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GAO

Report to Congressional Requesters

July 2002

FRUITS AND VEGETABLES

Enhanced Federal Efforts to Increase Consumption Could Yield Health Benefits for Americans

GAO-02-657

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Abbreviations

CDC	Centers for Disease Control and Prevention
CSFII	Continuing Survey of Food Intakes by Individuals
DASH	Dietary Approaches to Stop Hypertension
DOD	U.S. Department of Defense
DOD Fresh	Department of Defense Fresh Fruit and Vegetable Project
FNS	Food and Nutrition Service
GAO	General Accounting Office
HHS	U.S. Department of Health and Human Services
NIH	National Institutes of Health
USDA	U.S. Department of Agriculture
WIC	Special Supplemental Nutrition Program for Women, Infants, and Children

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United States General Accounting Office
Washington, DC 20548

July 25, 2002

The Honorable Jo Ann Emerson
House of Representatives

The Honorable Sam Farr
House of Representatives

Fruits and vegetables are a critical source of nutrients and other substances that help protect against chronic diseases, including heart disease and cancer. Yet fewer than one in four Americans consumes the daily 5 to 9 servings of fruits and vegetables recommended by the federal *Dietary Guidelines for Americans*.

The Departments of Agriculture (USDA) and Health and Human Services (HHS) are required by law to update and publish the *Dietary Guidelines for Americans* at least every 5 years.[1] The guidelines contain nutritional and dietary information and guidance for the general public, on the basis of current scientific and medical knowledge. To emphasize the disease-preventing benefits of nutrients in different kinds of fruits and vegetables, the 2000 edition of the guidelines included a specific recommendation that consumers "choose a variety of fruits and vegetables daily" as part of a healthy diet. The guidelines also included USDA's *Food Guide Pyramid*, which illustrates the recommended numbers of servings from each of the food groups—grains, vegetables, fruits, milk, and meat/beans—that together constitute a healthy diet. In 2000 HHS also released *Healthy People 2010*, a report that set national health goals and objectives to be achieved by the end of the decade, for use by federal agencies, states, communities, professional organizations, and others to develop programs to prevent disease and improve and maintain health. Two of the objectives relate to fruits and vegetables: (1) increase, from 28 percent to 75 percent, the proportion of Americans who consume at least 2 daily servings of fruit and (2) increase, from 3 to 50 percent, the proportion of Americans who consume at least 3 daily servings of vegetables, of which at least 1 serving is a dark green or orange vegetable.

In addition to developing dietary guidelines and goals, federal agencies provide nutrition education and intervention for the general public and for

[1]See 7 U.S.C. 5341 (2000).

participants in federal food assistance programs. The National Cancer Institute, within HHS's National Institutes of Health (NIH), administers the 5 A Day for Better Health Program—the only federal nutrition education and intervention program focused exclusively on increasing the general public's consumption of fruits and vegetables to 5 to 9 servings daily. This public-private partnership between federal/state/local governments, the fruit and vegetable industry, and supermarkets uses a variety of strategies, from national media campaigns to local programs in which, for example, participants prepare new recipes with fruits and vegetables to reinforce the 5 A Day message and influence dietary change. The Centers for Disease Control and Prevention (CDC), also in HHS, works with states' 5 A Day programs and funds some states' efforts to establish programs that include nutrition education and intervention activities for the general public. In April 2002, HHS and USDA signed a memorandum of understanding that established a general framework for the two departments' agencies to work together to implement an enhanced national 5 A Day Program.

USDA's Food and Nutrition Service (FNS) funds and oversees federal food assistance programs, many of which have nutrition education components for program participants. Key federal food assistance programs, which are administered by FNS and state governments, provide the following food benefits:

- The **Food Stamp Program** provides low-income people with benefits to supplement their food-purchasing ability.

- The **National School Lunch and Breakfast Programs** provide schoolchildren with low-cost or free meals and snacks. USDA provides food and funding and, under an agreement between USDA and the Department of Defense (DOD), the DOD Fresh Fruit and Vegetable Project (DOD Fresh) also purchases fresh fruits and vegetables with USDA funds and delivers them to participating public and private nonprofit schools in 39 states, Guam, and Puerto Rico.

- The **Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)** provides low-income pregnant, breast-feeding, and postpartum women, infants, and children ages 1 through 4, with benefits for the purchase of specific food items, including juice and carrots. Some WIC participants also receive $10 to $20 annually to use at farmers' markets in the **WIC Farmers' Market Nutrition Program**.

- The **Seniors Farmers' Market Nutrition Program**, new in fiscal year 2001, provides about 380,000 low-income elderly Americans with an average of $28 each to use at farmers' markets.

As you requested, this report (1) examines the health-related benefits associated with consuming the recommended servings of fruits and vegetables; (2) determines the extent to which overall fruit and vegetable consumption by Americans has improved under key federal nutrition policy, guidance, and education programs for the general public; (3) assesses the impact of key federal food assistance programs on fruit and vegetable consumption by program participants; and (4) identifies federal actions that experts recommend for increasing the consumption of fruits and vegetables, as well as some of the implications of those actions. As agreed with your offices, the key federal food assistance programs we reviewed are the Food Stamp Program, WIC, the School Lunch and Breakfast Programs, and the farmers' market programs for WIC participants and for seniors. You also asked us to provide funding information for key USDA, HHS, and DOD programs that may promote fruit and vegetable consumption. This information, which we obtained by surveying the three departments, is incorporated throughout the report and presented in appendix I. In addition, because we are not a scientific body, we did not conduct an independent study of the health benefits of various foods; rather, we reviewed existing literature and are reporting information contained in that literature. Therefore, nothing in this report would constitute an authoritative statement that could be used, under section 403(r)(2) of the Federal Food, Drug, and Cosmetic Act, to support a claim of a health benefit of any food; nor would anything in this report constitute valid support for a petition under section 403(r)(4) of the act to allow such a claim to be made. Our scope and methodology are presented in appendix II.

Results in Brief

Scientific evidence shows that consuming the recommended 5 to 9 daily servings of fruits and vegetables helps protect against heart disease and cancer. For example, studies show that people who consume 5 or more servings of fruits and vegetables daily have about one-half the cancer risk of those who consume fewer than 2 servings, according to NIH. Fruits and vegetables provide more than 100 dietary compounds, including vitamins and minerals, that may also have the potential to reduce the risk of obesity and many other chronic diseases including stroke, diabetes, and diverticulosis, according to reviews of the research by NIH, CDC, and academic experts. Deeply colored fruits, such as apricots and blueberries, and dark green or orange vegetables, such as spinach and carrots, are

particularly high in these compounds. While there is no estimate for disease-related costs or number of deaths attributable to low fruit and vegetable consumption, medical experts, including the Surgeon General, have noted that physical inactivity and poor diet—of which low consumption of fruits and vegetables is a key component—cause diseases that result in the death of more than 300,000 Americans each year.

Fruit and vegetable consumption by the general public as a whole has increased by about half a serving under key federal nutrition policy, guidance, and education programs, as shown by national consumption data compiled by federal agencies. In particular, 5 A Day, the one education and intervention program that encourages Americans to eat 5 to 9 servings of fruits and vegetables daily, has shown some success in improving consumption. However, most Americans still do not consume the 5 to 9 daily servings recommended in the *Dietary Guidelines for Americans*. Moreover, the consumption of the dark green or orange vegetables beneficial for disease prevention remains far below the *Healthy People 2010* objectives. This low consumption of fruits and vegetables may be due to factors such as taste preferences, cost, and the ready availability of other foods. Moreover, the *Food Guide Pyramid* graphic—the most widely recognized nutrition guidance—does not communicate the need to consume a variety of fruits and vegetables, particularly deeply colored ones that the *Dietary Guidelines for Americans* identifies as high in nutrients important for disease prevention and health promotion. The April 2002 commitment by USDA and HHS to promote a comprehensive national 5 A Day program could provide a framework for helping Americans meet the 2010 nutrition objectives for fruits and vegetables.

Key federal food assistance programs have had mixed effects on fruit and vegetable consumption by participants, as shown by national consumption data. However, increasing fruit and vegetable consumption is not a primary focus of these programs, which are intended to, among other things, reduce hunger and support agriculture. Food stamp participants and women in WIC consume about the same number of servings as nonparticipating low-income people and fewer servings than the general public. However, children in WIC and in the School Lunch and Breakfast Programs have shown some improvement. WIC children consume 0.3 serving more of fruit than similar nonparticipants; school meal children consume 0.7 serving more of vegetables (largely french fries) than nonparticipants at lunch and 0.4 serving more of fruit at breakfast. The consumption of fruits and vegetables at schools that use DOD Fresh may be higher because the produce available to the schools is generally lower priced, greater in variety, and higher in quality than otherwise available to

schools, according to the American School Food Service Association. In addition, participants in farmers' market programs may consume more fruits and vegetables. However, DOD Fresh and farmers' market programs are relatively small components of all food assistance programs. USDA also supports nutrition education and intervention, as well as research, to improve dietary habits of low-income Americans. In the April 2002 announcement regarding the expansion of 5 A Day, the Secretary of Agriculture noted that the food assistance programs enable USDA to reach millions of Americans and that USDA will commit the necessary resources to meet 5 A Day goals. However, USDA has not yet identified specific strategies for this 5 A Day commitment or for helping food assistance participants meet the *Healthy People 2010* objectives related to fruits and vegetables.

Federal officials and academic nutrition experts, as well as food advocacy and consumer groups, have identified a number of actions the federal government could take to encourage more Americans to consume the recommended 5 to 9 daily servings of fruits and vegetables. These actions include expanding nutrition education efforts, such as 5 A Day; modifying the WIC program to allow participants to choose from more of those fruits and vegetables important to disease prevention; expanding the use of DOD Fresh in schools; and expanding farmers' market programs for food assistance participants. These options could require additional resources or redirecting existing resources from other programs. That notwithstanding, USDA and HHS have committed to expanding 5 A Day, and USDA is already considering changes in WIC to allow more choices of vegetables.

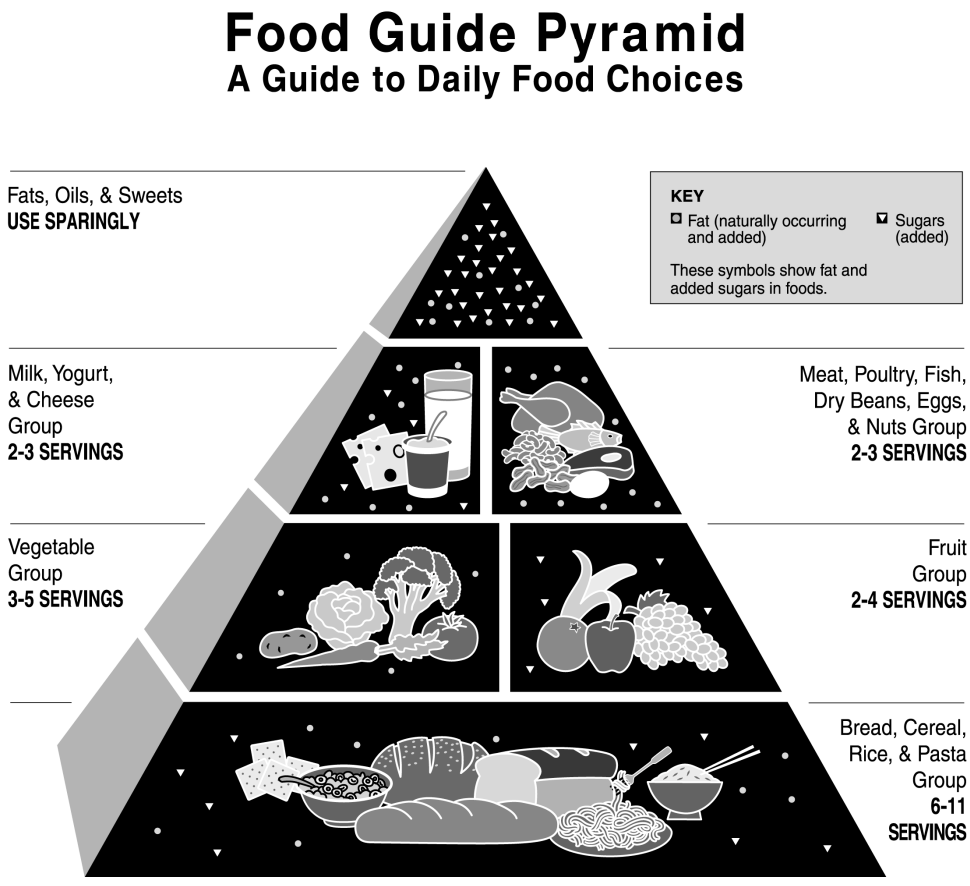
This report makes recommendations to USDA and HHS to encourage Americans to increase their consumption of fruits and vegetables important in disease prevention as part of a healthy diet. In commenting on a draft of this report, USDA and HHS generally concurred with our recommendations, although both pointed out that fruit and vegetable consumption should be addressed in the context of total diet. We agree. While the report focuses on fruits and vegetables, it discusses their importance as part of a healthy diet. In addition, HHS stated that we were too definitive about linking disease prevention to fruit and vegetable consumption and that we failed to consider the totality of the scientific evidence. We modified the report language to clarify the strength of the linkages and added citations for the sources of our information throughout the report. The information we present on health benefits came from NIH and CDC reports summarizing the related research and from documents

and research articles given to us by federal officials specifically for the purpose of identifying such linkages.

Background

USDA's *Food Guide Pyramid* visually depicts federal guidance for the number of servings needed in each of five food groups to provide a healthy diet. (See fig. 1.) For example, the *Pyramid* recommends eating from 2 to 4 servings of fruit and 3 to 5 servings of vegetables daily.

Figure 1: USDA's Food Guide Pyramid



Source: U.S. Department of Agriculture/U.S. Department of Health and Human Services

The specific number of servings of fruits and vegetables is based on nutrient requirements and energy needs, which are associated with gender, age, and activity level. (See table 1.) For example, most children and many teenagers and adults should consume 7 servings daily—4 of vegetables and 3 of fruit.

Table 1: Recommended Daily Fruit and Vegetable Servings for Men, Women, and Children, Based on Age and Activity Level

Type of person	Recommended servings	
	Vegetables	Fruits
Children ages 2 to 6 years, most women, some older adults	3	2
Children over 6, teen girls, active women, most men	4	3
Teen boys and active men	5	4

Source: Dietary Guidelines for Americans, 2000.

All federal nutrition education and food assistance programs are required to promote the *Dietary Guidelines for Americans*. USDA uses the guidelines and the *Food Guide Pyramid* as the science base for nutrition education efforts in the food assistance programs. Table 2 provides information on participation, benefits, and nutrition education funding for the Food Stamp Program, WIC, and the School Lunch and Breakfast Programs, as well as the WIC and seniors farmers' market programs.

