

“Eat For Health”: A Supermarket Intervention for Nutrition and Cancer Risk Reduction

ABSTRACT

Objectives. The results of an evaluation of “Eat for Health,” a supermarket nutrition intervention, are presented. The study tested whether such a program could be successfully carried out and whether it could effect changes in knowledge, attitudes, and food purchasing behavior in line with nutrition and cancer risk reduction guidelines.

Methods. The evaluation consisted of an in-store monitoring element, an in-store and telephone consumer survey, and an analysis of sales data on selected foods. A matched-pair design, using a total of 40 stores in the intervention and comparison groups, was used.

Results. The intervention was successfully implemented and had limited success in changing some food purchasing behaviors. There appeared to be no effect on knowledge and attitudes except for increased awareness of a link between diet and cancer and of the program itself.

Conclusions. Despite the intervention’s success, limitations of the consumer survey and sales data analyses and the continuing diffusion of nutrition messages throughout society make it difficult to specify the impact of this program on consumer nutrition knowledge and behaviors. (*Am J Public Health.* 1994;84:72–76)

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Introduction

Since the 1970s, a variety of programs have been implemented to test the proposition that information provided in supermarkets not only can increase awareness and knowledge of healthful food choices but can provide specific, focused guidance in making those choices. Evaluations of the few programs with evaluation components have shown mixed results, with some improvement in knowledge and attitudes and modest, if any, changes in behavior.^{1–13}

In March 1987, the National Cancer Institute (NCI), one of the National Institutes of Health, launched a 2-year multi-component supermarket intervention in cooperation with Giant Food Inc, a major supermarket chain in the Washington, DC–Baltimore, Md, area. The “Eat for Health” program was intended to stimulate changes in knowledge and food purchasing behavior consistent with NCI’s dietary recommendations for cancer risk reduction. These recommendations focus on reducing fat intake and increasing consumption of fruit, vegetables, and other fiber-containing foods.¹⁴ The intervention was conducted in Giant’s 105 Washington-area stores, while its 30 Baltimore stores served as the comparison group. Program elements included special shelf price labels; a food guide containing calorie, fat, cholesterol, sodium, and fiber values for all items carrying the special shelf price labels; a monthly bulletin containing nutrition information and recipes; signs in the produce department; and an intensive multimedia advertising campaign. Individual 3-month interventions, which were evaluated separately, were developed during the second year of the

campaign in conjunction with the National Livestock and Meat Board and several poultry producers. The components and development of Eat for Health are described more fully in Light et al.¹⁵

The Eat for Health study was evaluated to (1) assess participating stores’ ability to implement this multimethod nutrition education program; (2) measure changes in consumer purchases of fiber-rich and lower-fat foods; and (3) assess changes in consumer knowledge about diet and health issues, specifically diet and cancer issues, and self-reported food purchasing and preparation.

Methods

The Eat for Health evaluation consisted of an in-store monitoring program, an in-store and telephone consumer survey, and an analysis of sales data on selected foods.

A matched-pair design was selected, using 20 stores in the intervention group and 20 stores in the comparison group. Data from the 1980 US Bureau of the Cen-

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sus decennial survey were used to match stores with regard to their neighborhoods' racial composition, age distribution, occupation, income, and proportion of homeowners. Stores were also matched with regard to volume and presence or absence of a pharmacy.

In-Store Monitoring

The Eat for Health monitoring component consisted of nine visits to the 20 intervention stores selected for evaluation. In these visits an NCI staff person talked with the store manager and checked on availability of program materials. This component was based on experience from previous supermarket interventions that showed the importance of the availability of program materials and a commitment to the program by supermarket managers and staff.^{7,9} Odenkirchen et al. have described the monitoring program in more detail.¹⁶

Consumer Surveys

This series of three surveys was administered to shoppers from the 20 matched pairs of Washington and Baltimore stores selected for evaluation. Wave 1 was a baseline survey conducted in February and March 1987, wave 2 was conducted in January, February, and March 1988, and wave 3 was conducted in February, March, and April 1989. The shortened version of the food frequency portion of NCI's Health Habits and History Questionnaire was adapted for mail and self-reported administration.¹⁷

Potential survey participants were included only if they did more than 50% of the household shopping and shopped at Giant more than 50% of the time; ate less than 50% of their meals outside the home; were between the ages of 21 and 75 years; had no medical condition requiring a special diet; and did not work in the food, health, or market research industries. Table 1 provides further detail on response rates.

