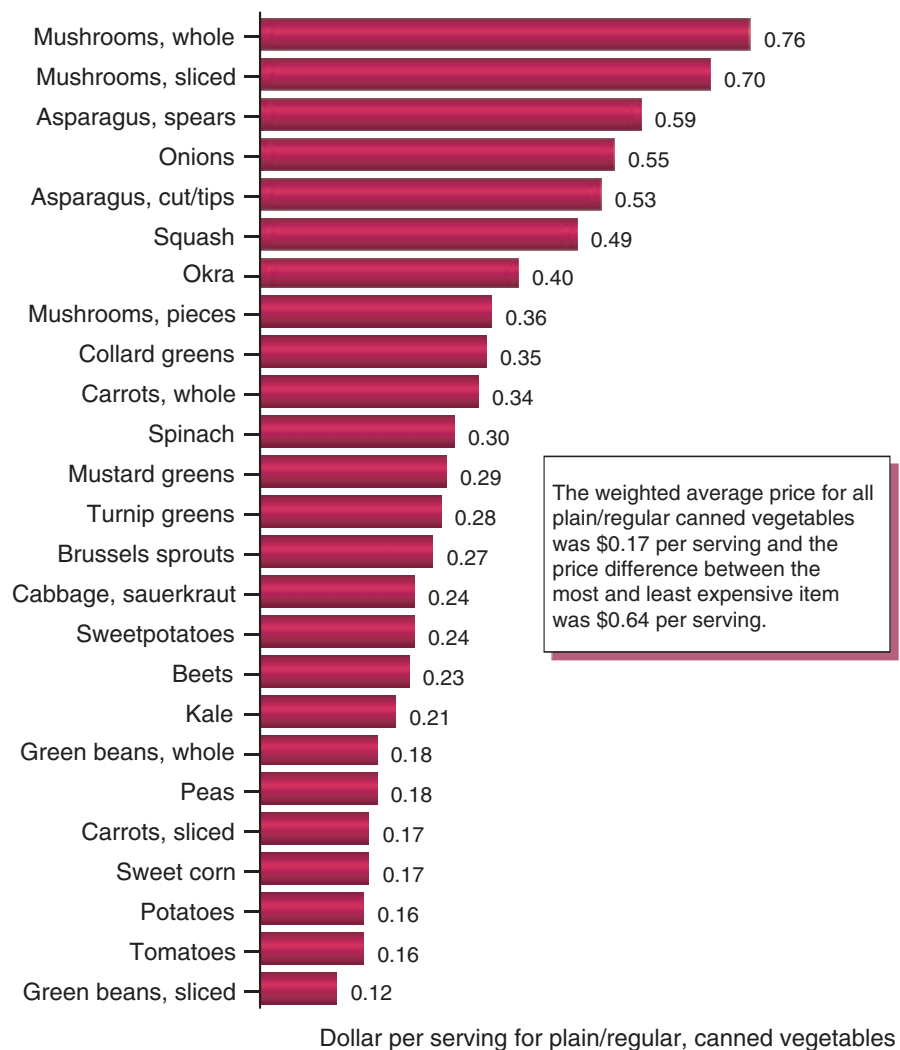
a weighted-average price of 17 cents per serving (fig. 7b). The cost per serving was less than 25 cents for 11 of the 25 canned vegetables and less than 50 cents for 20 of the 25 canned vegetables. Consumers who believe that canned vegetables are the best bargain might be surprised that they can save 81 cents on their homemade pizza by using a serving each of fresh onions and fresh, sliced mushrooms rather than a serving each of the canned equivalents.

Among the 23 plain/regular **frozen** vegetable items, prices ranged from 89 cents per pound for frozen onions (pearl onions) to \$4.57 per pound for whole, frozen asparagus, with a weighted-average price of \$1.11 (fig. 8a). Approximately one-third of the frozen vegetables were at or below the weighted-average price, and they accounted for almost three-quarters of frozen vegetables by sales volume.

Per serving, prices ranged from 17 cents for frozen, cut green beans to 85 cents for frozen, whole asparagus, with a weighted-average price of 22

Figure 7b

How much do canned vegetables cost to eat?

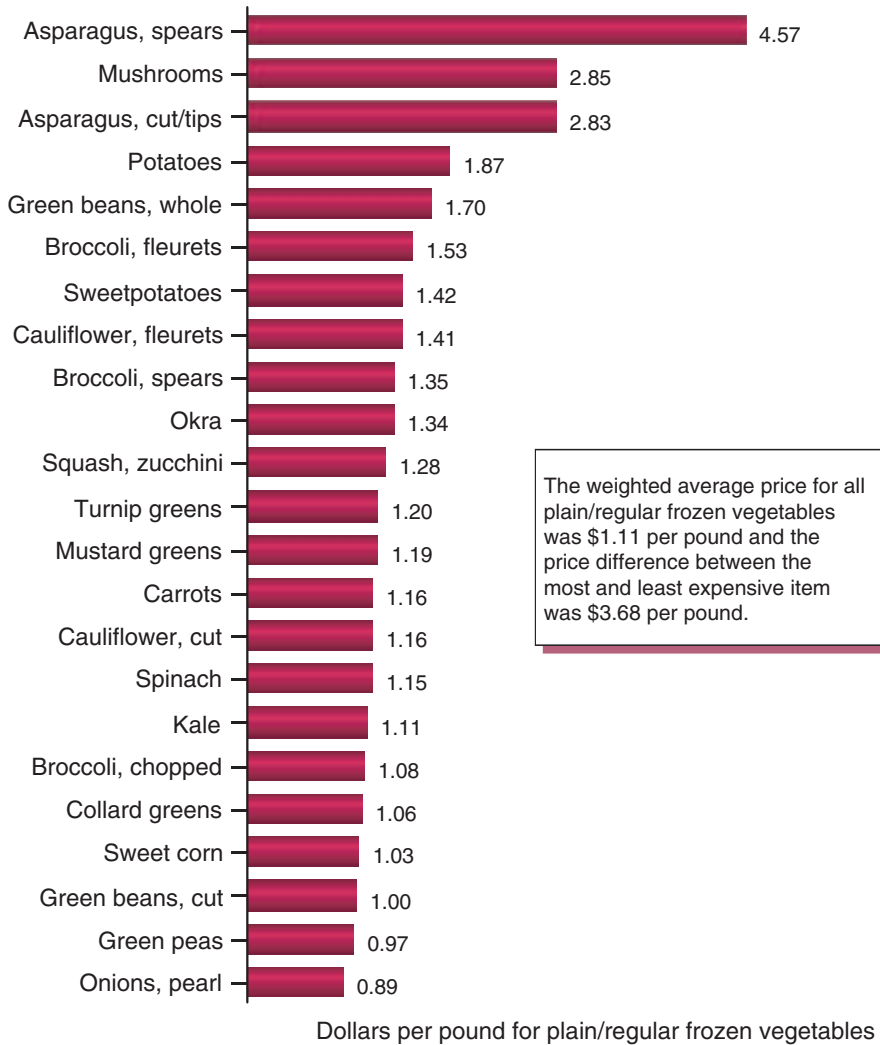


Source: Nielsen HomeScan data, 1999. Converted to servings using factors obtained from *The Food Buying Guide for Child Nutrition Programs*, U.S. Department of Agriculture, Food and Nutrition Service, revised November 2001.

