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Fruit and Vegetable Consumption by Low-Income Americans

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## Introduction

Fruits and vegetables have been shown to be protective against cancer in a number of cohort and case-control studies. Diets high in fruits and vegetables demonstrate consistent evidence of decreasing the risk of cancers of the stomach, esophagus, lung, oral cavity and pharynx, endometrium, pancreas, and colon. Increased fruit and vegetable consumption may also have noncancer-related effects, such as benefits against cardiovascular disease, diabetes, stroke, obesity, diverticulosis, and cataracts (1). In 1990, the U.S. Department of Agriculture's Dietary Guidelines Advisory Committee recommended that Americans consume a minimum of 3 servings of vegetables and 2 servings of fruits each day (2). This recommendation is consistent with the National Cancer Institute's Five a Day for Better Health Campaign, which recommends eating 5 or more servings of fruits and vegetables combined each day (2).

Socioeconomic status is one of the strongest and most important predictors of morbidity and mortality (3). Cancer rates (4), incidence of heart disease (5), and corresponding risk factors, such as poor diet (6), vary inversely with income. Does fruit and vegetable consumption also vary inversely with income? This paper will address this question, as well as explore factors that influence fruit and vegetable consumption among low-income populations. Finally, this paper will address ways to improve fruit and vegetable consumption among low-income Americans.

### The relationship between income and fruit and vegetable consumption

From 1994-1996, the USDA conducted the Continuing Survey of Food Intake by Individuals (CSFII). During each of the three survey years, 24-hour recall interviews of food intakes on 2 nonconsecutive days were performed using a nationally representative sample of individuals of all ages (7). Table 1 shows the mean fruit and vegetable consumption for all persons 2 years of age and older and for persons with household income less than 130%, between 131-350%, and greater than 350% of the poverty level.

Table 1. Selected 1994-1996 CSFII Data (2).

Socioeconomic Group	n	Total fruit	Total vegetables	Total fruits and vegetables
All persons $\geq$ 2 years	15, 016	1.5	3.4	4.9
Household income				
<130% poverty	3862	1.4	3.1	4.5
131-350% poverty	6146	1.5	3.4	4.8
>350% poverty	5008	1.7	3.6	5.3

Fruit and vegetable intake increases as household income increases. Individuals with the lowest household income (<130 % poverty) consumed less than the mean for all individuals 2 years or older in each category (total fruits and vegetables, total fruits, and total vegetables). In addition, although individuals with the lowest incomes met the minimum requirements for total vegetables (3 daily), they failed to meet the minimum requirements for total fruits and vegetables (5 daily) as well as total fruits (2 daily). Based on these data, it is clear that lower income individuals consume fewer fruits and vegetables daily than individuals of all incomes. The question that naturally follows is, "Why do the poor consume fewer fruits and vegetables than other segments of the population?"

## Factors affecting fruit and vegetable consumption among low-income Americans

Many factors influence food consumption, including taste, nutrition, cost, convenience, and weight control concerns. A survey of 2,910 Americans conducted by Market Facts, Inc. assessed how demographics are related to the importance of taste, nutrition, cost, convenience, and weight control. Researchers found that in general, taste was the most important influence on food consumption, followed by cost, nutrition, convenience, and weight control, in that order. A multivariate analysis of food choice factors that controlled for demographics demonstrated that the importance of taste, nutrition, and weight concerns was not significantly related to income. However, income did influence the importance of cost and convenience; cost and convenience were more important for those with lower incomes than for those of other income levels (8).