Table 2: Participation, Total Funding, Nutrition Education Funding, and Average Nutrition Education Funding per Participant for Selected Food Assistance Programs, Fiscal Year 2001

Program	Number of participants (in millions)	Total program obligations (dollars in millions)	Nutrition education obligations (dollars in millions)	Nutrition education obligations per participant
Food Stamp Program	17.3	$17,826.9	$148.3	$8.57
School Lunch and Breakfast Programs	27.5 7.8	8,234.7	13.8[a]	<0.27[a]
WIC	7.3	4,199.1	235.9	32.32
WIC Farmers' Market Nutrition Program	2.1[b]	21.0	[c]	[c]
Seniors Farmers' Market Nutrition Program	<0.4	15.0	[c]	[c]

Legend

< means less than.

[a]This number reflects the obligations divided by 50.5 million children (47.9 million eligible for school meals and 2.6 million in the Child and Adult Care Food Program).

[b]Total WIC recipients to whom farmers' market coupons were issued with either federal or nonfederal funds or both.

[c]Farmers' market programs provide a small nutrition education benefit; however, the amount is not tracked.

Source: GAO's analysis of data from USDA's Food and Nutrition Service and the National Association of Farmers' Market Nutrition Programs.

USDA's food assistance programs serve one in six Americans each year. As table 2 shows, in terms of funding, the Food Stamp Program is by far the largest, having over $17.8 billion in funding in fiscal year 2001. Slightly over half of the recipients are children, and about 20 percent are elderly or disabled. In terms of participation, the School Lunch and Breakfast Programs serve the greatest number of people (27.5 million and 7.8 million, respectively)—and are available to nearly 48 million school children.[2] As a result of school meals, participants in these programs consume greater amounts of several important nutrients, such as calcium.

[2]Almost all public and some private nonprofit schools are subsidized by USDA for each complete school meal served regardless of household income; lunches and breakfasts for children from low-income households receive greater subsidies.

WIC has seven food packages[3]—three for pregnant or postpartum women, two for children, and two for infants. Depending on the package, WIC benefits may be used to purchase cereals, 100 percent fruit (or vegetable) juice, eggs, milk, cheese, peanut butter, dried beans, infant formula, tuna, and carrots. WIC serves about half of all infants and a quarter of all children from 1 through 4 years old in the United States.[4] WIC is considered one of the most successful nutrition interventions, increasing birth weights and providing other health benefits.

Regarding nutrition education, USDA provides the lion's share of federal funding, although HHS, DOD, and other federal agencies fund nutrition education efforts as well. For food assistance participants, USDA obligated about $398 million toward nutrition education in fiscal year 2001. Nutrition education for WIC participants accounted for about half of USDA's total nutrition education funding. As table 2 shows, funding per participant for nutrition education varied greatly—from $32 per WIC participant to less than $0.27 per child in the school meal programs. In fiscal year 2001 CDC spent $16.2 million for nutrition, obesity, and physical activity efforts; the National Cancer Institute spent $3.6 million for 5 A Day initiatives; DOD spent $3.5 million for nutrition education activities for the services.

In addition to food assistance and nutrition education programs, other federal programs and policies—such as trade restrictions and environmental regulations—have the potential for affecting the consumption of fruits and vegetables. For example, trade restrictions in the form of tariffs on some fruits and vegetables result in higher prices that could reduce U.S. consumption of those fruits and vegetables. Likewise, environmental regulations limiting pesticides use may increase farm costs, which can reduce the quantities of fruits and vegetables sent to market, thereby increasing price and lowering consumption. However, the effect of trade restrictions and environmental regulations on farm-level prices would have to be substantial to have a large impact on consumption, because farm-level prices account for about one-third of retail prices for fruits and vegetables. Appendix III provides more detail on

[3]In the WIC program, the term "package" refers to the group of foods that the benefits can be used to purchase.

[4]Unlike the food stamp program, which is an entitlement program, participation in WIC is limited by the available funding.

how these programs and regulations can affect fruit and vegetable consumption.

The food "environment" is a major factor that affects the consumption of fruits and vegetables. The food environment includes prices set by retailers; access to and availability (year-round or seasonal) in local groceries, markets, and restaurants; the quality of fresh produce; the time available for shopping, preparation, and eating; and the ready availability, appeal, and advertising for and prices of other foods. Taste preferences and familiarity with foods of a particular culture are other important factors in food choices.

Consuming the Recommended Servings of Fruits and Vegetables Would Reduce the Risk for Some Chronic Diseases

Heart disease, cancer, stroke, and diabetes are among the leading causes of death for Americans. In fact, medical experts, including the Surgeon General, have noted that physical inactivity and poor diet—of which low consumption of fruits and vegetables is a key component—cause diseases that result in the death of more than 300,000 Americans each year.[5] Studying the relationship between diet and chronic diseases is challenging because, among other things, it is difficult to measure and account for all potential risk factors; this challenge is compounded because chronic diseases may take many years to develop. However, extensive and consistent evidence shows that diet is one of the leading risk factors for these diseases.

Although no diet can guarantee full protection against any disease, the recommendations from HHS and USDA and health organizations such as the American Cancer Society and American Heart Association indicate that consuming the recommended 5 to 9 daily servings of fruits and vegetables as part of a healthy diet provides some of the best dietary protection against disease. Research links increased fruit and vegetable consumption to reduction in the risk of heart disease and many types of cancer. Research also suggests their potential benefits for reducing the risk of stroke, diabetes, diverticulosis, and obesity, according to reviews by NIH, CDC, and academic experts. Fruits and vegetables are among the most concentrated natural sources of over 100 beneficial vitamins, minerals, and other dietary compounds such as fiber and antioxidants

[5]See U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General, *The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity: 2001* (Rockville, Md.: 2001).

important to disease prevention. With regard to the specific health benefits of fruits and vegetables, studies show that people who consume 5 or more servings daily have about one-half the cancer risk of those who consume 2 or fewer servings, according to a National Institutes of Health report.[6] That report also stated that, according to studies, diets high in fruits and vegetables are associated with a 20 to 40 percent reduction in the occurrence of coronary heart disease. Appendix IV describes some of the evidence that links fruit and vegetable consumption to reducing the risk for heart disease and cancer as well as possible links to reducing the risk for stroke, diabetes, obesity, and diverticulosis.

Because it is not clear how single nutrients, combinations of nutrients, the over consumption of nutrients, or age affect one's risk of specific diseases such as cancer, experts advise consuming a variety of fruits and vegetables to ensure an adequate intake of all known and as yet unidentified dietary compounds. A variety of deeply colored fruits, such as apricots, blueberries, and citrus fruits, and dark green or orange vegetables, such as spinach and carrots, are particularly rich in vitamins, minerals, antioxidants, other phytochemicals, and fiber.[7]

[6]See National Institutes of Health, National Cancer Institute, *5 A Day for Better Health Program Evaluation Report*, NIH Pub. No. 01-4904 (Bethesda, Md.: November 2000).

[7]Fruits and vegetables have also been linked to pathogens, such as *Salmonella* and *E. coli*, that cause foodborne illnesses. However, the cause of contamination is often unknown. While contamination may be carried in the seeds or the fruit/vegetable, diseases also have been linked to contamination during harvesting, packing, transporting, or preparation. Fruits and vegetables may also contain pesticide residues; however, the American Cancer Society, World Cancer Research Fund, and American Institute for Cancer Research reported that the benefits of fruits and vegetables in terms of cancer risks far outweigh the potential pesticides risks.

Americans' Consumption of Fruits and Vegetables Has Increased Somewhat Under Federal Policy, Guidance, and Education Programs for the General Public

Under current federal policy, guidance, and nutrition education programs, the consumption of fruits and vegetables by the general public as a whole has increased somewhat, yet most Americans consume fruits and vegetables below recommended levels. The most widely recognized nutrition guidance—the *Food Guide Pyramid* graphic—does not clearly convey some important nutrition guidance that could help Americans close this consumption gap, and USDA is currently assessing the *Pyramid* for possible updates. In recognition of the diet shortfall in fruits and vegetables, HHS's strategic plan identifies 5 A Day as one strategy for achieving its objective of improving the diet of Americans. Moreover, the April 2002 announcement by HHS and USDA to expand 5 A Day may further encourage Americans to consume the recommended 5 to 9 daily servings.

While Americans Have Increased Their Consumption of Fruits and Vegetables, Most Consume These Foods Below Recommended Levels

Under federal policy and guidance—*Dietary Guidelines for Americans*, *Healthy People 2010*, and the *Food Guide Pyramid*—the consumption of fruits and vegetables has improved somewhat.[8] Between the 1989-91 and 1994-96 time frames, the most recent years for which consumption data are available, fruit and vegetable consumption each increased by 0.2 serving (or nearly half a serving in total), such that the average consumption of fruits and vegetables is near the minimum recommended 5 servings a day. In addition to federal policy and guidance, USDA's Economic Research Service points to the increased year-round availability of fruits and vegetables as another factor influencing consumption. Nonetheless, most Americans still fall short of consuming the recommended levels for health promotion and disease prevention. As table 3 shows, even with the increase, only 23 percent of Americans get their recommended servings of fruits, and 41 percent, their recommended servings of vegetables.

[8]There are 18 objectives in the *Healthy People 2010* nutrition focus area, including ones for weight status and growth; food and nutrient consumption; iron deficiency and anemia; schools, work sites, and nutrition counseling; and food security.

Table 3: Average Servings of Fruits and Vegetables Consumed in 1989-91 and 1994-96, and Percentage of Americans Consuming the Minimum and Recommended Servings in 1996

Food	Average servings consumed		Percentage of Americans consuming minimum: 2 servings of fruit, 3 servings of vegetables, 1994-96	Percentage of Americans meeting their recommended servings:[a] 2-4 servings of fruit, 3-5 servings of vegetables, 1994-96
	1989-91	1994-96		
Fruits	1.3	1.5	28	23
Vegetables	3.2	3.4	49	41

[a]Adjusted for gender, age, and activity level.

Source: USDA Continuing Survey of Food Intakes by Individuals, 1989-91 and 1994-96.

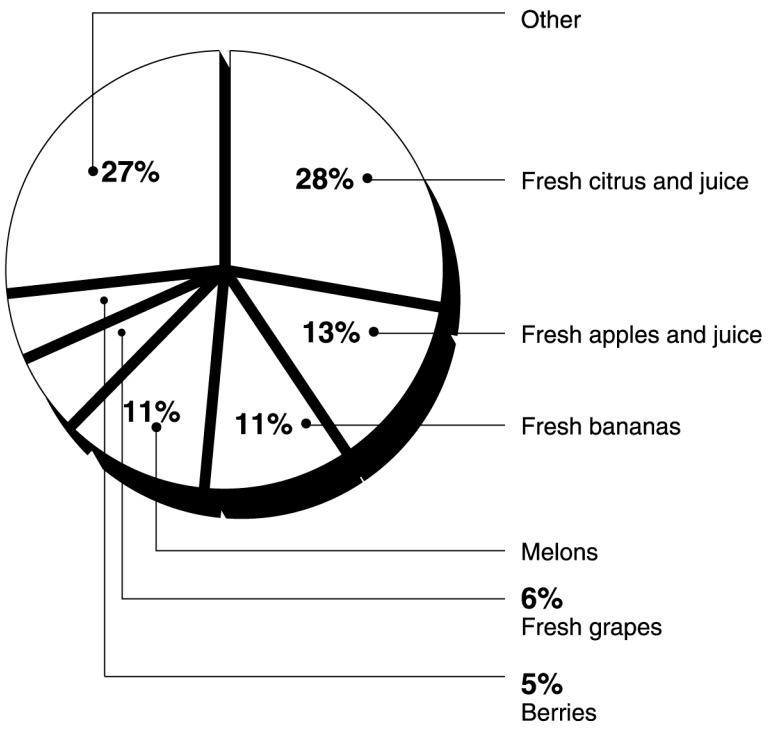
According to USDA and NIH researchers, consumption of the deeply colored fruits and deep green or orange vegetables falls far short of what is recommended for disease prevention. USDA's data for dark green or orange vegetables indicates that consumption increased by less than one-tenth of a serving between the 1989-91 and 1994-96 surveys. Indeed, only about 8 percent of Americans get the recommended daily 1 or more servings of dark green or orange vegetables.[9] Moreover, only 3 percent of Americans get both the recommended number of servings of vegetables and at least 1 serving daily of a dark green or orange vegetable. There may be many reasons why the consumption of fruits and vegetables, particularly deeply colored ones, is low. For example, many people may not be aware of the importance of eating deeply colored fruits and vegetables. In addition, taste, price, and seasonal availability, among other factors, may affect consumption, as might the ready availability of other foods.

Many Americans do not incorporate adequate variety into their daily diet. As noted earlier, eating a wide variety of fruits and vegetables is important because different fruits and vegetables are rich in different nutrients. For example, fruits such as apricots and blueberries, are excellent sources of protective phytochemicals and, although most citrus is consumed as juice, a fresh orange has 27 times the fiber content of orange juice. As shown in figure 2, three fruit sources—citrus (fresh and juice), apples (fresh and juice), and bananas—accounted for 52 percent of total fruit servings in

[9]USDA's most recent consumption data from the 1994-96 Continuing Survey of Food Intakes by Individuals (age adjusted to the standard population for 2000).

1999. While these provide important nutrients, they do not supply all the nutrients important for disease prevention and health promotion. (See app. V for a detailed listing of fruits in each of the categories for fig. 2.)

Figure 2: Percentage of Fruit Servings by Type, 1999



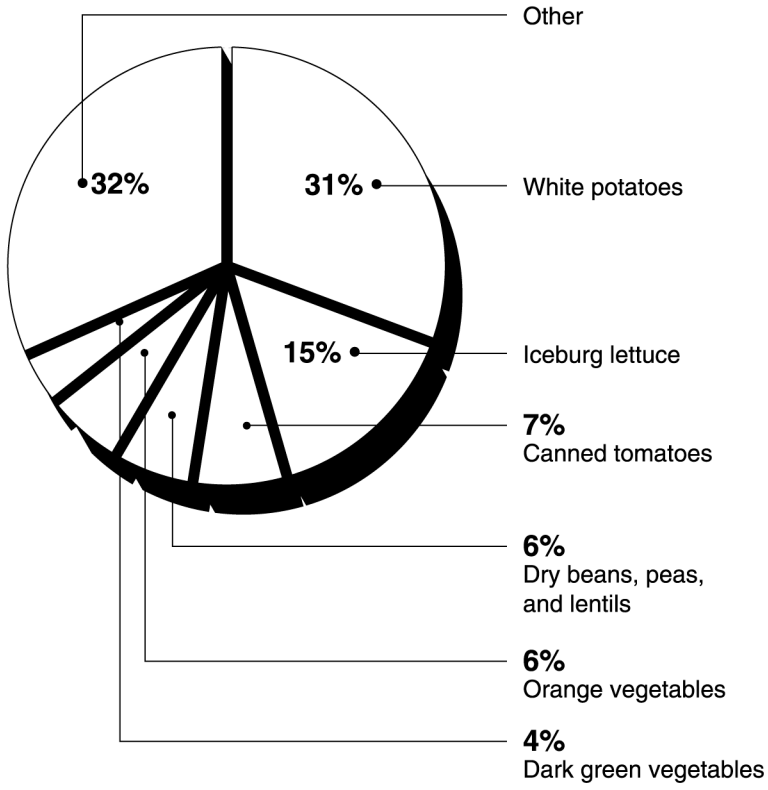
Note: "Other" includes cherries, peaches, pears, plums, pineapple, prunes, and raisins, among others. (See app. V for a complete list.) The percentages do not add to 100 percent because of rounding.