Consumers who believe that canned vegetables are the best bargain might be surprised that they can save 81 cents on their homemade pizza by using fresh onions and fresh, sliced mushrooms rather than the canned equivalents.

Figure 8a

How much do frozen vegetables cost to buy?



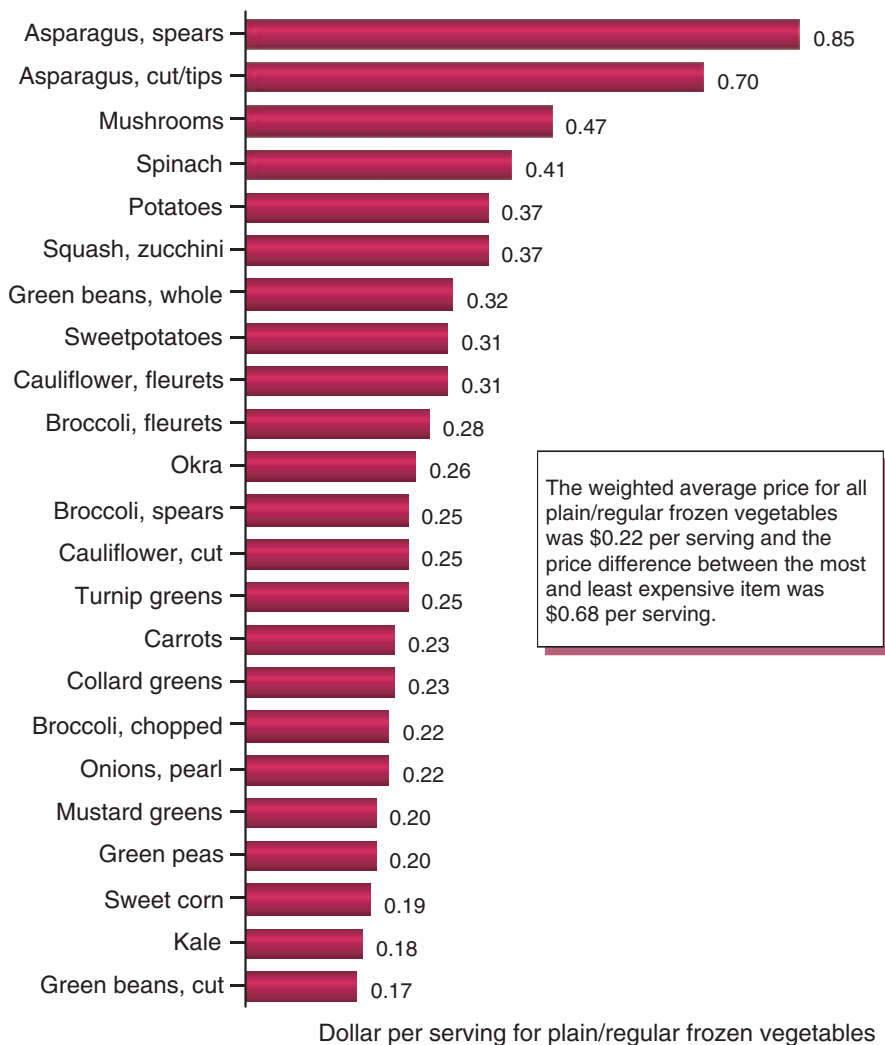
Source: Nielsen HomeScan data, 1999.

cents (fig. 8b). This was nearly twice the average cost of a serving of fresh vegetables, and a nickel more than a serving of canned vegetables. All frozen vegetables, except asparagus, cost less than 50 cents a serving. Without asparagus, there is only a 30-cent difference between the least and most expensive vegetable. A serving of frozen sweet corn was 33 cents cheaper per serving than fresh corn on the cob. On the other hand, a serving of frozen spinach was 20 cents more expensive than a serving of fresh spinach.

In summary, whether fresh, frozen, or canned, all 85 of the vegetables we priced were less than a dollar per serving, only three cost more than 75 cents a serving, and more than half were less than a quarter.

Figure 8b

How much do frozen vegetables cost to eat?



Source: Nielsen HomeScan data, 1999. Converted to servings using factors obtained from *The Food Buying Guide for Child Nutrition Programs*, U.S. Department of Agriculture, Food and Nutrition Service, revised November 2001.