To evaluate responses to the three cross-sectional surveys, an analysis of covariance approach was adopted in which the survey wave (1, 2, or 3) and place (Washington vs Baltimore) served as main effects and the survey response items served as the dependent variables in a series of ordinary least squares multiple regression models.

Sales Data

Summary sales data were obtained each week from Giant's computerized cash registers, which record purchases by

TABLE 1—Number of People Responding and Response Rate at Each State of Data Collection, by Wave

Response Category	Wave 1	Wave 2	Wave 3
A. Total approached	3084	3268	3218
B. Initially refused (would not speak to interviewer)	729	641	973
C. Refused (qualified but would not participate)	170	166	112
D. Disqualified	682	1141	734
E. Qualified and participated [A - (B+C+D)]	1503	1320	1399
F. Response rate, % (E/A - D)	62.6	62.1	56.3
G. Completed questionnaire	958	1045	1031
H. Response rate, % (G/E)	63.7	79.2	73.7
I. Completed telephone interview	917	1019	1042
J. Completed questionnaire and telephone interview	917	957	893
K. Response rate, % (J/G)	95.7	91.6	86.6

Universal Product Code. Data were collected for 1 baseline year (March 1986 through February 1987) and the 2 intervention years (March 1987 through March 1989) in the same 20 matched pairs of stores used for the monitoring and consumer surveys. The analysis of sales data focused on changes in purchases of fiber-containing foods, although sales data for meat and poultry were analyzed as well. A cross-sectional time series regression procedure was used to analyze the data.

Eight mutually exclusive food categories were targeted for analysis: dry cereal, baked goods, fresh produce, frozen vegetables, canned vegetables, canned and frozen beans, dried beans, and dried fruit.

Foods in each of the eight categories tracked for analysis were grouped into two subcategories: "recommended" and "other than recommended." Recommended foods contained at least 2 g of fiber and less than 30% of calories from fat. All other foods in each category were other than recommended.

The effect of the Eat for Health intervention was measured by two variables. The first was "recommended ounces," or sales in ounces of recommended food items in each category. The second was "percent recommended," or the percentage of all the foods sold in each category that were in the recommended subcategory. This portion of the evaluation is described in Patterson et al.¹⁸

Results

In-Store Monitoring

At the start of the Eat for Health program, it was determined that project elements (shelf labels, food guides, produce signs, and monthly bulletins) complied with the research protocol if they were

available and located properly and if the nutrition information on the shelf labels was correct. The goal for project elements was an average compliance rate of 80%.

Not surprisingly, the shelf labels had the highest compliance rate, averaging 92% to 100% over the program. This high compliance rate was largely due to the fact that the labels were computer-generated and therefore uniform and up-to-date in content. Also, once attached to the shelf the labels did not move.

The *Eat for Health Food Guide* also had a high compliance rate, with booklets available at an average of 85.3% of all checkouts. Like the shelf label, this element was stable; once placed in a rack at the checkout counter, the booklets were not moved and only had to be replaced as copies were sold.

The produce signs also met the project goal, with an average compliance rate of 83.2%. This average was considered particularly good, as the signs were frequently moved and changed when items in the produce department were shifted.

The Eat for Health monthly bulletin had the lowest compliance rate over the monitoring periods, averaging 63.5% for operating checkouts. Compliance differed most significantly from store to store, with a range of 31.6% to 89.5% at operating checkouts. This lower compliance rate was of some concern because the free take-home bulletin was the only element of the program that contained detailed information on Eat for Health issues. One possible reason may have been the bulletin's popularity. It was often out of stock by midmonth. Another reason may have been its location at the end of the checkout, a busy place that is crowded with materials such as grocery bags and other store flyers. Despite this disadvantage, previous programs had demonstrated that