Source: USDA, Economic Research Service food supply data.

Americans' vegetable consumption tells a similar story. Although federal dietary guidance recommends eating a variety of vegetables—including dark green or orange; starchy (e.g., potatoes, dry beans, peas, and lentils); and others—consumers eat a limited variety. As shown in figure 3, three foods—white potatoes, iceberg lettuce, and canned tomatoes—accounted for 53 percent of total vegetable servings in 1999. Although white potatoes are an excellent source of potassium and vitamin C and are naturally low in fat, frozen potatoes (mostly french fries) and potato chips together accounted for 43 percent of starchy vegetable servings and 17 percent of

total vegetable servings. The added-fat in french fries and potato chips carries calories that contribute to overweight and obesity. Moreover, the consumption of dark green or orange vegetables most likely to prevent disease and promote health totaled only 0.4 serving per day, well below the 1 or more daily servings suggested for the average person. (See app. V for a detailed listing of vegetables in each of the categories for fig. 3.)

Figure 3: Percentage of Vegetable Servings by Type, 1999



Note: "Other" includes artichoke, asparagus, cabbage, eggplant, olives, and onions, among others. (See app. V for a complete list.) The percentages do not add to 100 percent because of rounding.

Source: USDA, Economic Research Service food supply data.

The *Food Guide Pyramid* Graphic Does Not Provide Some Important Nutrition Guidance About Fruits and Vegetables

USDA's *Food Guide Pyramid* graphic—the most widely recognized nutrition guidance—does not communicate the need to consume a variety of fruits and vegetables, particularly the deeply colored ones that the *Dietary Guidelines for Americans* identifies as important for disease prevention and health promotion. (See fig. 1 on page 6.) USDA pointed out that the *Pyramid* graphic, introduced in 1992, was not intended to stand alone but, rather, it was to be used along with the information in the *Pyramid* brochure. However, the *Pyramid* graphic is typically displayed alone—on food packages and in classrooms, grocery stores, and cafeterias. The *Pyramid* brochure, which was modified slightly in 1996, provides selection tips for a variety of fruits and vegetables, including dark green or orange vegetables. According to HHS officials, a diet based on the *Pyramid* graphic provides adequate nutrient intake when people consume a variety of the recommended servings of fruits and vegetables, for example half of fruit servings from citrus, melons, or berries and one-third of vegetable servings from dark green or orange vegetables.

Furthermore, a 2001 publication by the National Cancer Institute stated that the inadequacies and imbalances in the current American diet—such as the low consumption of dark green or orange vegetables—relate to issues that were integral to the development of the *Food Guide Pyramid* but not captured in the *Pyramid* graphic.[10] Although the *Pyramid* graphic is based on analyses from more than 10 years ago, USDA's Center for Nutrition Policy and Promotion reanalyzed it in the mid-1990s and determined that it was consistent with the 1995 *Dietary Guidelines for Americans* and met most nutrient objectives. The center recently initiated a reassessment of the *Food Guide Pyramid* to ensure that it is consistent with the 2000 *Dietary Guidelines for Americans* and new nutrient intake recommendations released by the National Academy of Sciences.[11] The center plans to complete its assessment and any revisions before the 2005 update of the *Dietary Guidelines for Americans*.

[10]See National Institutes of Health, National Cancer Institute, *5 A Day for Better Health Program Evaluation Report,* NIH Pub. No. 01-4904 (Bethesda, Md.: November 2000).

[11]Since 1997, the National Academy of Sciences has been replacing the "Recommended Dietary Allowances" for nutrients with "Dietary Reference Intakes." Dietary Reference Intakes have been completed for most nutrients.

5 A Day Appears to Be an Effective Program, and HHS and USDA Have Announced Plans for Its Expansion

The 5 A Day program—a public-private partnership between federal/state/local governments, the fruit and vegetable industry, and supermarkets—is the only federal nutrition education and intervention effort focused on increasing fruit and vegetable consumption. Its long-range purpose is to help reduce the incidence of cancer and other chronic diseases through dietary improvements—specifically by getting Americans to consume 5 to 9 servings of fruits and vegetables daily. The National Cancer Institute coordinates and provides the funding for the federal side of the partnership, CDC develops and manages state-level programs, and the Produce for Better Health Foundation, a nonprofit organization of approximately 800 members of the fruit and vegetable industry and supermarkets, coordinates the private side of the partnership. To support a variety of 5 A Day program and research activities, the National Cancer Institute spent $3.6 million in fiscal year 2001. In fiscal year 2002, the Institute expects to spend $4.5 million; California, Florida, and Arizona have committed to providing $3 million, $1.7 million, and $0.3 million, respectively; and industry has committed about $3 million.

The success of 5 A Day may be due to its use of a combination of strategies, including hands-on experiences (e.g., food preparation and field-trips), visual cues (signs on cafeteria doors and at registers), and media campaigns (TV, radio, and print). Following are three examples of 5 A Day community-based programs that have had sustained results in improving fruit and vegetable consumption:[12]

- An 8-week program of activities for 4th- and 5th-grade children in three California communities increased the consumption of fruits and vegetables by over 1.5 servings after the first year and about 1 serving after the second year, compared with consumption by children who did not receive the activities. The program included classroom activities (lessons, problem-solving, and taste testing), cafeteria/food service activities (promotion of fruits and vegetables), and parent activities (homework assignments, brochures, refrigerator magnets). That program was subsequently expanded statewide.

- A 2-year study in 28 small- to medium-sized businesses in Seattle, Washington, provided half the sites with 5 A Day signs in the work

[12]For more information on these examples, see National Institutes of Health, National Cancer Institute, *5 A Day for Better Health Monograph*, NIH Pub. No. 01-5019, (Bethesda, Md.: September 2001).

environment to provide constant reminders about eating fruits and vegetables and worked with food-service staff to make more fruits and vegetables available as part of the regular menus. Nutrition education was provided through a specialist who visited the work sites, and an employee advisory board was used to encourage behavior change. Two years after the program concluded, the employees who received the 5 A Day program averaged about a third of a serving more of fruits and vegetables than the control group.

- A 20-month program involving 49 predominantly African-American churches in North Carolina resulted in a 0.85-serving increase in fruit and vegetable consumption at the 2-year follow-up. According to study participants, having more fruit and vegetables served at church functions, having the pastor promote the 5 A Day message from the pulpit, and receiving personalized printed materials were influential in increasing their consumption. The American Cancer Society has begun a nationwide program based on the design of this study.

In November 2000, the NIH's National Cancer Institute reported the results of an independent review of the science underlying the 5 A Day program, its implementation and accomplishments, and the degree to which its goals and objectives were achieved. The evaluation found that the evidence was convincing and that the program contributed to the small increases in fruit and vegetable consumption over the past decade. It recommended that the National Cancer Institute, among other things, increase resources, staffing, and expertise available to the states for the dissemination, monitoring, and evaluation of the 5 A Day program; expand 5 A Day by partnering with CDC to manage states' 5 A Day programs and develop a surveillance plan to monitor fruit and vegetable consumption; and partner with USDA to better focus dietary guidelines and promote research in agriculture and economic policies. The evaluation further recommended that the National Cancer Institute partner with other NIH institutes to promote fruit and vegetable research.[13]

In response to those recommendations, in April 2002, the Secretaries of Agriculture and Health and Human Services announced plans to expand 5 A Day. A memorandum of understanding signed by (1) the Director, National Cancer Institute; (2) the Director, National Center for Chronic

[13]See National Institutes of Health, National Cancer Institute, *5 A Day for Better Health Program Evaluation Report*, NIH Pub. No. 01-4904 (Bethesda, Md.: November 2000).

Disease Prevention and Health Promotion, CDC; and (3) USDA's Under Secretaries for Food, Nutrition, and Consumer Services; Research, Education, and Economics; and Marketing and Regulatory Programs, formalized commitments to enhance and more effectively coordinate the national 5 A Day partnership. It also established a framework for cooperation between the agencies to promote 5 A Day, whereby each agency pledges its commitment to encourage all Americans to eat 5 to 9 servings of fruits and vegetables daily.

To be successful, however, any crosscutting, multiagency efforts such as the new 5 A Day initiative depend on certain key elements, including clear leadership, an overarching strategy, and effective partnerships between the federal and state agencies. These are critical elements that underpin the Government Performance and Results Act of 1993,[14] which provides agencies with a systematic approach for managing programs. The results act's principles include developing a strategy, identifying goals and objectives, and establishing performance measures. The act states that performance goals should be sufficiently precise to allow for a determination of performance. When participants in a crosscutting program understand how their missions contribute to a common goal—such as achieving the *Healthy People 2010* nutrition objectives—they can develop specific goals and objectives and implementation plans to reinforce each other's efforts. We recognize the difficulties associated with making changes in dietary habits. However, we believe that if HHS and USDA work together in a comprehensive strategic approach, they are more likely to be successful.

Since it released *Healthy People 2010*, HHS has identified 5 A Day in its strategic plan for 2001-2006 as one strategy for achieving its objective of improving the diet of Americans.[15] With the NIH's National Cancer Institute as the lead federal agency for the new 5 A Day initiative, a steering committee—composed of the National Cancer Institute, CDC, USDA, the American Cancer Society, Produce for Better Health Foundation, and others—was created to plan and collaborate on specific activities to achieve the 5 A Day goal. The memorandum of understanding specified activities for each agency and supported, among other things, comprehensive planning at the federal, state, and local levels, and

[14]See P.L. 107-76 (2001).

[15]HHS' strategic plan identifies the percentage of Americans eating 5 servings daily of fruits and vegetables as an indicator of a healthy diet.

improved the availability of high-quality data related to fruit and vegetable consumption. If translated into specific strategies and targets in agencies' annual performance plans, these commitments could provide a framework to guide HHS' efforts to help Americans achieve the *Healthy People 2010* objectives for fruits and vegetables.

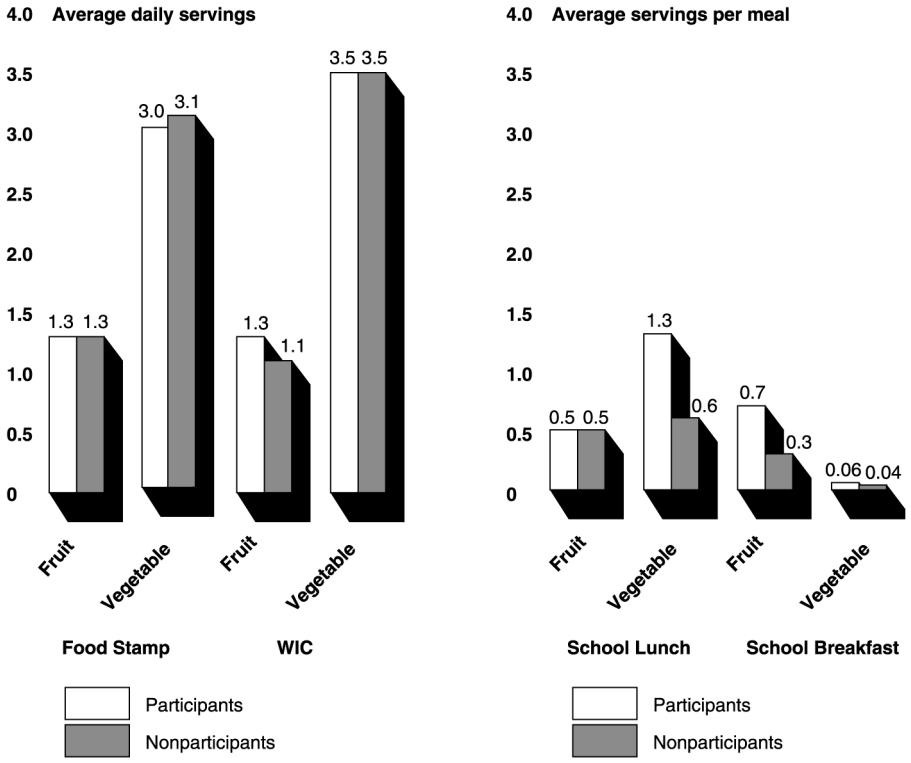
Food Assistance Programs Have Had Mixed Effects on Consumption of Fruits and Vegetables by Lower-Income Citizens

Fruit and vegetable consumption by food stamp participants and women in WIC is similar to that of low-income individuals who do not participate in these programs; both low-income groups have lower consumption than the general public. However, children in WIC and participants in the school meal programs and farmers' market programs have begun to show some improvement. In the April 2002 announcement by USDA and HHS to expand 5 A Day, USDA pledged to support 5 A Day in its food assistance programs. The 5 A Day commitments could provide a framework for incorporating the 2010 objectives in USDA's strategic and performance plans.

Consumption of Fruits and Vegetables by Participants in Food Assistance Programs Is Similar to or Slightly Better Than That of Low-Income Nonparticipants

The key purposes of the food assistance programs are to reduce hunger, increase food security, and improve nutrition and health, while supporting American agriculture. Increasing fruit and vegetable consumption is not a primary focus, yet it is part of USDA's nutrition education efforts under these programs. Nonetheless, the consumption of fruits and vegetables by food stamp participants and women in WIC differs little from that of similar nonparticipants, and consumption by children in the school meal programs is greater than that of nonparticipants, as shown in the right column of figure 4. In addition, according to data covering 1994-96 and 1998—different time frames from those presented in figure 4—children in WIC also have increased their consumption of fruits and vegetables. The limited information on farmers' market participants—in WIC and in the seniors program—suggests that they too consume more fruits and vegetables than nonparticipants.