Reicks et al. conducted focus group interviews with 30 low-income mothers of young children to identify their perceived barriers to fruit and vegetable consumption. Identified barriers were separated into three categories: environmental constraints, food-related influences, and social and psychological dimensions. Environmental constraints included access, cost, availability, and storage space. Fresh and raw fruits and vegetables were perceived as expensive and thus could only be purchased in limited quantities. Interviewees felt as if they had to give up other food to buy fruits and vegetables and had to limit their purchases to sale items. They expressed difficulty obtaining a variety and good quality of fresh produce in rural areas and cited limited storage space for fresh and frozen produce. Food-related influences included taste, appearance, convenience, and health. Canned vegetables were disliked due to their poor taste and texture. Fruits and vegetables were not considered convenient to fix and interviewees cited not knowing how to fix vegetables in ways that tasted good. Barriers that fell in the social and psychological dimensions category included childhood memories of being forced to eat vegetables and difficulty changing eating habits (6). The small sample size and narrow population focus used in this study limits its generalization, but the study nonetheless points out factors which may play a role in fruit and vegetable consumption among other low-income individuals. Further research would be needed to verify any such generalizations.

Treiman et al. conducted focus group discussions with a convenience sample of 32 women and central location intercept interviews with a convenience sample of 207 women in part to determine what barriers to consumption of fruits and vegetables they faced. All participants were enrolled in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). WIC participants must have a family income of 185% of the poverty level or less. Common barriers to fruit and vegetable consumption mentioned in focus group discussions included not liking certain fruits and vegetables, preferring other foods, preparation time and difficulty, perishability, and cost. Barriers mentioned frequently during central location intercept interviews were similar to those mentioned in focus group discussions and included lack of availability, time and effort needed to prepare or eat fruits and vegetables, not liking fruits and vegetables, and preferring other foods (9). Because this study used convenience samples rather than random samples, it is difficult to generalize the results, but it is worth noting that the studies performed by Treiman et al. and Reicks et al. uncovered similar barriers to fruit and vegetable consumption among low-income women.

Cost is an important factor influencing fruit and vegetable consumption among low-income Americans, as illustrated by the studies cited above. In addition, cost is of higher relative importance to low-income Americans than the rest of the population. One might suspect that the

importance of cost follows from the fact that low-income Americans have less money to spend, but the possibility of other economic factors should be discussed.

In what ways does income influence fruit and vegetable spending? Data from the most recent Consumer Expenditure Survey conducted by the USDA indicate that households in the poorest 20% of the nation's income distribution spent \$181 per person annually on fruits and vegetables at home while households in the wealthiest 20% spent \$247 per person annually on fruits and vegetables at home (10). Table 2 summarizes the CES data for 2000. Although the households in the poorest 20% spent less per person on fruits and vegetables than wealthier Americans, they allocated a similar percentage of their at home food budget to fruits and vegetables (17.5% for the lowest 20%, 17.9% for the highest 20%). This suggests that the poor spend less money on fruits and vegetables simply because they spend less money on food at home overall, not because they sacrifice fruit and vegetable expenditures to purchase other types of food. This analysis is somewhat limited, however, because it does not take into account money spent on food away from home, which may have included money spent on fruits and vegetables.

Table 2. Annual at-home food expenditures in U.S. dollars. Selected data from the 2000 Consumer Expenditure Survey (10).

	Lowest 20% of income			Highest 20% of income		
	Total household expenditures	Per capita expenditures	% of at home food expenditures	Total household expenditures	Per capita expenditures	% of at home food expenditures
Food at home	1826	1014.4	100	4507	1408.4	100
Cereals and bakery	270	150.0	14.8	683	213.4	15.2
Meats, poultry, fish, and eggs	492	273.3	26.9	1101	344.1	24.4
Dairy	197	109.4	10.8	474	148.1	10.5
Fruits and vegetables	326	181.1	17.9	790	246.9	17.5
Other food at home	541	300.6	29.6	1459	455.9	32.4