TABLE 2—Results for the Five Hypotheses Developed from the Overall Objectives of the Eat for Health Consumer Surveys

General Message/Questions	Survey Items	Adjusted Percentage Difference ^a		Comment
		Consumption	Purchase	
Hypothesis 1				
Choose more high-fiber foods	Vegetables	1.2	3.8	No statistically significant effect except for beans; insufficient to confirm hypothesis.
	Fruit	0.6	-2.0	
	Whole grains	-1.5	0.9	
	Beans	0.5	8.3*	
	Potatoes	-0.5	5.6	
Choose less high-fat foods	Bakery/snacks	-1.1	-8.9*	Trend favors positive program effect, but insufficient to confirm hypothesis.
	Whole milk prod.	-0.9	-4.4	
	High-fat foods	-4.2*	-1.4	
	Fried food	-0.8	...	
	Fats/oils	-1.1	...	
Choose more low-fat foods	Low-fat/skim milk	-1.1	3.1	Trend favors positive program effect, but insufficient to confirm hypothesis.
	Poultry	0.4	7.6	
	Fish	-0.1	-2.2	
Hypothesis 2				
Use more low-fat cooking methods	Baking	0.0		Insufficient evidence to confirm hypothesis.
	Broiling	8.6		
	Boiling	-2.2		
	Steaming	3.6		
	Microwaving	-3.5		
	Pressure-cooking	2.7		
Fry less; eat less charred/barbecued meats	Frying	-4.7		
	Stir-frying	-9.2*		
	Sauteing	-4.9		
	Grilling/barbecuing	-3.0		
Hypothesis 3				
Food items that reduce cancer risk?	Fiber	3.6		Overall trend favors positive effect, although insufficient to confirm hypothesis.
	Fresh fruit	15.7*		
	Vegetables	2.2		
	Whole grains	-2.8		
	Fish/poultry	3.8		
Food items that increase cancer risk?	Dairy products	0.7		
	Fatty foods	-6.3		
	Fatty meats	8.9		
Hypothesis 4				
Is diet related to cancer?	Unprobed	14.2*		Hypothesis well supported by results.
	Direct questions	5.4		
Is diet related to other chronic diseases?	Heart disease	-3.0		
	Obesity	6.1*		
	Diabetes	3.1		
Hypothesis 5				
Heard of Eat for Health?	Via mass media	18.8*		Hypothesis well supported by results.
	In store	3.2		
Heard of special promotion?	Via mass media	0.1		
	In store	10.4*		
Heard of fiber?	Via mass media	8.4*		
	In store	17.0*		
Store provides nutrition information?		19.3*		
Shelf labels provide nutrition information?		11.4*		

^aDifference between Washington and Baltimore in change from wave 1 to wave 3, controlling for 12 sociodemographic and health-related variables.

* $P < .05$.

the checkout was the best possible location for the bulletins.

Consumer Surveys

It was hoped that the five research hypotheses that were developed from the surveys would provide substantial insight into the dynamics of nutrition knowledge and practices in the Washington and Baltimore communities and would demonstrate an effect of the intervention materials on food purchasing and consumption behavior. These hopes were not entirely realized, as only two of the hypotheses were supported by the data. Table 2 summarizes the results for the five hypotheses.

Hypothesis 1. Self-reported purchasing and consumption of foods high in fiber and low in fat would increase, and purchasing and consumption of foods high in fat would decrease.

The analysis showed no statistically significant effect on self-reported purchases of high-fiber foods, with the exception of dried beans. In contrast, the direction of differences from wave 1 to wave 3 appeared to show a program effect for choosing fewer high-fat foods. However, the majority of differences were small and the results were not sufficient to confirm the hypothesis.

Hypothesis 2. There would be changes in food preparation methods consistent with the Eat for Health recommendations.

The only consistent trends that appeared here were for less frying and use of barbecued food, but these trends were not statistically significant.

Hypothesis 3. There would be an increase in knowledge about foods related to cancer risk reduction.

Although an overall pattern favoring a positive effect was apparent, it was not strong enough to confirm the hypothesis.

Hypothesis 4. There would be an increased awareness of the relationship between diet and chronic disease.