Figure 4: Fruit and Vegetable Consumption by Food Stamp Participants, Women in WIC, and Children in School Meal Programs Compared With Consumption By Similar Nonparticipants, 1994-96



Note: According to USDA, the 0.2 difference in fruit serving between women in WIC and similar nonparticipants is not statistically significant. The WIC data presented here are USDA projections for a 30-year-old participant and similar nonparticipant.

Source: Food stamp participant data are from the Continuing Survey of Food Intakes by Individuals; WIC data are from the U.S. Department of Agriculture, Economic Research Service, *The Effect on Dietary Quality of Participation in the Food Stamp and WIC Programs* (Washington, D.C.: September 2000); School meal data are from U.S. Department of Agriculture, Food and Nutrition Service, *Children's Diets in the Mid-1990s: Dietary Intake and Its Relationship with School Meal Participation* (Alexandria, Va.: January 2001).

Our analysis of fruit and vegetable consumption, food benefits, and related initiatives for the Food Stamp Program, WIC, the National School Lunch and Breakfast Programs, and the WIC and Seniors Farmers' Market Nutrition Programs are as follows.[16]

[16]All consumption data, unless otherwise noted, are for 1994-96—the most recent years for which data are available from the Continuing Survey of Food Intakes by Individuals.

- **The Food Stamp Program**. Food stamp recipients receive on average less than $80 monthly to help them purchase foods of their choice. They consume about the same amounts of fruits and vegetables as similar low-income nonparticipants. According to USDA, program participants consumed 1.3 servings of fruits and 3.0 servings of vegetables as compared with 1.3 and 3.1 servings, respectively, for low-income nonparticipants. Both low-income groups fall short of the national average of 1.5 servings of fruits and 3.3 servings of vegetables, as well as the recommended number of servings—2-4 of fruits and 3-5 of vegetables. Furthermore, both participants and low-income nonparticipants consumed only 0.1 serving each of deep green or orange vegetables—those most important to disease prevention. According to USDA, the program's electronic benefit payment system may discourage participants from shopping at farmers' markets because many markets do not have the technology needed to access payments. In 2002, New York State received $100,000 in federal funds to support a pilot program in the state to implement wireless and other innovative electronic solutions that will allow farmers' markets to accept food stamp and WIC benefits.

- **WIC**. As with food stamp participants, women in WIC have about the same low fruit and vegetable consumption as similar nonparticipants.[17] For example, according to USDA data, a 30-year-old woman in WIC would consume 0.2 serving more fruit (1.3 versus 1.1)[18] and the same number of servings of vegetables (3.5) as a similar nonparticipant, according to USDA estimates. Children ages 2 through 4 in WIC consume 0.3 more serving of fruit (1.4 versus 1.1) and 0.1 serving more of vegetables (1.2 versus 1.1). The five WIC packages for women and children designate allowable foods selected to improve nutrient intake.[19] Only one WIC food package includes vegetables, and it provides only about one-quarter serving—all in carrots. In contrast, the five WIC packages for women and children provide far more servings of other food groups. For example, all five WIC packages for women and children provide from 3.2 to 4.1 of the recommended 3 to 5 daily

[17]See U.S. Department of Agriculture, Economic Research Service, *The Effects on Dietary Quality of Participation in the Food Stamp and WIC Programs* (Washington, D.C.: September 2000).

[18]The USDA study found this 0.2 difference not statistically significant.

[19]The other two WIC packages are for infants.

servings of dairy products. Appendix VI shows the foods in the five WIC packages for women and children.

- **The National School Lunch and Breakfast Programs**. The millions of children who participate in School Lunch consume daily, on average, twice as many servings of vegetables as nonparticipants for lunch (1.3 servings versus 0.6); however, most of that difference is in the form of white potatoes—mostly french fries.[20] With respect to fruit consumption, there is no difference between the participants of School Lunch and similar nonparticipants. The millions of children who participate in School Breakfast consume daily, on average, 0.4 more serving of fruit than nonparticipants for breakfast (0.7 serving versus 0.3).

  FNS officials pointed out that their most significant initiative to improve school meals (the School Meals Initiative) was begun in 1995 and that the most current consumption data (for 1994-96) would not capture potential increases in consumption that may have occurred after 1996. The School Meals Initiative included new nutrition standards for school meals and educational and technical resources to assist food service personnel in preparing nutritious and appealing meals. In 2001 USDA reported, from a survey of school food service authorities, that schools reported an increase in (1) the numbers of fruits and/or vegetables offered, (2) the purchases of fruits and vegetables, and (3) plate waste for cooked vegetables.[21] However, it is unclear whether the increased overall purchases or offerings resulted in increased consumption because purchases or offerings per student or meal were not reported.

  Although participation in the School Lunch and Breakfast Programs has been shown to improve dietary quality, 40 percent of children do not eat the School Lunch and 83 percent do not eat School Breakfast in schools where the meals are offered. USDA reported that participation might be affected by other meal options available to students such as

[20]See U.S. Department of Agriculture, Food and Nutrition Service, *Children's Diets in the Mid-1990s: Dietary Intake and Its Relationship with School Meal Participation* (Alexandria, Va.: 2001) and U.S. Department of Agriculture, Economic Research Service, *America's Eating Habits: Changes and Consequences*, Ag. Info. Bulletin No. 750 (Washington, D.C.: 1999).

[21]See U.S. Department of Agriculture, *School Meal Initiative Implementation Study: Second Year Report* (Alexandria, Va.: July 2001).

foods sold *a la carte*, in vending machines, and school stores or snack bars. Those foods do not have to meet the nutrition standards required for the USDA-reimbursable meals of School Lunch and Breakfast. USDA reported that *a la carte* sales are higher in higher-income schools and that as *a la carte* sales increase, school meal participation decreases.[22]

- **WIC Farmers' Market Nutrition Program**. A USDA-funded evaluation of a 1991 pilot program that became the WIC Farmers' Market program found, from a survey, that participants daily consumed an average of 0.2 serving more of both fresh fruits and vegetables than low-income nonparticipants. According to the survey, which was based on a random statistical sample, participants consumed an average of 3.6 servings of fruit and 4.1 servings of vegetables daily, compared with 3.4 and 3.9 servings, respectively, for nonparticipants. In surveys developed by the National Farmers' Market Association and conducted by states annually from 1996 to 2000, most of the over 20,000 participants surveyed reported that they had increased their consumption of fresh fruits and vegetables. In the 2000 survey, 71 percent reported that they ate more fresh fruits and vegetables than usual and 80 percent reported that they planned to eat more year round. Surveys for each of the previous 4 years had similar results.[23] Over 2 million WIC participants receive farmers' market coupons; only about 60 percent redeem them, annually. According to FNS, eligible individuals may not participate because, among other things, farmers' markets are often not located in or near low-income areas and they may not be familiar with farmers' markets or with the program.

- **The Seniors Farmers' Market Nutrition Program**. Established in 2001, the seniors program serves about 380,000 low-income elderly people. This small program is based on the WIC farmers' market program and the two farmers' market programs are often run by the same state and local agencies. Although national data are not available, one county in Washington State surveyed 87 homebound participants,

[22]See U.S. Department of Agriculture, *School Nutrition Dietary Assessment Study-II* (Washington, D.C.: April 2001).

[23]The over 20,000 survey resopndents each year did not represent the entire population of nearly 2 million participants because they are not selected randomly as part of a statistical sample. In addition, the wording of questions in this survey may overestimate the reporting of increased comsumption.

who reported increasing their consumption of fruits and vegetables by one serving daily.

Under the school meal programs, USDA has increased its spending for canned, frozen, and fresh fruits and vegetables from $140 million in 1996 to $243 million in 2001. In addition, under an agreement between USDA and DOD, DOD Fresh provides about $31 million in fresh produce to schools in 39 states, Puerto Rico, and Guam. Participating schools benefit from DOD's purchasing power and distribution network. According to the American School Food Service Association, DOD Fresh generally provides lower-priced, more-varied, and better-quality fruits and vegetables than are otherwise available to schools and may result in increased consumption. Dark green or orange vegetables are among the 10 most popular items ordered by schools through DOD Fresh. In 1997 we identified states' use of DOD Fresh as a best practice for improving the nutritional content of school meals.[24] Because DOD uses a decentralized system to purchase produce from local vendors, we reported that it was able to provide high-quality fresh produce. According to USDA, many school food authorities can purchase fresh produce of similarly high-quality from distributors and, seasonally, from local sources.

Nonetheless, fruits and vegetables are the most frequently wasted (e.g., thrown away) food items in the School Lunch Program, ranging from 21-percent to 42-percent waste.[25] In 2002 USDA reported that wasted food—including fruits and vegetables—cost USDA $600 million annually.[26] Studies have shown that this waste can be decreased by such factors as (1) scheduling recess before lunch, (2) increasing the use of fresh produce and local foods, (3) involving students in meal planning, (4) introducing new fruits and vegetables to students before they appear in school meals, and (5) allowing students to serve themselves—for example, using self-service salad/meal bars.

[24]See U.S. General Accounting Office, *School Meals Programs: Sharing Information on Best Practices May Improve Programs' Operations*, GAO/RCED-97-126 (Washington, D.C.: May 21, 1997).

[25]See U.S. General Accounting Office, *School Lunch Program: Cafeteria Managers' Views on Food Wasted by Students*, GAO/RCED-96-191 (Washington, D.C.: July 18, 1996). Cafeteria managers estimated the amount of waste on the basis of observation.

[26]See U.S. Department of Agriculture, Economic Research Service, *Plate Waste in School Nutrition Programs: Final Report to Congress*, ERS Pub. No. E-FAN-02-009 (Washington, D.C.: March 2002).

Over the past few years, FNS has helped fund some innovative programs implemented by local and state agencies that have been found to promote fruit and vegetable consumption. One such program—Food Sense—is under way in two counties in Washington State. Food Sense provides 1,300 low-income adults with handouts, recipes, and information about the *Food Guide Pyramid* and the *Dietary Guidelines for Americans*, and how to select and prepare fresh produce. The program also serves 2,000 children from low-income households and uses storytelling, games, and healthy snack tasting to reinforce healthy food choices. State data on the program show that 75 percent of the adults and 31 percent of the children participating in Food Sense ate more fruits and vegetables daily as a result of the program.

Another initiative, funded jointly by USDA and three California school districts, also appears to have increased the consumption of fruits and vegetables in the School Lunch and School Breakfast Programs.[27] That effort provided salad bars as an alternative to the standard hot meal, along with hands-on nutrition education in the classroom, contests, and tours of local farms and farmers' markets. Students who consumed the salad bar and were surveyed, reported increasing their daily consumption of fresh fruits and vegetables by an average of 1 to 2 servings. To meet USDA requirements for meal reimbursement, the schools' salad bars offered items from each of the five food groups (grain, milk, protein, fruit, and vegetables), and students were required to take a minimum of one serving from three groups.

In addition to the FNS efforts, USDA's Cooperative State Research, Education and Extension Service administers a nutrition education effort—the Expanded Food and Nutrition Education Program—to improve the dietary habits of low-income children and families with children. In 2001 about 447,000 children and 164,000 adults were in the program, which was funded at $58.6 million. At a cost of about $96 per participant, the program includes a series of lessons taught by peer instructors over several months and uses hands-on approaches, such as cooking new recipes, that enable participants to gain the practical skills necessary to make positive behavioral change. Nearly three quarters of the participants entering the program in 2001 were receiving federal food assistance; an additional 8 percent were on food assistance by the time they left the

[27]The three California school districts were Santa Monica-Malibu, Los Angeles, and Vacaville Unified School District.

program. For about a decade, the program has tracked participants' consumption levels for each food group when participants enter and exit the program. The 106,000 adult participants who completed the program in fiscal year 2001 increased their fruit and vegetable consumption by more than 62 percent (from 2.9 to 4.7 servings), according to program evaluation data. According to USDA, evaluation data from participants has led to improvements in curriculum, staff development and training, new community partnerships, and increased cooperation with researchers who are studying diet-related behavior.

In commenting on a draft of this report, USDA pointed out that its efforts to promote fruits and vegetables extend beyond food assistance and nutrition education to include agricultural, economic, and behavioral research; agricultural extension; and market development and support. For example, USDA sponsors research investigating the health-promoting properties of fruits and vegetables, as well as the motivations and barriers to their consumption.

Opportunities Exist for USDA to Better Use Its Strategic and Performance Plans to Help Achieve the *Healthy People 2010* Objectives for Fruits and Vegetables and Meet New 5 A Day Commitments

USDA's strategic and performance plans do not specifically address the *Healthy People 2010* objectives for increasing the proportion of Americans in food assistance programs who consume at least 2 servings of fruit and 3 of vegetables daily. USDA's strategic plan for 2000 to 2005 has a goal and related targets for improving the overall diet of food assistance program participants through nutrition education and education-related research. To help achieve that goal, USDA recently launched the national EAT SMART. PLAY HARD.™ nutrition education and promotion campaign to convey motivational messages regarding nutrition and physical activity aimed at changing dietary behavior, among other things. In addition, USDA's 2003 revision to its 2002 performance plan includes a goal of improving access to fruits and vegetables, which it will measure by the funding provided to purchase fruits and vegetables for schools, and by the number of sites on Indian reservations receiving fresh fruits and vegetables.

According to an FNS planning official, the strategic and performance plans include a focus on overall dietary quality. Although these plans do not specifically address the *Healthy People 2010* objectives related to fruits and vegetables, officials told us that USDA is working to increase fruit and vegetable consumption through improvements in nutrition education efforts, such as the EAT SMART. PLAY HARD.™ campaign. However, USDA has reported for several years that limited funding hinders nutrition education efforts and evaluation of those efforts. The current strategic

plan also acknowledges that inadequate funding for nutrition education is the key factor that could hinder plans to improve Americans' diet, including the diet of food assistance program participants. With regard to evaluating these efforts, a 1996 report by USDA's Center for Nutrition Policy and Promotion cited inadequate funding as a major factor limiting the evaluation of USDA's nutrition education efforts.[28] In 1999 FNS reported that the evaluation system was fragmented and minimal, and lacked outcome measures.[29] Agriculture appropriations acts for the past several years have generally prohibited the use of food stamp, WIC, and school meal program funds for such evaluations.

Those funding constraints notwithstanding, in the April 2002 memorandum of understanding between USDA and HHS regarding 5 A Day, USDA pledged to plan and support the delivery of the 5 A Day message to food assistance participants. USDA has not yet identified what additional resources, if any, will be needed to accomplish this effort; however, the Secretary of Agriculture pledged to commit the necessary resources to meet the 5 A Day goals. As noted earlier, the strategic planning process is designed to address crosscutting, multiagency/government issues such as the expanded 5 A Day initiatives in the memo of understanding. In fact, the 5 A Day commitments could provide a framework for USDA to incorporate the 2010 objectives in strategic and performance plans. Identifying strategies and targets could help USDA implement its 5 A Day commitments, which in turn could help food assistance participants achieve national *Healthy People 2010* objectives for fruits and vegetables.