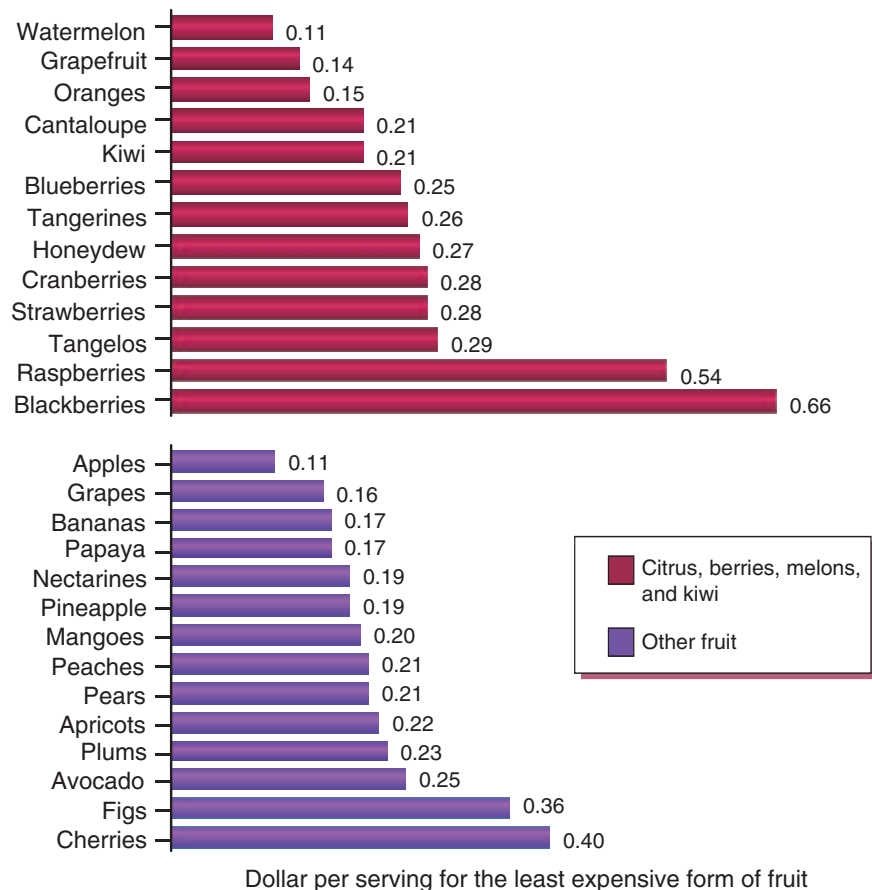
Cost of Meeting Dietary Recommendations

Dietary recommendations for an average dietary intake of 2,200 calories call for three servings of fruit daily, with consumption fairly evenly divided between (a) citrus, melons, and berries; and (b) other fruit. Dietary recommendations also call for four servings of vegetables daily, with consumption coming from (a) dark-green and leafy vegetables, (b) deep-yellow vegetables, (c) starchy vegetables, including potatoes, dry beans, peas, and lentils; and (d) other vegetables. Figures 9 and 10 show price per serving of all the fruits and vegetables in the study, based on the least expensive form for each fruit and vegetable. For example, fresh apples cost 11 cents per serving; canned apples, 20 cents; canned applesauce, 19 cents; and apple juice, 13-15 cents per serving. Therefore, we use the least expensive form for apples: fresh.

Based on Homescan data, three servings of fruit, with equal servings from the two subgroups, can cost as little as 37 cents. This includes ½ cup each of cut, fresh watermelon and apple, a little less than ½ cup of grapefruit juice, and 1/8 cup of raisins. Together, these fruits supply over 75 percent of the Daily Value for Vitamin C for 150 calories and less than 1 gram of fat.

Figure 9

Pyramid subgroups - fruit

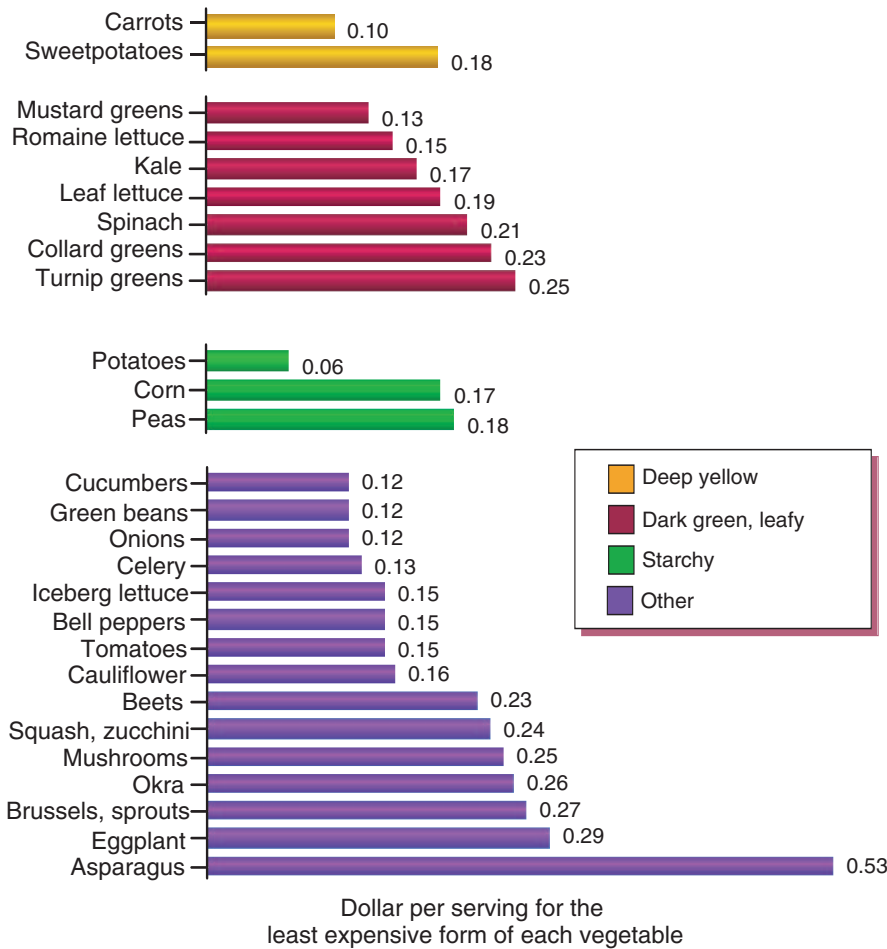


Dollar per serving for the least expensive form of fruit

Source: Nielsen HomeScan data, 1999. Converted to servings using factors obtained from *The Food Buying Guide for Child Nutrition Programs*, U.S. Department of Agriculture, Food and Nutrition Service, revised November 2001.

Figure 10

Pyramid subgroups - vegetables



Dollar per serving for the least expensive form of each vegetable

Source: Nielsen HomeScan data, 1999. Converted to servings using factors obtained from *The Food Buying Guide for Child Nutrition Programs*, U.S. Department of Agriculture, Food and Nutrition Service, revised November 2001.

Four servings of vegetables, with one serving from each of the four subgroups, can be obtained for an additional 27 cents. This includes ½ cup each of fresh carrots, broccoli fleurets, potatoes, and cabbage. Totaling just 75 calories, this combination provides 100 percent of the Daily Value for Vitamins A and C, and 15 percent of fiber.

That’s a lot of good nutrition for 64 cents, only 225 calories, and less than 1 gram of fat. According to the Consumer Expenditure Survey, in 1999 Americans spent an average of \$5.50 per person per day on food. So consumers trying to follow the Food Guide Pyramid can meet their daily recommendations for two out of the five major food groups for only 12 percent of their daily food expenditures. That leaves 88 percent of their food dollar left for the other three food groups. Even consumers from households whose income is less than 130 percent of the poverty line, and spend \$4.07 per person per day on food, have 84 percent of their food dollar left. Since consumers have different tastes and crave variety, table 5 shows seven different ways (one for each day of the week) to eat three servings of fruit and four servings of vegetables per day for a dollar or less.