It appears that Eat for Health's diet and cancer message made a clear impression on Washington shoppers. The proportion of these shoppers who mentioned, unprompted, a link between diet and cancer increased by 14.2 percentage points over the Baltimore figure from wave 1 to wave 3. This was a large and significant change.

Hypothesis 5. Awareness of the Eat for Health program would increase.

This hypothesis was also well supported by the results. Significantly more Washington shoppers than Baltimore shoppers heard of Eat for Health over

time. In particular, awareness of fiber information and awareness of the supermarket as a source of nutrition information favored a positive program effect.

Sales Data

Dry cereals. The dry cereal category included all dry cereals sold by Giant. The recommended subcategory included all high-fiber cereals. Sales data showed a striking decline in sales of these cereals. After price and other confounding variables were taken into account, the data showed a greater decrease in sales of recommended cereals in Washington than in Baltimore, indicating a negative intervention effect.

Baked goods. The baked goods category included all types of breads and rolls. Recommended types included whole wheat, natural grain, and bran-type breads. In both intervention years, the number of recommended ounces was greater than in the baseline year, but intervention effects were negative. This indicated that shoppers in both areas bought more of the recommended breads, but the trend was stronger in Baltimore than in Washington.

Fresh produce. The fresh produce category included a wide variety of fresh fruits and vegetables available in Giant supermarkets. The number of recommended ounces sold decreased in Baltimore during the intervention period compared with the baseline year. In Washington, on the other hand, sales of recommended ounces increased over the course of the intervention. During the second year, adjusted sales increased almost 8% more in Washington than in Baltimore, a result that approached statistical significance. An increase in percentage of recommended sales over baseline was also seen in both years in Washington, compared with only year 1 in Baltimore. After adjustment, Washington showed a statistically significant relative increase in market share over Baltimore (2.4%) during the intervention period.

Frozen vegetables. The frozen vegetable category included most types of frozen vegetables; more than 60% of sales were in the recommended subcategory. Average sales changed little over the study period, although there was a small decline in percentage of recommended items sold. The decline in sales of recommended frozen vegetables was significantly smaller in Washington than in Baltimore, indicating a positive intervention effect.

Canned vegetables. The canned vegetable category included all canned vegetables. The recommended subcategory included corn, green peas, and lima beans. The number of ounces of vegetables in the recommended category fell during both study years compared with the baseline period, but the decline was greater in Baltimore than in Washington, resulting in a statistically significant increase in sales of the higher-fiber vegetables recommended by Eat for Health.

Canned and frozen beans. The canned and frozen bean category included baked and other canned beans and frozen beans, such as kidney beans and black-eyed peas; all items in this category were recommended. Intervention effects were negative but not statistically significant.

Dried beans. All types of dried beans were included in the dried bean category, and practically all were in the recommended subcategory. Sales declined from baseline in both areas, but again, the decline was smaller in Washington than in Baltimore, and positive intervention effects were seen for both intervention years. These changes approached statistical significance.

Dried fruit. The dried fruit category included raisins, dates, and other types of dried fruit; all were in the recommended subcategory. Results for this category were similar to those for dried beans in that intervention effects were positive but did not reach statistical significance.

Meat and poultry. The results of the separate analyses of the second-year meat and poultry interventions reveal limited changes, primarily associated with price, in the purchase of recommended vs other than recommended types during each 3-month intervention period related to the previous 1-year period. For meat, mean recommended ounces and percent recommended ounces decreased in both Baltimore and Washington; the decrease was smaller in Washington. For poultry, recommended ounces increased in both areas, but more so in Washington.

Discussion

Three goals were set for the Eat for Health program: (1) to demonstrate that a multifaceted nutrition information program could be carried out in more than 100 supermarkets over a period of 2 years; (2) to effect changes in food purchasing behavior in line with NCI's nutrition and cancer risk reduction dietary guidelines; and (3) to stimulate positive changes in knowledge and attitudes toward diet and

health issues. Judged against these goals, Eat for Health had mixed success.