[28]See U.S. Department of Agriculture, Center for Nutrition Policy and Promotion, *The State of Nutrition Education in USDA: A Report to the Secretary* (Washington, D.C.: October 1996).

[29]See U.S. Department of Agriculture, Food and Nutrition Service, *Promoting Healthy Eating: An Investment in the Future, A Report to Congress* (Alexandria, Va.: December 1999).

Experts Have Identified Many Actions That Federal Agencies Could Take to Further Increase Consumption of Fruits and Vegetables

Federal officials, academic nutrition experts, and representatives from industry, food advocacy, and consumer groups have identified a number of actions they believe the federal government could take to help people make better dietary choices and increase their consumption of fruits and vegetables.[30] The actions most frequently identified include (1) expanding and improving federal nutrition education programs, (2) emphasizing the importance of program evaluation and related behavioral research efforts to maximize the impact of nutrition education, (3) providing incentives to encourage food stamp recipients to purchase fruits and vegetables, (4) including more fruits and vegetables in WIC packages, (5) expanding the availability of salad bars and access to DOD Fresh in schools, and (6) expanding farmers' market programs for WIC participants and low-income seniors.[31]

- **Expand and improve federal nutrition education programs**. To promote better nutrition, particularly fruit and vegetable consumption, USDA and HHS officials, university professors, and the Center for Science in the Public Interest emphasized to us the value of nutrition education programs for the general public and the need to expand federal investment in programs shown to be effective at changing dietary behavior. Several contrasted the food industry's annual advertising expenditures (about $11 billion, annually) to the federal government's nutrition education expenditures (under $500 million, annually). According to FNS, it is unrealistic to expect consumer behavior to be consistent with national nutrition goals in an environment that provides a barrage of messages that encourage poor nutrition. The 1999 FNS report to Congress stated that an ongoing investment reinforcing the importance of nutrition education is essential to counter the environment that has been moving the general population toward poorer nutrition. The report further stated that adequate nutrition education for the general population—not just FNS program participants—is an essential component of an overall strategy because FNS program participants are influenced by trends that affect the population as a whole.

[30]Appendix II identifies the experts and organizations we interviewed.

[31]Other options that were identified but not as frequently mentioned included (1) requiring nutrition education training for medical students, (2) increasing the availability of nutrition information for foods eaten away from home, (3) levying taxes on unhealthful foods, and (4) increasing agricultural research on fruits and vegetables.

In addition, the Surgeon General recommended a national campaign to foster public awareness of the benefits of healthful dietary choices and physical activity. With regard to food assistance programs, the Surgeon General recommended expanding these nutrition education efforts as well. Likewise, the 1999 FNS report to Congress noted that nutrition education should be an integral benefit of all FNS programs. According to FNS, dependable funding for nutrition education is needed to support planning, program delivery, and the integration of services, and for the federal government to provide the necessary leadership and support. FNS also reported that the child nutrition programs—the largest of which are the School Lunch and Breakfast Programs—serve more participants, and yet have less funding per participant for nutrition education, than any other FNS program. The report noted that uneven nutrition education funding and reductions in program funding have decreased the capacity of state and local agencies to effectively deliver nutrition education to children. Similarly, CDC noted the need to improve the capacity of state programs that promote healthy behaviors to reduce the risk of chronic disease.[32] CDC's long-term goal is to establish a nationwide network of state-based comprehensive nutrition and physical activity programs for the prevention and control of obesity and related chronic diseases, and to include 5 A Day activities as an essential component of every state's nutrition education effort.

- **Emphasize the importance of evaluating programs and conducting behavioral research to maximize the impact of nutrition education**. In the 1999 report to Congress, FNS pointed out the need to invest in improved nutrition education evaluation.[33] FNS officials and others agreed that adequate and reliable evaluations are needed to determine which program components improve diet so that FNS and state and local agencies administering the programs can plan effective nutrition education strategies. In a 2001 report on WIC, we recommended that FNS work with stakeholders to develop a strategic plan to evaluate the impacts of specific WIC nutrition services and include in the plan information on the types of research that could be done to evaluate the impacts of specific nutrition services as well as

[32]CDC also conducts state-based surveillance for fruit and vegetable consumption.

[33]See U.S. Department of Agriculture, Food and Nutrition Service, *Promoting Healthy Eating: An Investment in the Future, A Report to Congress* (Alexandria, Va.: December 1999).

the data and the financial resources that would be needed to conduct such research.[34] In addition to program evaluation, a number of experts, including the 2000 Dietary Guidelines Advisory Committee and the Surgeon General, recommended increasing behavioral research efforts to gain a greater understanding of what motivates people to make healthy food choices.[35] Research findings could be used to improve the design of new, or make improvements in existing, nutrition education efforts. Officials from CDC also noted the need for more fruit- and vegetable-related economic, marketing, and consumer research, as well as research to clarify the roles of nutrients and other compounds found in fruits and vegetables that may be beneficial to health.

- **Provide incentives to encourage food stamp recipients to purchase more fruits and vegetables**. Academic nutrition experts and officials from the American Public Health Association, the state of California, food advocacy groups, the Center for Science in the Public Interest, and the Produce for Better Health Foundation suggested the use of incentives, such as double coupons or discounts, to encourage food stamp recipients to purchase fruits and vegetables. California's Department of Health Services, in conjunction with three grocery chains that are 5 A Day partners, has proposed a pilot project to FNS to see how food stamp recipients respond to three different approaches for providing incentives to buy fruit and vegetables. These include coupons at checkout for free or discounted items, "buy one, get one free" promotions, and store discount cards that can be used with electronic benefit transfer cards. For example, stores have agreed to allow recipients to "buy one, get one free" for certain fruits and vegetables. The stores will feature different fruits and vegetables for which local food stamp participants have expressed preferences, and community partners will promote the program as part of a nutrition message. The grocery receipt would show the value of the free item as an additional incentive. The stores and the other industry partners in the pilot have agreed to pay for the free fruits and vegetables.

[34]See U.S. General Accounting Office, *Food Assistance: WIC Faces Challenges in Providing Nutrition Services*, GAO-02-142 (Washington, D.C.: December 7, 2001).

[35]See U.S. Department of Agriculture, *Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2000* (Washington, D.C.: August 2000).

- **Include more fruits and vegetables in WIC packages**. The National WIC Association (formerly the National Association of WIC Directors), several health associations, and others have suggested that USDA broaden the WIC food package to include fruits and vegetables, because the current packages are inconsistent with the *Dietary Guidelines for Americans*. In a November 2000 letter to the Secretary of Agriculture, the American Cancer Society, American College of Preventive Medicine, other health associations, and industry groups urged USDA to broaden the WIC food package to include a variety of fresh produce. In addition, the National WIC Association, in a 2000 position paper, recommended that WIC packages offer a proportional balance of foods from each group in the *Food Guide Pyramid*. The association further stated that WIC should offer fresh, frozen, or canned fruits and vegetables, such as citrus fruits, tomatoes, sweet potatoes, greens, and broccoli.

  USDA recognizes that revisions to the food packages are vital to bringing the WIC packages in line with current scientific dietary recommendations—the Dietary Guidelines for Americans. FNS had planned to publish a proposed rule in The Federal Register in September 2000 that would add nutrient-dense leafy and other dark green or orange vegetables to five food packages, allow the substitution of canned legumes for dry legumes in four food packages, and reduce the servings of juice for three food packages. The final rule was to be effective September 2002. However, USDA decided to delay proposing the rule until after the 2000 election, because of concerns over potential opposition by industries that may lose revenue as a result of changes in the packages. The rule has yet to be published.

- **Expand the availability of salad bars and DOD Fresh in schools**. Federal and association officials in the 5 A Day partnership have called for the introduction of salad bars as part of all school meal programs. USDA has funded DOD Fresh at about $31 million per year for schools. Schools and state agencies have asked USDA to increase funding to make DOD Fresh available to more schools. Increased funding for DOD Fresh could also help provide produce for school salad bars.[36] In addition, USDA, the American Academy of Family Physicians, American Academy of Pediatrics, American Dietetic Association,

[36]See U.S. Department of Agriculture, *USDA Food Distribution 2000: Transforming Food Distribution for the Next Millennium* (Washington, D.C.: November 2000).

National Hispanic Medical Association, and the National Medical Association have suggested that (1) foods that compete with school lunches be required to follow the same nutritional regulations as the school meals; (2) all students have designated lunch periods as near the middle of the school day as possible and of sufficient length to enjoy eating healthy foods with friends; and (3) schools provide enough serving areas to ensure student access to school meals with a minimum of wait time, among other things. Also, the Farm Security and Rural Investment Act of 2002 includes a provision to pilot a program to offer free fruits and vegetables to school children in about 100 schools—25 schools in each of four states—and on an Indian reservation. This same act also includes a provision for mandatory spending on fruits and vegetables. The provision directs USDA to spend not less than $50 million for fresh fruits and vegetables for schools through DOD Fresh.

- **Expand farmers' market programs for WIC participants and the elderly**. The American Public Health Association, the National WIC Association, the Center for Science in the Public Interest, and others support increasing farmers' market programs for WIC and elderly participants.[37] In addition, a few representatives noted that USDA agencies should collaborate to increase the number of markets in areas where WIC participants and other low-income people live. Such collaboration is needed because initiating farmers' markets in low-income areas is hindered by several factors including difficulties with finding space in a large city and farmers' lack of familiarity with the redemption of WIC coupons, according to one university researcher. He further stated that USDA's Agricultural Marketing Service, which is responsible for promoting farmers' markets, could work with extension agents as well as public service agencies to find suitable locations for these markets. In addition, some experts noted that most farmers' markets do not have the technology, electricity, and telephone equipment needed to process the magnetic electronic benefit cards provided to food stamp recipients.

Some of these efforts—such as expanding nutrition education—would require additional federal resources, while others—such as emphasizing an evaluation of nutrition education efforts, expanding DOD Fresh, promoting salad bars in schools, and expanding farmers' markets for WIC

[37]Officials of the National WIC Association support the expansion of farmers' markets only if separate funding is provided.

and the elderly—may only require redirecting existing federal resources. Adding more choices of fruits and/or vegetables to the WIC package without reducing other food items would require additional funding. However, if USDA reduces the servings of other foods, then additional resources may not be required, but industries that stand to lose revenue are likely to oppose the proposal.

Conclusions

Although federal nutrition policy and guidance—the *Dietary Guidelines for Americans* and the *Healthy People 2010* nutrition objectives—recognize the importance of consuming a variety of fruits and vegetables as part of a healthy diet, the *Food Guide Pyramid* graphic does not convey this important guidance. The *Pyramid* graphic—the most widely recognized and disseminated nutrition guide—does not direct Americans to the best dietary choices, particularly to choosing a variety fruits and vegetables high in nutrients that science has linked to promoting health and reducing the risk for chronic diseases. While we recognize that USDA intended the *Pyramid* graphic to be used in the context of the information in the *Pyramid* brochure, in reality, the *Pyramid* graphic typically stands alone. Moreover, when HHS issued *Healthy People 2010* with specific national objectives for fruit and vegetable consumption, it did so with the expectation that those objectives would be reflected in federal programs. However, USDA's strategic plan does not specifically address how it will help food assistance program participants achieve the objectives—despite the fact that one in six Americans is on food assistance and half of American babies are on WIC.

The memorandum of understanding between HHS and USDA provides a framework for expanding 5 A Day across all food assistance programs and to all Americans. Incorporating the new 5 A Day commitments into the agencies' performance plans and establishing performance measures is a logical next step. We recognize the difficulty involved in changing Americans' dietary habits. However, if USDA and HHS develop strategies with specific targets and milestones emphasizing the importance of fruits and vegetables—particularly deeply colored fruits and vegetables—in all their programs, they are more likely to be successful in influencing Americans to follow healthier diets.

Finally, nutrition experts and others have identified a number of actions—such as increasing salad bars in schools and expanding farmers' market programs—that hold promise for improving fruit and vegetable consumption for Americans and may warrant further evaluation.

Recommendations for Executive Action

To give Americans the most current, science-based guidance for making dietary choices, we recommend that, as USDA considers revisions to the *Food Guide Pyramid*, the Secretary of Agriculture, in consultation with the Secretary of Health and Human Services, ensure that the *Pyramid* graphic communicates information on the need for a variety of fruits and vegetables, especially deeply colored fruits and vegetables, in accordance with the *Dietary Guidelines for Americans* and in support of the *Healthy People 2010* objective for vegetables.

To ensure that federal nutrition education/intervention and food assistance programs promote federal goals and guidelines on the consumption of fruits and vegetables, we further recommend that

- the Secretary of Agriculture include in the department's strategic and performance plans, strategies and targets supporting the *Healthy People 2010* objectives for fruit and vegetable consumption,
- the Secretary of Health and Human Services direct the National Institutes of Health, CDC, and other relevant agencies to include in their performance plans, strategies and targets for supporting the *Healthy People 2010* objectives for fruit and vegetable consumption, and
- the Secretaries of Agriculture and Health and Human Services consider the actions that experts and others have identified to increase the consumption of fruits and vegetables and, for those deemed most promising, assess the merits, feasibility, and costs to determine whether the actions should be implemented.

Lastly, to provide accountability for implementing the commitments in the April 2002 memorandum of understanding for 5 A Day, we recommend that the Secretaries of Agriculture and Health and Human Services, in their strategic and performance plans, develop specific strategies and targets for implementing the 5 A Day commitments made in the April 2002 memorandum of understanding.

Agency Comments and Our Response

We provided USDA and HHS with a draft of this report for their review and comment. We obtained USDA's comments in a meeting with department officials; HHS provided written comments. (See app. VII.) USDA said it understood the basis for our recommendations and generally concurred with our treatment of the issues relating to its programs. USDA said that the science base for its nutrition efforts is the *Dietary Guidelines*

for Americans, which includes the *Food Guide Pyramid*. USDA also said that its approach is to address total diet by promoting overall balanced nutrition and the principles of the *Dietary Guidelines for Americans*, which includes, but is not limited to, increasing fruit and vegetable consumption and other dietary improvements that support all of the *Healthy People 2010* nutrition objectives and the 5 A Day targets.

USDA said it has not considered the *Healthy People 2010* nutrition objectives as goals that must be directly incorporated into its strategic plan, but that it could consider the merits of including components directly supporting the *Healthy People 2010* objectives and 5 A Day in its strategic and performance plans. We believe the *Healthy People 2010* objectives—which USDA was a major participant in developing—present a national agenda for improving the health of Americans and that USDA should incorporate these measurable targets and time frames into the food assistance programs. We further believe that the 5 A Day partnership presents a reasonable framework for addressing the objectives related to increasing fruit and vegetable consumption.