Table 5--Seven ways to eat 3 servings of fruit and 4 servings of vegetables per day for a dollar or less

Item	Number of servings	Serving size	Dollars	Item	Number of servings	Serving size	Dollars
Total cost				Total cost			
1.00				0.90			
Apple juice, frozen	1	3/4 cup	0.13	Apricots, fresh	1	1/2 cup	0.25
Orange juice, frozen	1	3/4 cup	0.15	Orange juice, frozen	1	3/4 cup	0.15
Bananas, fresh	1/2	1/2 cup	0.09	Grapefruit, fresh	1/2	1/2 cup	0.09
Cantaloupe, fresh	1/2	1/2 cup	0.11	Apple, fresh	1/2	1/2 cup	0.06
Fruit				Fruit			
0.48				0.55			
Radishes, fresh	1	1/2 cup	0.11	Cabbage, fresh	1	1/2 cup	0.04
Carrots, fresh	1	1/2 cup	0.10	Sweetpotatoes, fresh	1	1/2 cup	0.18
Green peas, canned	1	1/2 cup	0.18	Potatoes, fresh	1	1/2 cup	0.06
Mustard greens, fresh	1	1 cup	0.13	Broccoli, fresh fleurets	1	1/2 cup	0.07
Vegetables				Vegetables			
0.52				0.35			
Total cost				Total cost			
1.00				0.82			
Apple juice, frozen	1	3/4 cup	0.13	Watermelon, fresh	1	1/2 cup	0.11
Raisins	1/2	1/4 cup	0.08	Peaches, fresh	1	1/2 cup	0.21
Kiwi, fresh	1/2	1/2 cup	0.11	Grapefruit juice, frozen	1/2	3/4 cup	0.07
Orange juice, frozen	1/2	3/4 cup	0.08	Raisins	1/2	1/4 cup	0.08
Fruit				Fruit			
0.40				0.47			
Green beans, canned	1	1/2 cup	0.12	Broccoli, fresh fleurets	1	1/2 cup	0.07
Sweetpotatoes, fresh	1	1/2 cup	0.18	Potatoes, fresh	1	1/2 cup	0.06
Sweet corn, canned	1	1/2 cup	0.17	Carrots, fresh	1	1/2 cup	0.10
Mustard greens, fresh	1	1 cup	0.13	Green beans, canned	1	1/2 cup	0.12
Vegetables				Vegetables			
0.60				0.35			
Total cost				Total cost			
0.99				0.64			
Banana, fresh	1	1/2 cup	0.17	Watermelon, fresh	1	1/2 cup	0.11
Apple juice, frozen	1	3/4 cup	0.13	Apple, fresh	1	1/2 cup	0.11
Cantaloupe, fresh	1/2	1/2 cup	0.11	Grapefruit juice, frozen	1/2	3/4 cup	0.07
Grapefruit, fresh	1/2	1/2 cup	0.09	Raisins	1/2	1/4 cup	0.08
Fruit				Fruit			
0.50				0.37			
Radishes, fresh	1	1/2 cup	0.11	Carrots, fresh	1	1/2 cup	0.10
Carrots, fresh	1	1/2 cup	0.10	Broccoli, fresh fleurets	1	1/2 cup	0.07
Lettuce, Romaine	1	1 cup	0.15	Potatoes, fresh	1	1/2 cup	0.06
Celery, fresh	1	1/2 cup	0.13	Cabbage, fresh	1	1/2 cup	0.04
Vegetables				Vegetables			
0.49				0.27			
Total cost				Total cost			
.96				.96			
Orange juice, frozen	1	3/4 cup	0.15	Orange juice, frozen	1	3/4 cup	0.15
Watermelon, fresh	1	1/2 cup	0.11	Watermelon, fresh	1	1/2 cup	0.11
Pears, fresh	1/2	1/2 cup	0.11	Pears, fresh	1/2	1/2 cup	0.11
Pineapple, juice	1/2	3/4 cup	0.10	Pineapple, juice	1/2	3/4 cup	0.10
Fruit				Fruit			
0.47				0.47			
Potatoes, fresh	1	1/2 cup	0.06	Potatoes, fresh	1	1/2 cup	0.06
Sweetpotatoes, fresh	1	1/2 cup	0.18	Sweetpotatoes, fresh	1	1/2 cup	0.18
Cucumbers, fresh	1	1/2 cup	0.12	Cucumbers, fresh	1	1/2 cup	0.12
Mustard greens, fresh	1	1 cup	0.13	Mustard greens, fresh	1	1 cup	0.13
Vegetables				Vegetables			
0.49				0.49			

Source: Nielsen Homescan Database, 1999.

Most and Least Expensive Ways To Buy

To determine whether fresh fruits and vegetables are more expensive than processed, we compared prices for the 16 fruits and 20 vegetables for which retail prices were available for both fresh and processed forms (canned, frozen, dried, and/or juice). Not all processed forms are available for all fruits and vegetables. Although green beans are available in fresh, canned, and frozen forms, broccoli is only available in fresh and frozen form. On the other hand, there may be more than one “type” for the forms available. For example, fresh carrots are available as whole and as baby carrots, whereas canned carrots are available whole or sliced. Some fruits and vegetables—such as melons, lettuce, and celery—were excluded from this analysis because they were only available in one form, typically fresh.

We also separated out the different types of juice (shelf-stable, refrigerated, frozen, and frozen concentrate) for this analysis. For each fruit and vegetable, we identified the forms with the highest and lowest price, both per pound and per serving.

Most and Least Expensive Forms of Fruits

No one form stood out as being the most expensive way of buying fruit at retail. Four fruits were most expensive when purchased fresh, five when purchased frozen, four when purchased canned, and three as dried, while juice was never the most expensive (fig. 11a). By serving, canned fruit became the most expensive form for nearly half of the 19 fruits (fig. 11b). Frozen fruit was the most expensive way to eat 4 of the 16 fruits. Oranges and pineapple were most expensive when eaten fresh.