Do the poor pay more for food than other segments of the population? A report published by the USDA's Economic Research Service found that low-income households may face higher food prices for three reasons. First of all, low-income households may spend less in supermarkets, which typically offer the lowest prices. Secondly, low-income households are more likely to live in central cities and rural area and are less likely to live in suburban locations where food prices are often lower. Finally, supermarkets in low-income neighborhoods may charge higher prices than those in nearby higher income neighborhoods. These three factors together raise the food prices paid by low-income households approximately 1% higher than the national average. Despite facing higher food prices, low-income households have lower per-unit food costs for nearly all food categories, including most categories of fruits and vegetables. According to data collected in the USDA's Nationwide Food Consumption Survey from 1987-1988, low-income households paid less per pound than households of all incomes for fresh fruits, fresh vegetables, canned fruits and vegetables, and dried fruits and vegetables, with the poor paying more than all income levels for vegetable and fruit juices. The authors of the ERS report speculated that the

lower costs paid by low-income households were due to low-income shoppers looking for bargains, buying lower quality items, and choosing foods sold in bulk (11).

Low-income Americans face higher food prices but spend less per pound for fruits and vegetables than the average of all households (11). The poor spend less per person on fruits and vegetables than wealthy Americans, but spend approximately the same percentage of their at-home food budget on fruits and vegetables as the wealthy do (10). What does all this mean? The poor pay 5-20% less per unit of fruits and vegetables than all households (11) but spend approximately 27% less per person on fruits and vegetables at home (10). These data together suggest that the poor buy fewer units of fruits and vegetables per person than all other income levels. In addition, one might conclude that low-income households buy fewer total fruits and vegetables per person than all households simply because they have less money to spend on food, not because they spend more per pound for fruits and vegetables than other consumers, nor because they spend less money on fruits and vegetables in order to buy foods in other categories.

### Ways to improve fruit and vegetable consumption among low-income Americans

Knowledge of the barriers to fruit and vegetable consumption faced by low-income Americans and factors influencing general food consumption among low-income Americans goes a long way towards suggesting approaches to improve fruit and vegetable consumption among this population. Interventions seeking to increase fruit and vegetable consumption among low-income Americans, especially low-income women, should address the barriers identified in the studies described above. For example, Treiman et al. discovered that lack of availability, time and effort needed to prepare or eat fruits and vegetables, not liking fruits and vegetables, and preferring other foods were all barriers to fruit and vegetable consumption among women participating in WIC (9). Efforts to address these barriers might include teaching women how to maintain a consistent supply of fruits and vegetables in the home, teaching quick and easy ways to prepare fruits and vegetables, offering opportunities for women to share their favorite ways of preparing fruits and vegetables, and giving women the opportunity to taste-test a variety of fruits and vegetables (9).

The finding that cost and convenience were more important influences on food consumption for those with lower incomes than for those of other income levels (8) suggests that programs aimed at increasing fruit and vegetable consumption among low-income Americans should address the cost and convenience of fruits and vegetables. For example, the convenience of whole fruits, canned fruits, and canned vegetables could be stressed. The issue of cost might be addressed by emphasizing the low cost of many fruits and vegetables relative to other foods and encouraging low-income shoppers to get the best buys by buying produce in season, purchasing sale items, and shopping at farmer's markets (9).

Reicks et al. identified access to fruits and vegetables as a barrier to fruit and vegetable consumption among low-income populations (6). Efforts aimed at increasing access to affordable and high-quality fruits and vegetables in areas with limited conventional retail sources might include encouraging farmer's markets in low-income neighborhoods, creating community gardening programs, and establishing food rescue programs that make fresh fruits and vegetables available to charitable food providers. WIC has established the WIC Farmer's Market Nutrition Program in which participants receive vouchers that can be exchanged for fresh produce at

farmer's markets (2). An analysis of one such WIC program in Michigan demonstrated that receiving vouchers redeemable for fresh farmer's market produce had a direct effect on increasing fruit and vegetable consumption behavior (12).

### Conclusion

Fruit and vegetable consumption among low-income Americans is a complex behavior influenced by many factors. An understanding of the factors influencing fruit and vegetable intake by the poor is crucial in developing and implementing interventions aimed at improving low-income fruit and vegetable consumption. Additional studies of perceived barriers to fruit and vegetable consumption should be performed upon wider segments of the low-income population (that is, not just low-income women) so that future interventions can address population-specific barriers and increase the likelihood of the intervention's success.

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