With regard to the *Food Guide Pyramid* graphic, USDA noted that consumer research showed that the graphic communicates the messages of proportionality, moderation, and variety among the food groups. USDA stated that the *Pyramid* graphic does not convey all nutrition messages and that the *Pyramid* booklet provides more detailed information on how to make appropriate fruit and vegetable selections. Nonetheless, USDA agreed with the merits of our recommendation that, as it considers revising the *Pyramid* graphic and related materials, it will explore appropriate ways to effectively communicate information on the need for a variety of fruits and vegetables, especially deeply colored ones. USDA also pointed out that its efforts to promote fruits and vegetables extend beyond food assistance and nutrition education to include agricultural, economic, and behavioral research; agricultural extension; and market development and support. We added this information in the report.

HHS stated that our draft report was too definitive in its statements about the relationship between fruit and vegetable consumption and the reduction of diseases, and that the scientific evidence does not support the statements we made concerning the reduction of disease rates and the dollar savings that would result from increased intakes of fruits and vegetables alone. HHS was particularly concerned about the information we present in appendix IV—which describes some of the evidence that links fruit and vegetable consumption to reducing the risk for certain diseases. We qualified the language in appendix IV to clarify the strength

of the linkages between consuming fruits and vegetables and specific diseases and added citations for our sources throughout the report. With regard to the cost data, we deleted the reference to USDA's estimate of total diet-related costs for heart disease, cancer, stroke, and diabetes because it was not limited to costs solely for low fruit and vegetable consumption. HHS further stated, "There is no comprehensive recent detailed review by a recognized authoritative body from which such a summary of the evidence could be based that would reflect the totality of recent evidence and that has undergone appropriate clearance." Our sources for information included September 2001 and November 2000 National Institutes of Health reports summarizing the evidence on the relationship between fruits and vegetables and disease prevention; *The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity: 2001*; articles published in the *Journal of the American Medical Association*, the *New England Journal of Medicine*, and the *Annals of Internal Medicine*; and documents from CDC; the National Institutes of Health; the National Cancer Institute; and other HHS offices. The reports, documents, and information from HHS agencies were represented to us as reflecting current research; HHS did not identify evidence that we should cite that might be contradictory to any links between fruit and vegetable consumption and prevention of diseases cited in the report.

HHS further stated that dietary messages for the consumer can be confusing, particularly when the public receives conflicting reports or isolated parts of the total diet message. While our report focuses on fruits and vegetables, it does so in the context of a healthy diet. With regard to our recommendation—to include in agencies' annual performance plans, strategies and targets for supporting the *Healthy People 2010* objectives for fruits and vegetables—HHS noted that performance measures based on relevant *Healthy People 2010* objectives are already included in the strategic plans of many HHS agencies. However, the annual performance plans of the National Institutes of Health and CDC do not address the objectives on fruits and vegetables. We recommend that they do so.

USDA and HHS also provided technical comments that we incorporated as appropriate.

As agreed with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this report. At that time, we will send copies to the Secretaries of Agriculture, Defense, and Health and Human Services; the Director, Office

of Management and Budget; and other interested parties. We will make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at the following address: http://www.gao.gov.

If you have any questions about this report, please contact me or Erin Lansburgh at (202) 512-3841. Key contributors to this report are listed in appendix VIII.

Lawrence J. Dyckman
Director, Natural Resources
and Environment

Appendix I: Federal Obligations for Efforts Related to Fruit and Vegetable Consumption

The largest federal activities related to fruit and vegetable consumption are the purchase of fruits and vegetables and nutrition education. The U.S. Department of Agriculture (USDA) estimated that it obligated $6.7 billion for these activities in fiscal year 2001. In arriving at this figure, USDA estimated that 20 percent of the total food stamp and school meal expenditures were for the purchase of fruits and vegetables. Funding information for the Department of Health and Human Services (HHS) includes funding for the Centers for Disease Control and Prevention (CDC) and the National Institutes of Health (NIH) only, and reflects 5 A Day activities carried out by the agencies, as well as CDC grants to states for 5 A Day efforts and other diet-related efforts. Department of Defense (DOD) funding goes primarily to purchase fruits and vegetables for military personnel and to support 5 A Day initiatives in each military service branch. USDA, HHS, and DOD nutrition education and/or intervention, human nutrition research, and "other" activities include activities related to fruits and vegetables, as well as those focused on general nutrition or other diet-related issues, because agencies generally do not track nutrition education/intervention funding related to fruits and vegetables separately from funding related to other foods.

Funding information provided by USDA, HHS, and DOD are presented below in 2001 dollars in tables 4, 5, and 6, respectively.

Table 4: USDA Funding for Activities Related to Diet and Fruit and Vegetable Consumption, Fiscal Years 1997-2001

Constant 2001 dollars in thousands

Activity	FY1997	FY1998	FY1999	FY2000	FY2001
Purchasing fruits and vegetables (except at farmers' markets)	$7,524,861	$6,869,337	$6,659,353	$6,539,206	$6,667,931
Purchasing fruits and vegetables at farmers' markets	7,809	13,383	15,616	19,762	35,921
Nutrition education related to total diet	355,121	368,748	393,870	422,793	474,656
Human nutrition research related to total diet	13,002[a]	18,022	22,084	34,900	16,250[a]
Agricultural research related to fruits and vegetables	24,792[a]	81,174	78,273	97,436	64,402[a]
Other general nutrition activities (e.g., Healthy Eating Index, Thrifty Food Plans, and Food Supply Database)	202	309	517	537	532
Other agricultural activities (e.g., farmers' market development and promotion, marketing order administration, and market news)	395[a]	73,789	74,985	75,201	79,686

[a]The Cooperative State Research, Education and Extension Service did not provide funding data for fiscal years 1997 and 2001; the Agricultural Marketing Service and Economic Research Service did not provide data for fiscal year 1997.

Source: USDA's Food and Nutrition Service; Center for Nutrition Policy and Promotion; Cooperative State Research, Education, and Extension Service; Agricultural Marketing Service; Economic Research Service; and Agricultural Research Service.

Table 5: HHS Funding for Activities Related to Diet and Fruit and Vegetable Consumption, Fiscal Years 1997-2001

Constant 2001 dollars in thousands

Activity	FY1997	FY1998	FY1999	FY2000	FY2001
NIH funding for nutrition education and/or intervention and research related to fruits and vegetables.	$3,969	$4,972	$5,430	$5,627	$3,600
CDC funding for prevention research, monitoring and surveillance, collaboration, and evaluation, and other nutrition education/intervention related to total diet	1,609	1,587	1,566	6,650	16,200

Note: Data do not include Medicare reimbursements for nutrition counseling provided in medical care. Some administrative costs related to 5 A Day are not included.

Source: Centers for Disease Control and Prevention and National Institutes of Health.

Table 6: DOD Funding for Activities Related to Diet and Fruit and Vegetable Consumption, Fiscal Years 1997-2001

Constant 2001 dollars in thousands

Activity	FY1997	FY1998	FY1999	FY2000	FY2001
Purchasing fruits and vegetables	$39,693	$47,605	$46,367	$55,350	$60,000
Nutrition education related to total diet	3,488	3,503	4,389	4,565	3,535
Human nutrition research related to total diet	4,348	6,304	6,236	4,740	3,619

Note: Data do not include nutrition counseling provided as part of medical care.

Source: Budget data were provided by the Army, Navy, Air Force, Defense Supply Center, and Defense Commissary Agency.

Appendix II: Scope and Methodology

To identify the health-related benefits associated with the consumption of the recommended servings of fruits and vegetables, we reviewed research studies and/or obtained expert views from medical and nutritional scientists at USDA's Center for Nutrition Policy and Promotion; HHS's National Institutes of Health, including the National Cancer Institute and the National Heart, Lung, and Blood Institute, and CDC; the National Academy of Sciences; and academic research institutions, including Harvard University, the Mayo Clinic, Cornell University, New York University, and the University of California at Davis. We also considered federal dietary guidance and the two health claims for fruits and vegetables authorized by the Food and Drug Administration. We also analyzed published data on the costs to the nation, including deaths, associated with poor diets, including diets low in fruits and vegetables, from these agencies and experts.

To assess whether the general public has improved its consumption of fruits and vegetables under key federal nutrition policy, guidance, and programs, we interviewed officials with and analyzed documents from (1) HHS's Office of the Secretary, including the Surgeon General, the Food and Drug Administration and its Center for Food Safety and Nutrition; (2) USDA's Agricultural Marketing Service; Center for Nutrition Policy and Promotion; Economic Research Service; and Cooperative State Research, Education and Extension Service; (3) DOD's Office of the Secretary and representatives with nutrition responsibilities from each of the armed services; (4) industry groups, including United Fresh Fruit and Vegetable Association; and (5) consumer and health associations, including the Center for Science in the Public Interest; the American Public Health Association; the American Cancer Society; and the American Heart Association. We also interviewed former USDA and HHS officials with responsibilities for nutrition policies and programs to obtain historical information on certain programs.

To assess whether key federal food assistance programs have achieved improvements in the fruit and vegetable consumption of program participants, we analyzed data on consumption for program participants and similar nonparticipants; documents related to the requirements for providing fruits and vegetables in food assistance programs; and internal and external program evaluations of food assistance and nutrition programs. We discussed this information with the officials previously identified, California's Department of Health Services, the Food Research and Action Center, and the National WIC Association.

To identify federal actions that experts recommend for increasing the consumption of fruits and vegetables, as well as the implications of those actions, we analyzed documents and interviewed officials from the aforementioned federal and state agencies, universities, and consumer and health associations. Documents included reports to Congress and the Secretaries of Agriculture and Health and Human Services, published articles, internal and external program evaluations, and position papers.

To determine funding information for federal programs that may promote fruit and vegetable consumption, we developed a data collection instrument to identify federal obligations for efforts to promote fruit and vegetable consumption for a 5-year period. We requested from USDA, HHS, and DOD information on purchases of fruits and vegetables, human nutrition research, nutrition education, and other activities. In some instances, agency officials estimated funding information when precise information was not available.

With regard to information on the numbers of servings of fruits and vegetables, we used consumption data that USDA calculates by surveying a sample of Americans in its "Continuing Survey of Food Intakes by Individuals" (CSFII). The most recent CSFII data are based on 1994-96 surveys. USDA also estimates food available for consumption by adjusting annual food supply data for spoilage, waste, and other losses accumulated throughout the marketing system. USDA's Economic Research Service reports these data in terms of *Food Guide Pyramid* servings. While these data are more current, food supply data may overestimate actual consumption, according to USDA. Therefore, unless otherwise stated, we used CSFII data throughout this report.

Finally, because we are not a scientific body, we did not conduct an independent study of the health benefits of various foods; rather, we reviewed existing literature and are reporting information contained in that literature. Therefore, nothing in this report would constitute an authoritative statement that could be used, under section 403(r)(2) of the Federal Food, Drug and Cosmetic Act, to support a claim of a health benefit of any food; nor would anything in this report constitute valid support for a petition under section 403(r)(4) of the act to allow such a claim to be made.

Our work was conducted in accordance with generally accepted government auditing standards from August 2001 through June 2002.

Appendix III: Federal Agricultural, Trade, and Environmental Programs and Regulations Can Affect Fruit and Vegetable Consumption

The federal government influences the consumption of fruits and vegetables in many ways besides through food assistance and nutrition programs. Any government program or regulation that affects either consumers' preferences for consuming fruits and vegetables or producers' ability or willingness to supply fruits and vegetables to the market can influence U.S. consumption, although these effects may be small. Such programs and regulations include trade-restriction and export-promotion programs, environmental regulations, and agricultural programs. However, the effects on farm-level prices of such programs or regulations would have to be fairly substantial to have a large impact on consumption, because farm-level prices generally account for about one-third of the retail prices for fruits and vegetables.

Trade Restriction and Export Promotion Programs

Trade restrictions, in the form of tariffs, on some fruits and vegetables result in higher prices that could reduce U.S. consumption of those fruits and vegetables. Although tariffs on most fruits and vegetables are low—less than 10 percent of the price—tariffs of 20 percent or more are sometimes applied to some imported fruits and vegetables, such as certain types of melons, asparagus, and broccoli.[1] In addition, when domestic marketing orders are in place, some imports, including tomatoes, potatoes, and grapes, are subject to minimum quality requirements. Some foreign suppliers and others claim that these requirements keep out lower-priced imports to maintain higher prices for domestic producers, which can reduce consumption. Proponents of the standards claim that the standards ensure high quality, which encourages consumption.

The U.S. government also promotes exports of U.S.-grown fruits and vegetables to increase the demand for these products in other countries. Increasing exports through such promotions may divert fruits and vegetables from domestic markets, raising their price and lowering fruit and vegetable consumption by U.S. consumers.

Environmental Regulations

Environmental regulations regarding the use of pesticides, as well as the protection of water and air quality, can affect fruit and vegetable consumption in a variety of ways. For example, complying with regulations on pesticides may increase farm costs, which can reduce the

[1]Some of these imports come from countries that are covered by regional trade agreements that provide reduced or tariff-free entry for these commodities.

quantities of fruits and vegetables supplied to the market, thereby increasing prices and lowering consumption. On the other hand, pesticide regulation may reduce consumers' concerns about the safety of pesticides and other chemicals used on fruits and vegetables. To the extent that these concerns decrease, consumption may increase, particularly the consumption of those fruits and vegetables often eaten fresh, such as apples and broccoli. Similarly, consumers' perceptions that lax environmental controls in other countries make imported produce less safe may affect the consumption of fruits and vegetables.

Agricultural Programs

Several agricultural programs administered by USDA can affect U.S. consumption of fruits and vegetables. These programs include (1) *marketing orders*, which advertise and promote certain crops and, in some instances, limit the quantity or specify the quality that can be marketed; (2) *commodity programs*, in which USDA provides farmers with price and income supports; and (3) *crop insurance*, through which USDA indemnifies farmers, in part or in whole, against the loss of certain crops.

- **Marketing Orders**. Marketing orders are agreements among producers of a particular commodity on actions designed to provide an "orderly market" that would reduce fluctuations in farm and retail prices and assure consumers of a steady supply of quality products.[2] In general, the promotional activities of marketing orders can increase consumer demand and, therefore, the consumption of some fruits and vegetables. However, a few marketing orders restrict the quantity of a particular fruit or vegetable that can be marketed, particularly during periods of oversupply. In general, these quantity restrictions could be expected to raise prices compared with free market levels and, thereby, reduce consumption. Also, some marketing orders impose quality restrictions. While some economists have suggested that these orders might also be used to restrict quantity—by increasing the quality requirements during periods of strong supply—other economists have noted that such action might not affect supply because major purchasers (wholesalers and retailers) set quality requirements higher than those imposed by federal marketing orders.