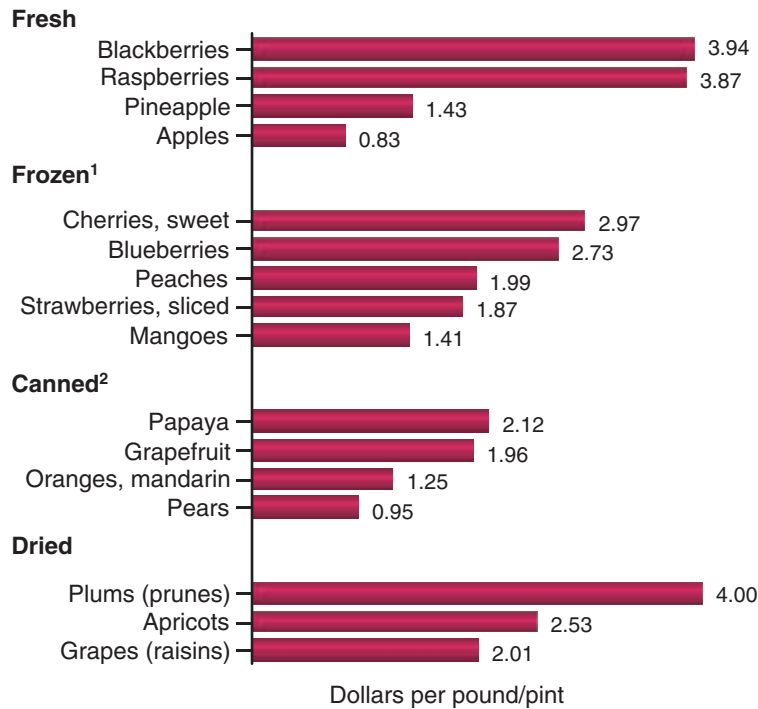
The cheapest way to buy fruit was fairly evenly distributed between fresh (5), juice (6), and canned (5) (fig. 12a). Frozen and dried fruit were never the cheapest way to buy fruit. When converted to servings, the cheapest way to eat fruit was overwhelmingly fresh (fig. 12b). Two-thirds of all fruits were cheapest when eaten fresh. Juice was the cheapest route to eat fruit for 3 of the 16 fruits. Canned was never the cheapest way to eat fruit. Dried apricots and raisins were the most expensive way to buy those two fruits (apricots and grapes), but when converted to servings they were actually the cheapest way to eat them. This is because dried fruit has such a high per-serving yield and the serving size is smaller, $\frac{1}{4}$ cup instead of $\frac{1}{2}$ cup for other forms of fruit.

Although there were price differences for different forms of fruits, the dollar-per-serving difference between the most and least expensive form of the same fruits was typically small (fig. 13). For example, the price per serving was 25 cents for fresh apricots, 37 cents for canned apricots, and 22 cents for dried apricots, so the price spread was 15 cents per serving. For half of the fruits in the sample, the price difference per serving between the most and least expensive forms was less than 25 cents, and for all but one fruit—peaches (canned vs. frozen)—it was under 50 cents.

When converted to servings, the cheapest way to eat fruit was overwhelmingly fresh.

Figure 11a

Most expensive way to buy fruit

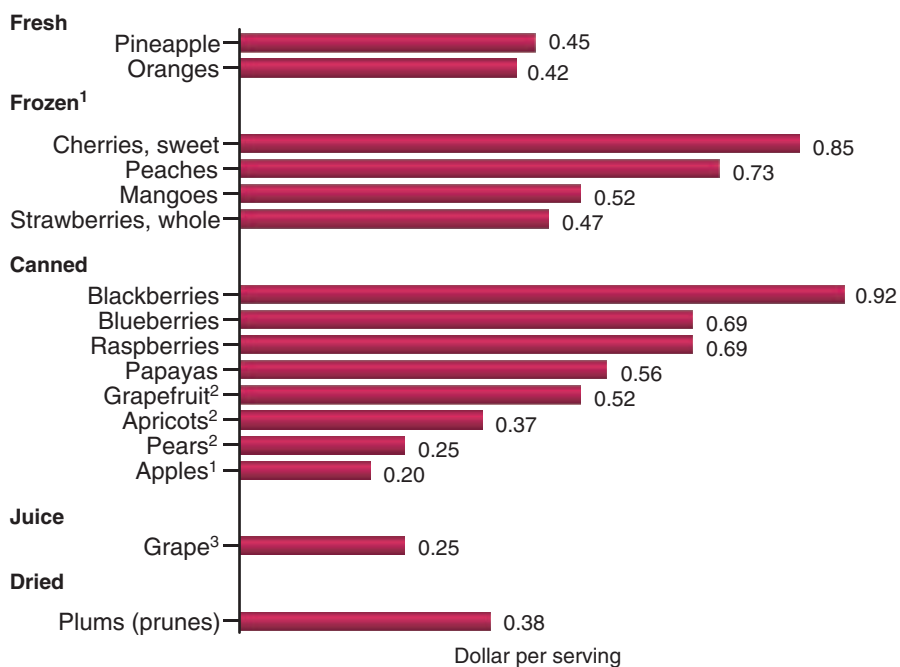


¹Unsweetened. ²Packed in juice, except canned papaya. Includes all canned papaya.

Source: Nielsen HomeScan data, 1999.

Figure 11b

Most expensive way to eat fruit

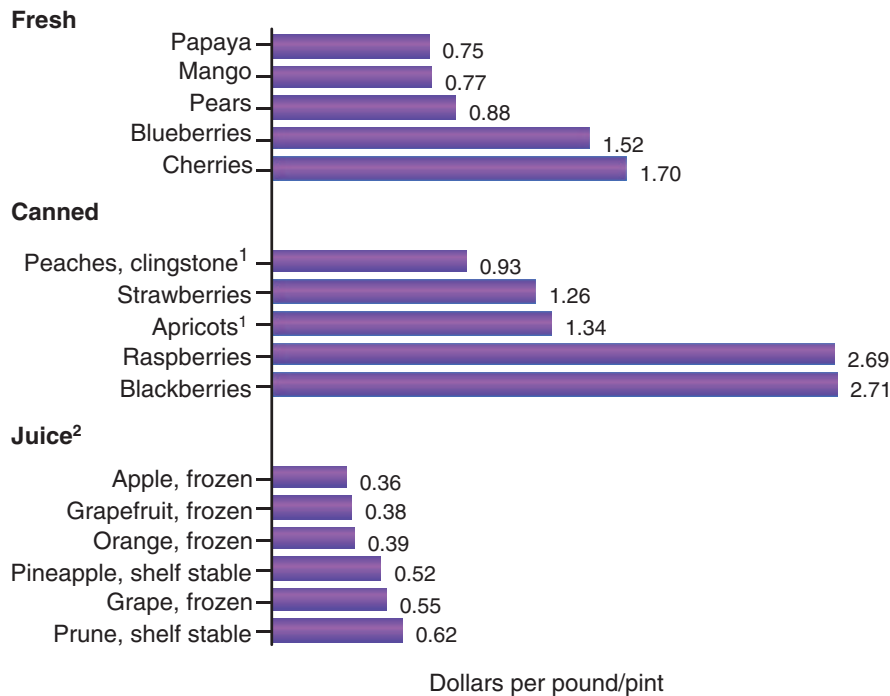


¹Unsweetened/unflavored. ²Packed in juice. ³Shelf stable.

Source: Nielsen HomeScan data, 1999. Converted to servings using factors obtained from *The Food Buying Guide for Child Nutrition Programs*, U.S. Department of Agriculture, Food and Nutrition Service, revised November 2001.

Figure 12a

Least expensive way to buy fruit

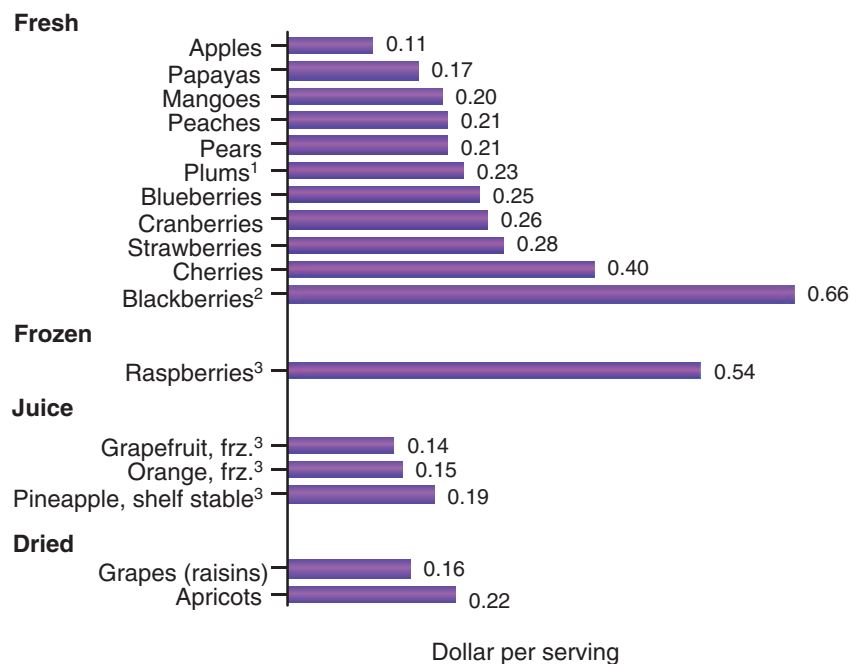


¹Packed in juice. ²Unsweetened.

Source: Nielsen HomeScan data, 1999.

Figure 12b

Least expensive way to eat fruit

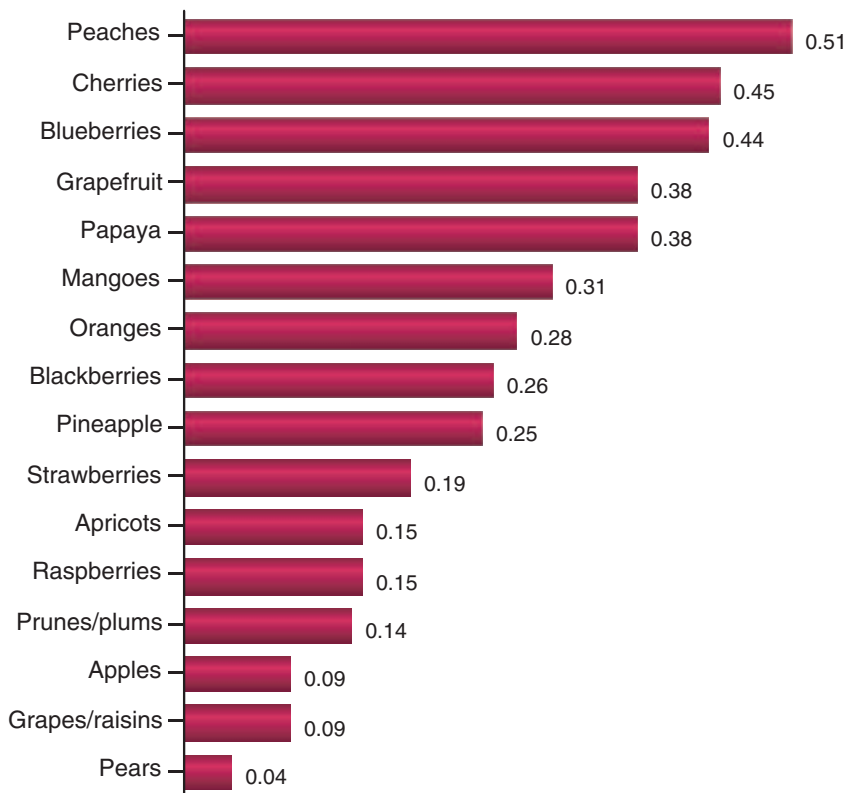


¹Fresh plums and shelf-stable prune juice were both the least expensive at 23 cents per serving. ²Fresh and unsweetened, frozen blackberries were both the least expensive at 66 cents per serving. ³Unsweetened.

Source: Nielsen HomeScan data, 1999. Converted to servings using factors obtained from *The Food Buying Guide for Child Nutrition Programs*, U.S. Department of Agriculture, Food and Nutrition Service, revised November 2001.

Figure 13

What is the price difference between the most and least expensive form of the same fruit?



Dollar per serving difference between most and least expensive form of same fruit

Source: Nielsen HomeScan data, 1999. Converted to servings using factors obtained from *The Food Buying Guide for Child Nutrition Programs*, U.S. Department of Agriculture, Food and Nutrition Service, revised November 2001.

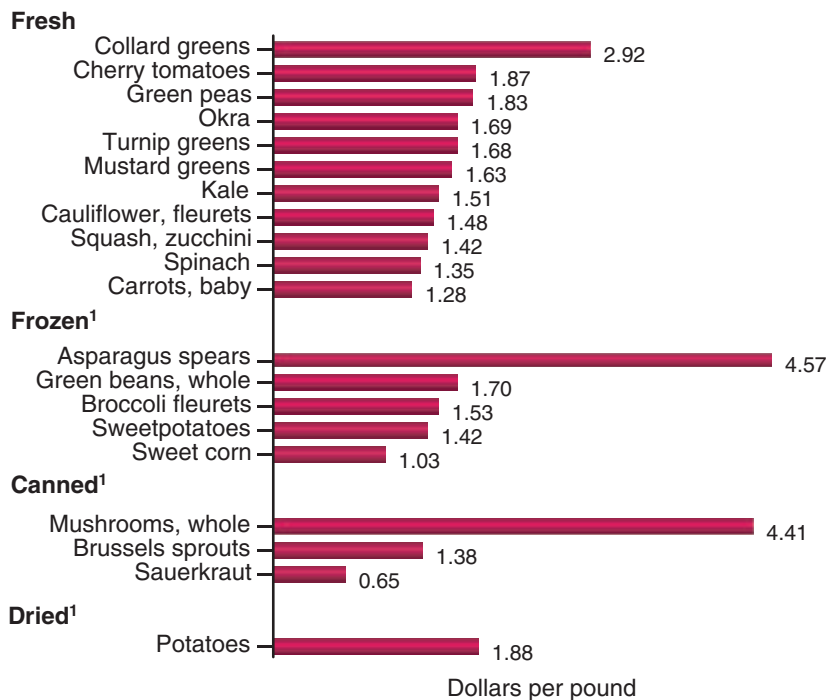
Most and Least Expensive Forms of Vegetables