[2] Once marketing order agreements are voted in by the industry and approved by the Secretary of Agriculture, they are issued as federal regulations and have the force of law.

- **Commodity Programs**. The provisions of commodity programs that provide producers of other commodities, such as grains and cotton, with income and price supports can affect fruit and vegetable consumption. For example, during the past several years, grain and cotton farmers who received direct payments from USDA under production flexibility contracts were restricted from increasing their acreage devoted to fruits and vegetables if they wanted to remain eligible for these payments. This restriction may have reduced the supply of certain fruits and vegetables, thereby raising prices and lowering the consumption of those fruits and vegetables. In addition, because consumers have to choose how to spend their food dollars—on fruits and vegetables or on other foods—anything that influences the consumption of other foods by influencing their prices, including government income and price support programs, can also affect fruit and vegetable consumption.

- **Crop Insurance**. By providing subsidized crop insurance for certain crops, USDA reduces the risk to farmers of growing those crops—which would generally lead to greater supplies and lower prices for those crops. Not all fruits and vegetables are covered under federal crop insurance. To the extent that the availability of crop insurance affects the supply of certain fruits and vegetables, it may also affect their prices and, hence, their consumption.

Other Federal Activities

Other federal activities may also affect the prices of fruits and vegetables and their consumption.

- Restrictions on legally importing seasonal workers when domestic workers are not available can reduce the amount of fruits and vegetables that farmers can harvest, which can result in higher prices, which, in turn, can reduce consumption.

- Laws that subsidize the cost of the water that some farmers use for irrigation can lower those farmers' costs of growing fruits and vegetables. To the extent that the lower cost results in lower prices to consumers, consumption may increase.

- Federal efforts to ensure food safety can increase consumer confidence in the safety of fruits and vegetables and, perhaps, increase the quantities consumed.

Appendix IV: Fruits and Vegetables Help Protect Against Heart Disease; Cancer; and, Potentially, Other Diseases

The following describes some of the evidence that links fruit and vegetable consumption to reducing the risk for heart disease and cancer. It also discusses the evidence suggesting links to reducing the risk for stroke, diabetes, obesity, and diverticulosis. Studying the relationship between diet and chronic diseases is challenging for many reasons, including the difficulty in accounting for all potential risk factors and the fact that chronic diseases may develop over a long period of time.

- **Heart Disease**. Heart disease is the leading cause of death in the United States, killing about 725,000 people each year, according to CDC. A healthy lifestyle, including a healthy diet, has great potential to reduce disease and death associated with coronary heart disease—the manifestation of heart disease that afflicts the heart's blood vessels. A diet low in saturated fat and cholesterol and rich in fruits, vegetables, and grains has been found to be associated with lower rates of coronary heart disease. According to an NIH report, diets high in fruits and vegetables are associated with a 20 to 40 percent reduction in the occurrence of coronary heart disease.[1] An array of substances in fruits and vegetables, including antioxidants, folate, fiber, potassium, flavonoids, and other phytochemicals, may be responsible for the decreased risk. Recent studies have added to the growing evidence that diets high in fruits and vegetables reduce important risk factors associated with coronary heart disease, hypertension, and high plasma lipid levels in particular. For example, a recent report combining data from women in the Nurses' Health Study with men in the Health Professionals' Follow-Up Study showed that men who ate an average of 10 servings and women who ate an average of 9 servings per day of fruits and vegetables had a 20-percent lower risk of coronary heart disease than men and women who ate an average of 2.5 to 3 servings a day.[2] The lowest risks were observed for the men and women with the highest consumption of green leafy vegetables and vitamin-C-rich fruits and vegetables, such as strawberries, oranges and orange juice, Brussels sprouts, and red cabbage. That study found a 4 percent lower risk of coronary heart disease for each serving-per-day-increase in

[1]See National Institutes of Health, National Cancer Institute, *5 A Day for Better Health Program Evaluation Report*, NIH Pub. No. 01-4904 (Bethesda, Md.: November 2000).

[2]See K.J. Joshipura, F.B. Hu, et al. *Effect of Fruit and Vegetable Intake on Risk for Coronary Heart Disease* (Philadelphia, Pa: Annals of Internal Medicine, June 2001) 134:1106-1114. This prospective cohort study followed female nurses for 14 years and male health professionals for 8 years.

fruits and vegetables. Another study looked at the effect of a diet high in fruits and vegetables and low in fat—the Dietary Approaches to Stop Hypertension (DASH) diet—on plasma lipid levels and found reductions in plasma levels of total cholesterol, LDL and HDL, in all races and both sexes compared with the control diet.[3] Furthermore, the DASH diet is also effective in lowering blood pressure. The beneficial effect of fruits and vegetables on coronary heart disease risk is also likely due, in part, to their high fiber and antioxidant activity.

- **Cancer**. Cancer is the second leading cause of death in the United States according to CDC. Over 550,000 cancer deaths are expected in 2002, and estimates are that about one-third of those deaths will be related to poor nutrition, a preventable cause of death. Indeed, reviews of more than 200 studies by the American Institute for Cancer Research and others indicate that the link between the consumption of fruits and vegetables and some cancers is consistent and strong.[4] People who consume 5 or more servings daily have about one-half the cancer risk of those who consume 2 or fewer servings, according to an NIH report.[5] Although there are still many unresolved questions regarding the association between cancer risk and the consumption of fruits and vegetables, ample scientific evidence indicates that the frequent consumption of a variety of fruits and vegetables protects against some cancers, particularly cancers of the mouth, pharynx, esophagus, stomach, colon, and rectum. The evidence also suggests reductions in the risk for cancers of the breast, pancreas, larynx, and bladder.[6]

- **Stroke**. Stroke is the third leading cause of death in the United States. CDC reports that about 600,000 Americans have a stroke each year, of which about 160,000 will die. Studies have shown that the consumption

[3]See E. Obarzanek, F. M. Sacks, et al. *Effects on Blood Lipids of a Blood Pressure-Lowering Diet: The Dietary Approaches to Stop Hypertension (DASH) Trial* (American Journal of Clinical Nutrition, 2000) 74:80-89. See also U.S. General Accounting Office, *Food Stamp Program: Information on the Costs of Special Diets*, GAO/RCED-00-144R (Washington, D.C.: May 8, 2000).

[4]See World Cancer Research Fund/American Institute of Cancer Research, *Food, Nutrition and the Prevention of Cancer: A Global Perspective* (Washington, D.C.: 1997).

[5]See National Institutes of Health, National Cancer Institute, *5 A Day for Better Health Program Evaluation Report*, NIH Pub. No. 01-4904 (Bethesda, Md.: November 2000).

[6]See U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Cancer Institute, *Cancer Progress Report: 2001*, NIH Pub. No. 02-5045 (Bethesda, Md.: 2001).

of fruits and vegetables may decrease the risk of stroke through their effect on reducing hypertension (high blood pressure), an important risk factor for stroke. These studies show that the lowest risks for stroke are associated with high consumption of cruciferous vegetables (e.g., broccoli and cabbage), green leafy vegetables, citrus fruits, and vitamin-C-rich fruits and vegetables. For example, a recent analysis of 14 years of data from the Nurses' Health Study and 8 years of data from the Health Professionals' Follow-Up Study disclosed that each additional daily serving of fruits or vegetables was associated with a 4 to 7 percent reduction in the risk of stroke.[7] A 2001 study confirmed the blood-pressure-reducing effect of the DASH diet (high in fruits, vegetables, and low-fat dairy products and low in saturated fat and cholesterol) and found further decreases in blood pressure when the DASH diet was combined with low sodium intake.[8] In addition, a 2002 study of a representative sample of the U.S. population added support for the association between fruit and vegetable consumption and lower risk of stroke incidence and mortality.[9]

- **Diabetes**. Diabetes is the sixth leading cause of death in Americans and is associated with a range of other serious, chronic ailments, including coronary heart disease, stroke, hypertension, blindness, kidney disease, and amputation. CDC reported that, during the last 10 years, diabetes increased 49 percent among adults, and that over 800,000 new cases and over 200,000 deaths were from diabetes-related complications each year. An analysis of 20-year follow-up data from nearly 10,000 men and women who participated in a 1970s study showed that individuals who developed diabetes had a lower average consumption of fruits and vegetables.[10] Specifically, the study found an association between consuming 5 or more servings of fruits and vegetables daily and a lower incidence of diabetes. Furthermore,

[7]See K.J. Joshipura, A. Asherio, et al. *Fruit and Vegetable Intake in Relation to Risk of Ischemic Stroke* (Journal of the American Medical Association, 1999) 282:1233-1239.

[8]See F.M. Sacks, L.P. Svetkey, et al. *Effects on Blood Pressure of Reduced Dietary Sodium and the Dietary Approaches to Stop Hypertension (DASH) Diet* (New England Journal of Medicine, 2001) 344:3-10.

[9]See L.A. Bazzano, J. He, et al. *Fruit and Vegetable Intake and Risk of Cardiovascular Disease in US Adults: The First National Health and Nutrition Examination Survey Epidemiological Follow-Up Study* (American Journal of Clinical Nutrition, 2002) 76:93-99.

[10]See E.S. Ford, A.H. Mokdad. *Fruit and Vegetable Consumption and Diabetes Mellitus Incidence Among U.S. Adults* (Preventive Medicine, 2001) 32:33-39.

women who consumed 5 or more servings of fruits and vegetables per day were 39 percent less likely to develop diabetes compared with women who consumed little or no fruits and vegetables. There are a number of possible mechanisms by which fruit and vegetable consumption could affect diabetes, and additional studies will be needed to conclusively determine the relationship between fruit and vegetable consumption and diabetes. For example, fiber and magnesium in fruits and vegetables have positive effects on the primary manifestations of diabetes—the control of glucose and peripheral insulin sensitivity. The potential benefits in preventing diabetes also may stem from antioxidant vitamins and phytochemicals found in high levels in fruits and vegetables.

- **Obesity**. The link between obesity and the consumption of fruits and vegetables is receiving considerable attention from scientists, especially as the prevalence of obesity has increased. Over 60 percent of American adults are overweight, and about 13 percent of children and adolescents are seriously overweight. Overweight and obesity are important risk factors for a number of diseases, including heart disease, cancer, stroke, and diabetes. The Surgeon General's 2001 report on obesity estimated the total medical cost associated with overweight- and obesity-related diseases at $117 billion in 2000.[11] Although the link is not direct, fruits and vegetables may affect obesity through their relatively low-calorie level, high water content, palatability, and fiber content. The inclusion of fruits and vegetables in the diet has the potential to affect each of those factors. A study looking at the short-term effects of diet on calorie intake found that adding fruits and vegetables to lunch or dinner meals lowered the calories in the meal but did not affect palatability or feelings of fullness and hunger.[12] Importantly, consuming meals with the added fruit and vegetables resulted in a 30 percent reduction in total caloric intake for the day. That study, and others like it, suggests that consuming foods of low-energy density, such as vegetables and some fruits, may be a useful strategy for weight loss and control. Adding fruits and vegetables to the

[11]See U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General, *The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity: 2001* (Rockville, Md.: 2001).

[12]See E.A. Bell, V.H. Castellanos, et al. *Energy Density of Foods Affects Energy Intake in Normal-Weight Women.* (American Journal of Clinical Nutrition, 1998) 67:412-420.

diet was also explored as a weight loss strategy in a recent study of obese parents, whose normal-weight children are at risk for becoming obese.[13] In that study, some families were encouraged to increase fruit and vegetable consumption while others were encouraged to decrease high-fat/high-sugar foods. The families that increased fruit and vegetable consumption had greater weight reduction. These data support the positive benefits of including fruits and vegetables in weight loss diets and suggest that an effective approach to weight loss might focus on increasing the consumption of healthy foods rather than emphasizing dietary restriction.

- **Diverticulosis**. Diverticulosis occurs when small out-pouches called diverticula develop in the large intestine (colon), a condition that affects an estimated one-half of Americans age 60 to 80, and almost everyone over age 80 according to the National Institutes of Health. An estimated 10 to 25 percent of individuals with diverticulosis develop diverticulitis—an infection or inflammation of these out-pouches—that can result in tearing, blockages, or bleeding if left untreated. High-fiber diets—especially those high in insoluble cellulose fiber—have been found to reduce the risk of diverticulosis and diverticulitis. Because fruits and vegetables are excellent sources of cellulose fiber—accounting for over 30 percent of the insoluble fiber in fruits and 50 percent or more in vegetables—an increase in the consumption of fruits and vegetables may be particularly important in helping prevent diverticulosis and its complications.

[13]See L.H. Epstein, C.C. Gordy, et al. *Increasing Fruit and Vegetable Intake and Decreasing Fat and Sugar Intake in Families at Risk for Childhood Obesity.* (Obesity Research, 2000) 9:171-178.

Appendix V: The U.S. Department of Agriculture's Fruit and Vegetable Categories

USDA classifies fruits in two groups: (1) citrus, melons, and berries and (2) other fruits.[1]

Table 7: USDA's Fruit Categories

Fruit category	Fruits in category
Citrus, melons, and berries	Acerola, blackberries, blueberries, boysenberries, calamondin, cantaloupe, casaba melon, cranberries, elderberries, gooseberries, grapefruit, honeydew melon, juneberries, kiwifruit, kumquat, lemon, lime, loganberries, mulberries, orange, raspberries, strawberries, tangelo, tangerine, ugli fruit, watermelon, and juices made from these fruits
Other fruits	Apple, apricot, Asian pear, avocado, banana, cherries, currants, dates, figs, genip, grapes, guava, jackfruit, Japanese pear, jobo, lychee, mamey, mango, nectarine, papaya, passion fruit, peach, pear, persimmon, plantain, pineapple, plum, pomegranate, prickly pear, prunes, quince, raisins, rhubarb, sapodilla, soursop, star fruit, sweetsop, tamarind, wi-apple, and juices made from these fruits

Source: USDA, Economic Research Service.

[1]Apples, bananas and grapes are part of USDA's "other fruits" category; because they account for a large portion of fruit consumption, they are shown separately in figure 2 of the report.