Consumers’ perceptions that fresh produce is often more expensive than processed is bolstered by a comparison of the price per pound between fresh and processed vegetables (fig. 14a). Vegetables in their fresh form drew the highest price per pound for 11 of the 20 vegetables. For example, among the different types of carrots (fresh whole and baby carrots, canned whole and sliced, frozen whole and sliced), fresh, baby carrots had the highest price per pound. Frozen vegetables had the highest price per pound for 5 of the 20 vegetables. Canned vegetables were the most expensive for only three vegetables. We included only one dehydrated vegetable in our study, potatoes, and it drew the highest price per pound among potato forms.

However, per serving, the most expensive way of eating a particular vegetable becomes fairly evenly divided among canned vegetables (7 of the 20 vegetables), frozen (7), and fresh (6) forms (fig. 14b). It may seem surprising that for so many vegetables a serving was more expensive in canned form. The reason is that the weight of the canned vegetables

Figure 14a

Most expensive way to buy vegetables

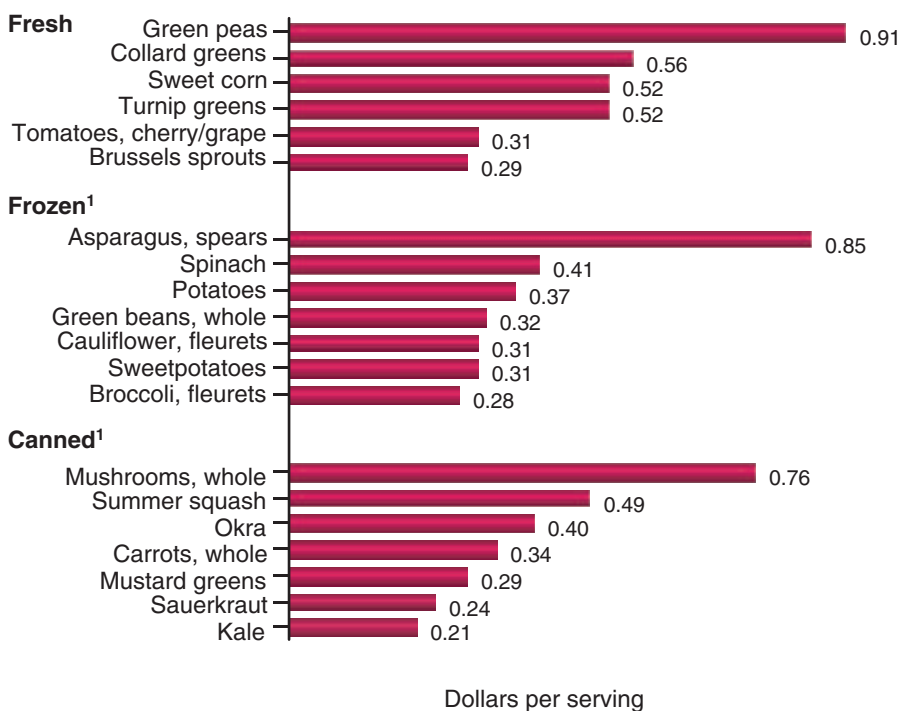


¹Plain/regular versions.

Source: Nielsen HomeScan data, 1999.

Figure 14b

Most expensive way to eat vegetables



¹Plain/regular versions.

Source: Nielsen HomeScan data, 1999. Converted to servings using factors obtained from *The Food Buying Guide for Child Nutrition Programs*, U.S. Department of Agriculture, Food and Nutrition Service, revised November 2001.

includes the packing liquid, whereas the serving size reflects a drained amount. As a result, most canned vegetables had fewer servings per pound than their fresh or frozen counterparts, so their price per serving increased.

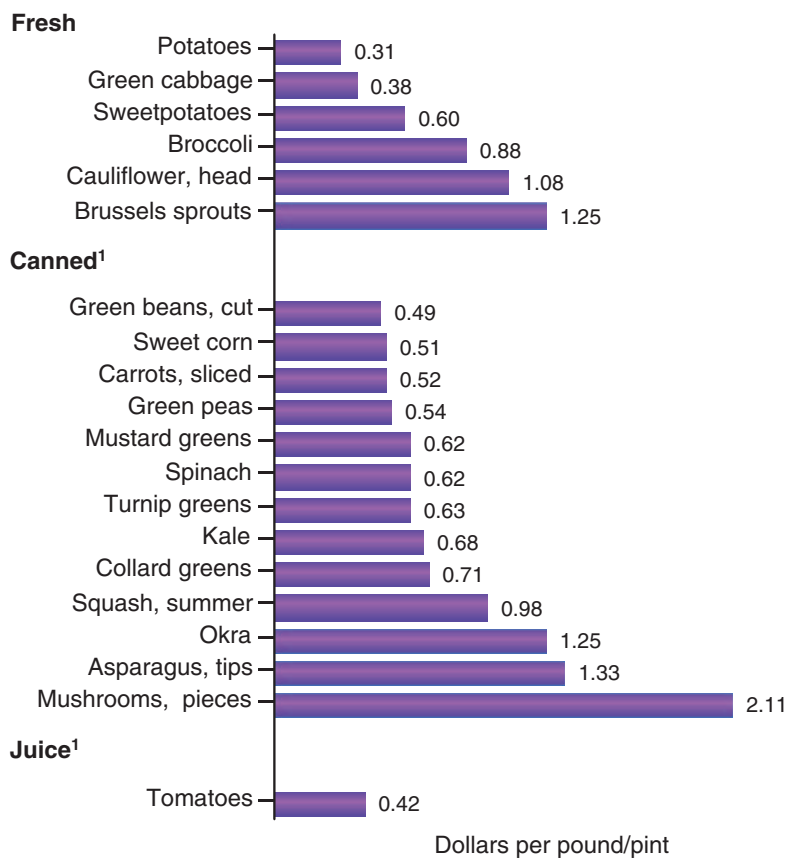
Since fresh and frozen vegetables are typically more expensive per pound than other forms, it is not surprising that the least expensive way of purchasing vegetables is in canned form (fig. 15a). For 13 out of 20 vegetables, a canned form was the cheapest way to buy a pound of the vegetable. For 6 vegetables, fresh was the least expensive way to buy a pound. Frozen was never the cheapest way to buy a pound of vegetables. Interestingly, tomato juice was the cheapest way to buy an equivalent amount of “tomatoes” (we used a pint of juice as equivalent to a pound).

For more than half of all vegetables, 11 out of 20, a serving was cheapest in fresh form (fig. 15b). For most vegetables, from cabbage to mushrooms, fresh yields the highest number of servings per pound.

For vegetables, the difference between the most expensive and the least expensive forms ranged from as little as 3 cents for Brussels sprouts to 73 cents for green peas (fig. 16). As with fruits, most of the price differences for vegetables were less than 25 cents, and all—except green peas and mushrooms—were less than 50 cents.

Figure 15a

Least expensive way to buy vegetables



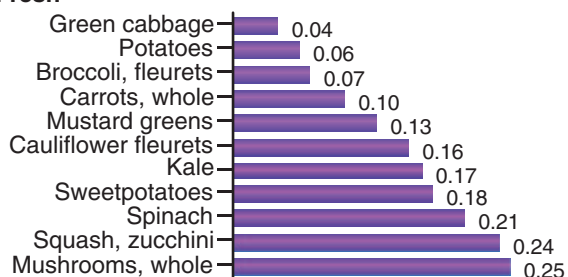
¹Plain/regular versions.

Source: Nielsen HomeScan data, 1999.

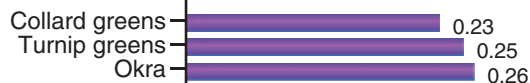
Figure 15b

Least expensive way to eat vegetables

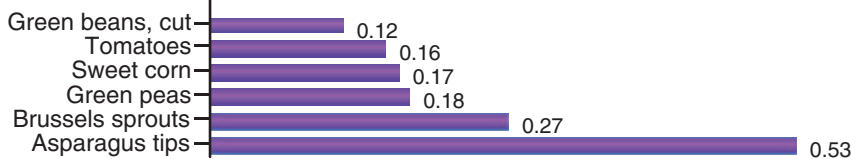
Fresh



Frozen¹



Canned¹



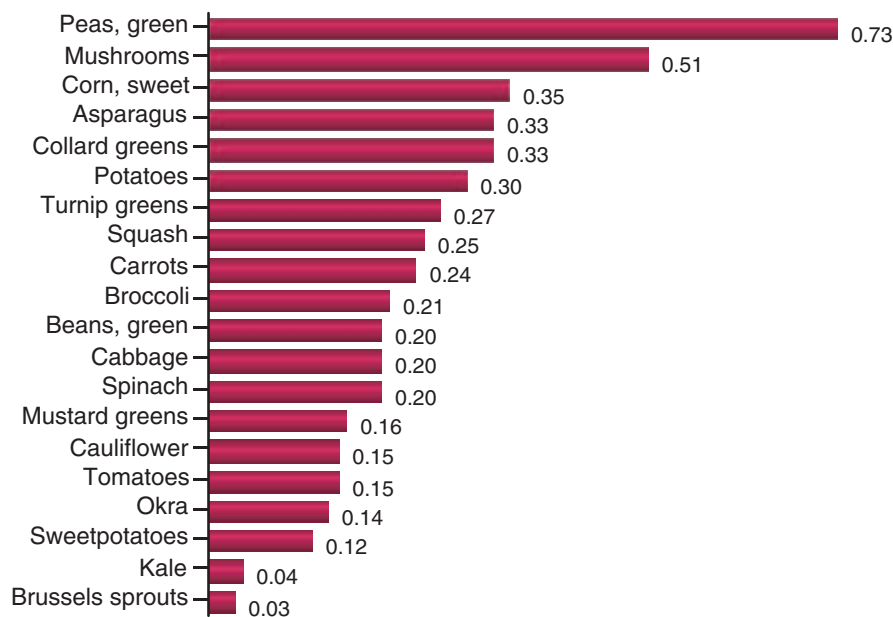
Dollar per serving

¹Plain/regular versions. ²Canned tomatoes and tomato juice were both the least expensive at 16 cents per serving.

Source: Nielsen HomeScan data, 1999. Converted to servings using factors obtained from *The Food Buying Guide for Child Nutrition Programs*, U.S. Department of Agriculture, Food and Nutrition Service, revised November 2001.

Figure 16

What is the price difference between the most and least expensive form of the same vegetable?



Dollar per serving difference between most and least expensive form of same vegetable

Source: Nielsen HomeScan data, 1999. Converted to servings using factors obtained from *The Food Buying Guide for Child Nutrition Programs*, U.S. Department of Agriculture, Food and Nutrition Service, revised November 2001.

Conclusion

Among the 69 forms of fruits and 85 forms of vegetables included in the analysis, more than half were estimated to cost 25 cents or less per serving in 1999, and 86 percent of all vegetables and 78 percent of all fruit cost less than 50 cents a serving. That's 127 different ways to eat a serving of fruits and vegetables for less than the price of a 3-ounce candy bar. In fact, consumers can meet the FGP recommendations of three servings of fruits and four servings of vegetables daily for as little as 64 cents. Consumers trying to meet the 5-a-day challenge could do so for even less.

Are fresh fruit and vegetables more expensive to eat than processed? According to our findings, definitely not. After adjusting for waste and serving size, 63 percent of fruits and 57 percent of vegetables were cheapest in their fresh form. However, these data do not consider spoilage. Expectations that fresh produce will go bad and be thrown out may be responsible for consumers' perception that fresh produce is more expensive than processed. Regardless, consumers need to be savvy and consider not only the price per pound, but also the number of servings obtainable from a pound.

Even though fresh fruits and vegetables are generally cheaper to eat than processed, for many fruits and vegetables the difference in price per serving between the cheapest and most expensive forms was often less than 25 cents. For some, this price difference may be a small price to pay for the conveniences—such as longer shelf life, ease of preparation, and greater availability—associated with processed forms. Although the prices for fruits and vegetables in this study are national averages for the entire year and not the prices that any household might face on a given day, they amply demonstrate that cost need not be a barrier to consumption of the recommended amounts of fruits and vegetables.

Economic literature suggests that consumers do not respond strongly to changes in prices of fruits and vegetables (Huang, 1993; Huang and Lin, 2000). However, it is clear that consumers buy more of the lower priced items. Among the 154 forms of fruits and vegetables included in the study, 27 percent (41 forms) cost less than the weighted-average price per pound, yet they accounted for 60 percent of total sales volume and 41 percent of total expenditures.

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