USDA classifies vegetables in three groups: (1) dark-green leafy and deep-yellow vegetables; (2) starchy vegetables and dry beans, peas, and lentils; and (3) other vegetables.[2]

Table 8: USDA's Vegetable Categories

Vegetable category	Vegetables in category
Dark-green leafy (dark green)	Arugula, beet greens, broccoli, chard, chicory, collard greens, dandelion greens, endive, escarole, grape leaves, kale, lambsquarters, mustard greens, parsley, poke greens, romaine lettuce, spinach, taro leaves, turnip greens, and watercress
Deep-yellow (orange) vegetables	Carrots, carrot juice, pumpkin, sweet potato, and winter squash
Starchy vegetables	Black-eyed peas (not dried), breadfruit, cassava, cowpeas (not dried), green peas, hominy, lima beans (immature), parsnips, sweet corn, white potato, rutabaga, and taro
Dry beans, peas, and lentils	Bayo beans, black beans, black-eyed peas, broadbeans, calico beans, chickpeas (garbanzos), cowpeas, kidney beans, lentils, lima beans (mature), mung beans, navy beans, pinto beans, pink beans, red Mexican beans, split peas, soybeans (mature), and white beans
Other vegetables	Artichoke, asparagus, balsam-pear pods, bamboo shoots, bean and alfalfa sprouts, broccoflower, beets, Brussels sprouts, cabbage (green and red), cactus, capers, cauliflower, celery, chayote, Chinese cabbage, chives, christophene, coriander, cucumber, eggplant, garlic, ginger root, green beans, horseradish, iceberg lettuce, leek, mushrooms, okra, olives, onions (mature and green), peppers (green, red, hot, banana), pimiento, radicchio, radishes, sauerkraut, seaweed, snow peas, summer squash, tomatillos, tomatoes, tomato juice, turnips, water chestnuts, wax beans, and zucchini

Source: USDA, Economic Research Service.

[2]In figure 3 of the report, white potatoes are shown separately from the other starchy vegetables because they account for a large portion of starchy vegetable consumption. Similarly, canned tomatoes and iceberg lettuce—included in USDA's "other vegetables" category—are shown separately.

Appendix VI: Serving Sizes by Food Group for Five Food Packages for Women and Children in WIC

All five packages for women and children in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) provide foods for four of the food groups—grain, fruit, dairy, and protein; one package also provides a partial serving of the fifth food group—vegetable.

Table 9: Number and Percentage of Minimum Recommended Servings by Food Group for Five WIC Packages for Women and Children

	Pyramid food group (WIC-allowed food)				
	Grain (cereal)	Vegetable (carrots)	Fruit (juice)	Dairy (milk, cheese)	Protein (eggs, tuna, beans, peanut butter)
WIC package	**Number of servings (percentage of minimum recommended servings[a])**				
Package III (for children 2-3 years of age)	1.8 (30%)	0 (0%)	2.3 (115%)	3.2 (160%)	0.64 (46%)[b] 0.68 (49%)[c]
Package IV (for children 4 years of age)	1.2 (20%)	0 (0%)	1.5 (75%)	3.2 (160%)	0.64 (32%)[b] 0.68 (34%)[c]
Package V (for women who are pregnant and women who are breastfeeding and receiving formula)	1.2 (13%)	0 (0%)	1.5 (50%)	3.7 (123%)	0.64 (27%)[b] 0.68 (28%)[c]
Package VI (for nonbreastfeeding postpartum women)	1.2 (20%)	0 (0%)	1 (50%)	3.2 (160%)	0.48 (24%)[d]
Package VII (for women who are breastfeeding and not receiving formula)	1.2 (13%)	0.28 (9%)	1.8 (60%)	4.1 (137%)	1.2 (50%)[e]

Note: Packages I and II are for infants only.

[a]The *Food Guide Pyramid* is the source for minimum recommended servings.

[b]Eggs and beans.

[c]Eggs and peanut butter.

[d]Eggs.

[e]Eggs, peanut butter, beans, and tuna.

Source: National WIC Association.

Appendix VII: Comments from the Department of Health and Human Services

Note: GAO's comments supplementing those in the report's text appear at the end of this appendix.

DEPARTMENT OF HEALTH & HUMAN SERVICES Office of Inspector General

Washington, D.C. 20201

JUN 28 2002

Mr. Lawrence J. Dyckman
Director, Natural Resources
and Environment
United States General
Accounting Office
Washington, D.C. 20548

Dear Mr. Dyckman:

Enclosed are the Department's comments on your draft report entitled, "Fruits and Vegetables: Enhanced Federal Efforts to Increase Consumption Would Yield Health Benefits for Americans." The comments represent the tentative position of the Department and are subject to reevaluation when the final version of this report is received.

The Department also provided numerous technical comments directly to your staff.

The Department appreciates the opportunity to comment on this draft report before its publication.

Sincerely,

Michael Mangano
for Janet Rehnquist
Inspector General

Enclosure

The Office of Inspector General (OIG) is transmitting the Department's response to this draft report in our capacity as the Department's designated focal point and coordinator for General Accounting Office reports. The OIG has not conducted an independent assessment of these comments and therefore expresses no opinion on them.

COMMENTS OF THE DEPARTMENT OF HEALTH AND HUMAN SERVICES ON THE U. S. GENERAL ACCOUNTING OFFICE (GAO) DRAFT REPORT, "FRUITS AND VEGETABLES: ENHANCED FEDERAL EFFORTS TO INCREASE CONSUMPTION WOULD YIELD HEALTH BENEFITS FOR AMERICANS" (GAO-02-657)

The Department of Health and Human Services (HHS) appreciates the opportunity to review and comment on this draft report, which addresses Federal efforts to increase consumption of fruits and vegetables.

General Comments

See comment 1.

As identified in the *Dietary Guidelines for Americans*, which is issued by HHS and the United States Department of Agriculture (USDA), choosing a variety of fruits and vegetables daily is a key element of a healthy diet. *Healthy People 2010* set objectives based on the *Dietary Guidelines* to stimulate action and to provide a way to measure progress toward meeting the recommendations. Performance measures based on relevant *Healthy People 2010* objectives are already included in the strategic plans of many HHS agencies and offices.

See comment 2.

The HHS agrees that continued emphasis on consumption of increased amounts and variety of fruits and vegetables is an important part of the national total diet message. However, HHS feels that dietary messages for the consumer can be confusing particularly when the public receives conflicting reports or isolated parts of the total diet message. The emerging science in the area of fruit and vegetable consumption is consistent with the total diet message promulgated by the USDA/HHS *Dietary Guidelines for Americans,* the National Heart, Lung, and Blood Institute's (NHLBI) National Cholesterol Education Program, National High Blood Pressure Education Program, and Obesity Education Initiative. The HHS believes it is essential to present recommendations for increased consumption of fruits and vegetables in the context of a total diet that is low in saturated fat and cholesterol and moderate in total fat, lower in salt, with levels of energy intake and physical activity to maintain or lose weight as needed for health. Also, evidence is emerging of a strong link between genetics, diet and health outcomes that is not addressed in this document.

See comment 3.

In general, the draft report is too definitive in its statements about the relationship between fruit and vegetable consumption and the reduction of disease. The scientific evidence does not support such firm statements concerning the reduction of disease rates and the dollar savings attached that would result from increased intakes of fruits and vegetables alone. Notation of the differing strengths of scientific evidence for the different diseases and conditions covered by the draft report would greatly enhance its utility for its diverse readership. In addition, HHS believes that presentation of the scientific evidence for the health effects of fruits and vegetables in the draft report would be substantially strengthened by including references. Statements based on a few studies should be qualified as "reporting" any health effects to ensure that the statements do not imply scientific consensus.

1

See comment 4.

Finally, the review of the scientific literature in Appendix IV does not reflect the totality of the evidence relating fruit and vegetable consumption with health. Moreover, there is no comprehensive recent detailed review by a recognized authoritative body from which such a summary of the evidence could be based that would reflect the totality of recent evidence and that has undergone appropriate clearance. For example, the GAO draft report does not present the totality of the evidence and contains inaccuracies in the report text for the bullet "Heart Disease" and the bullet "Stroke."

See comment 5.

The Food and Drug Administration (FDA), under provisions of the Federal Food, Drug, and Cosmetic Act (the Act) (section 403®) of the Act), has established provisions for truthful and non-misleading nutrient content and health claims that may be used to encourage consumption of fruits and vegetables. Implementing regulations for nutrient content claims establish definitions for claims that fruits and vegetables may use to highlight the levels of the many nutrients they contain. Likewise, regulations for health claims establish the requirements to be met before claims characterizing the relationship between a substance in the diet to a disease or health-related condition can be used in food labeling. These regulations provide that FDA may authorize a health claim only when it determines, based on the totality of publicly available scientific evidence, that there is significant scientific agreement among experts qualified by scientific training and experience to evaluate such claims that the claim is supported by such evidence.

See comment 5.

Based on these standards, FDA has provided for two health claims that pertain to fiber-containing fruits and vegetables. Sample claims that may be made for these two health claims are: "Low fat diets rich in fiber-containing grain products, fruits, and vegetables may reduce the risk of some types of cancer, a disease associated with many factors" (21 CFR 101.76) and "Diets low in saturated fat and cholesterol and rich in fruits, vegetables, and grain products that contain some types of dietary fiber, particularly soluble fiber, may reduce the risk of heart disease, a disease associated with many factors" (21 CFR 101.77). These claims are written to clearly identify the dietary factors that must be present with the fruits and vegetables in order to have the claimed effect and to point out that the etiology of these diseases is multi-factorial.

See comment 6.

The Centers for Disease Control and Prevention (CDC) supports population-based public health efforts to promote healthy personal behaviors associated with prevention of premature death and disability from chronic diseases. The CDC does this in part by providing funding and technical assistance to State Departments of Health to support development and implementation of programs for the general population. The CDC has developed goals and objectives specific to 5 A Day, and with the National Cancer Institute (NCI) has completed a major round of 5 A Day strategic planning activities with every state. Currently there is no specific 5 A Day funding for States, even though every State has designated a 5 A Day coordinator. States that receive current or future funding for nutrition and physical activity programs for prevention and control of obesity and related chronic diseases will have opportunities to incorporate 5 A Day components into programs as they develop and test or adopt effective interventions, promote policies and environmental changes, conduct surveillance, and implement social marketing strategies. Current

2

See comment 6.

capacity is dependent on a variety of local, state, and federal government as well as private and non-profit resources, and is very limited in many states.

In April 2002, HHS and USDA signed a memorandum of understanding that established a general framework for the two departments' agencies to work together to implement an enhanced national 5 A Day Program. The CDC has partnered with NCI in the past to provide a mechanism for NCI to distribute funds to support state-based program evaluation projects. Now, CDC is assuming an expanded role in the "5 A Day for Better Health Program" by working with State Departments of Health to promote 5 A Day in all funded chronic disease prevention programs. The CDC's long-term goal is to establish a nationwide network of state-based comprehensive nutrition and physical activity programs for prevention and control of obesity and related chronic diseases, and to include 5 A Day activities as an essential component in every State. The CDC also conducts and supports state-based surveillance of fruit and vegetable consumption and is in the process of developing questions on barriers to and determinants of fruit and vegetable consumption.

3

The following are GAO's comments on the Department of Health and Human Services' letter dated June 28, 2002.

GAO's Comments

1. While performance measures based on relevant *Healthy People 2010* objectives may be in the strategic plans of many HHS agencies, the objectives for fruit and vegetable consumption are not in the performance plans for the National Institutes of Health and the Centers for Disease Control and Prevention (CDC). Our recommendation addresses the need for strategies and targets specifically for the National Institutes of Health and the Centers for Disease Control and Prevention (CDC).

2. HHS agrees that continued emphasis on fruit and vegetable consumption is important to the total diet message, but that recommendations for increasing consumption should be in the context of a healthy diet and physical activity. Our report acknowledges the importance of a healthy diet and physical activity; however, because we were asked to examine fruit and vegetable consumption, our study and recommendations focus on that aspect of a healthy diet.

3. HHS stated that the draft report was too definitive in its statements about the relationship between fruit and vegetable consumption and the reduction of disease, and that including references would substantially strengthen the presentation. The sources for our information include September 2001 and November 2000 NIH reports summarizing the evidence on the relationship between fruits and vegetables and disease prevention, The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity: 2001, articles published in the Journal of the American Medical Association and the Annals of Internal Medicine, and documents from CDC, NIH, National Cancer Institute, and other HHS offices. In many instances, our statements are more conservatively couched than in the source documents. We have also added—and repeated—references throughout the report to clarify the sources of our information. The reports, documents, and information we received from HHS agencies were represented as reflecting current research. HHS did not identify evidence that might be contradictory to any links between fruit and vegetable consumption and prevention of diseases cited in our report. With regard to the cost data, we deleted the reference to USDA's estimate of total diet-related costs for heart disease, cancer, stroke, and diabetes because it was not limited to costs solely for low fruit and vegetable consumption.

4. While HHS states that appendix IV does not reflect the totality of evidence, HHS did not identify evidence that we should cite that might be contradictory to any links between fruit and vegetable consumption and the prevention of diseases cited in the appendix. HHS further states that there is no "comprehensive recent detailed review by a recognized authoritative body from which such a summary of the evidence could be based…" Our sources included, among others, the November 2000 NIH/NCI report—5 A Day for Better Health Program Evaluation Report (NIH Pub. No. 01-4904)—and the September 2001 NIH/NCI report—5 A Day for Better Health Program Monograph (NIH Pub. No. 01-5019)—both of which review the relevant research demonstrating the linkages between fruit and vegetable consumption and disease prevention. We modified the appendix to clarify the strength of the linkages and added specific citations for the sources of our information. We also made revisions to the appendix bullets on stroke and heart disease, based on technical comments from HHS.

5. HHS describes the role and responsibility of the Food and Drug Administration for approving health claims that industry can make on food labels. To address HHS' concerns that we may be perceived as a scientific body making authoritative statements that can be used by industry to seek approval for health claims, we have added a statement in the front of the report and in our scope and methodology appendix. That statement clarifies that "nothing in this report would constitute an authoritative statement that could be used, under section 403(r)(2) of the Federal Food, Drug and Cosmetic Act, to support a claim of a health benefit of any food; nor would anything in this report constitute valid support for a petition under section 403(r)(4) of the act to allow such a claim to be made."

6. Our report cites the agreements that CDC, NCI, and USDA agencies have initiated to expand 5 A Day and that the memorandum of understanding establishes a framework for cooperation among the agencies to promote their commitment to encourage all Americans to eat 5 to 9 servings of fruits and vegetables daily. We believe that, if carried out, these commitments could provide a framework for helping Americans achieve the *Healthy People 2010* nutrition objectives for fruits and vegetables. In addition, based on technical comments from HHS, we added information to the report regarding CDC's surveillance of fruit and vegetable consumption and its concern for the need to improve the capacity of state programs that promote healthy behaviors to reduce the risk of chronic disease.

Appendix VIII: GAO Contacts and Staff Acknowledgments

GAO Contacts

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Erin Lansburgh, (202) 512-3017

Acknowledgments

In addition to those named above, Beverly A. Peterson, Terrance N. Horner, Jr., Nancy Bowser, Jay Cherlow, and Cynthia Norris made key contributions to this report.

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