The ability to carry out such a large-scale, long-term program was strongly demonstrated. Over its 2-year span, from 150 000 to 200 000 bulletins were distributed each month for 25 months, more than 100 000 food guides were sold, and hundreds of thousands of people were exposed to a multimedia advertising campaign. Numerous groups and individuals were cooperatively involved in the preparation, review, and implementation of the many project elements. In the course of developing the program, Eat for Health staff were conscious of elements of previous supermarket interventions that had contributed to their successful implementation.^{1,2,6,7,9} A number of these were found to work well for Eat for Health also. Important among them was the good working relationship between the Eat for Health program staffs at NCI and Giant Food. This relationship was formalized by an agreement outlining roles and responsibilities of both collaborators and further enhanced by the continual support of senior management at Giant and NCI. Training of Giant store managers and other staff and open discussion between store managers and the NCI staff person during monitoring visits also stimulated commitment to the program.

With respect to the second goal, Eat for Health's effect on food purchasing behavior appears to have been modest. This conclusion recognizes several limitations imposed by the complexity of the technical problems inherent in the analyses and by the realities of conducting research in a marketplace setting.

Because the intervention and control groups had to be assigned to Washington and Baltimore groups of stores rather than on a random basis, it was difficult to ensure comparability of the two groups and therefore to determine whether changes in sales were due to the intervention rather than to inherent differences in the study groups. Very large fluctuations in the levels of sales also occurred during the course of the intervention, resulting in tremendous variability in the data, which made it difficult to detect any intervention effect.

Despite these limitations, some changes in food purchasing behavior were observed, particularly with respect to produce. This may have been due to the emphasis on fruits and vegetables in the monthly bulletins and produce signs, to the popular weekly half-price sales in which the Giant salad bar was often fea-

tured, and to a public perception of the superiority of fresh produce.

Results in the third area—nutrition knowledge and attitudes and self-reported food purchasing behavior—appear to have been the most modest. Several possible reasons for this slight effect can be suggested. Washington-area shoppers may have already been sensitized to the general diet and health messages of Eat for Health by the two previous nutrition interventions held in Giant Food stores (Foods for Health in 1979 and Special Diet Alert in 1981) and by Giant's well-known commitment to providing nutrition information in its stores even in the absence of a formal intervention. National public health and private sector media campaigns related to various food and health issues may also have previously affected the knowledge and behaviors of Washington-area consumers. Finally, intervention stores happened to be located in more affluent areas than were comparison stores, and this somewhat higher socioeconomic status may account in part for the greater awareness of Washington shoppers. It should be noted, however, that the greatest positive change occurred for knowledge of a relationship between diet and cancer. This was a relatively new piece of information for consumers and the fact that such a dramatic change occurred here argues in favor of the effectiveness of Eat for Health materials in transmitting concepts to consumers.

Like the sales data, these survey data were analyzed in light of several recognized concerns and limitations. First, there was concern about the reliability of consumer responses to nutrition surveys. In particular, we were sensitive to the experience of previous programs, such as the Special Diet Alert and the Lean Meats Make the Grade programs, in which survey respondents claimed awareness of the program even before its inception or demonstrated confusion between the program and other types of nutrition promotions in the store.^{2,6} To some extent this was true for Eat for Health as well, although knowledge of Eat for Health per se increased dramatically over the study period. Sec-

ond, as this was a quasi-experimental study, there was very little control over survey participants' shopping behavior and media access, and therefore the sample of shoppers for the survey may not have been truly representative. Third, the time frame for data collection in the first wave was unexpectedly delayed, and data collection was still ongoing for several days after the program was launched.

Conclusions

One way to encourage and strengthen positive behavior change is to institutionalize its catalysts. Providing appealing, usable information in the supermarket that complements the healthful choices available there is one example of this process. Supermarket programs have demonstrated their value in enhancing customers' satisfaction with and loyalty toward their stores.^{19,20} As a result, nutrition programs appear to be an entrenched feature of the supermarket business landscape.^{21,22}

As messages and support systems for healthful dietary change become more established in the marketplace and diffused throughout society, it may be increasingly difficult to detect an impact from any one supermarket intervention. On the other hand, the positive contributions of these programs—along with those of many other nutrition efforts—may be reflected over time in the gradual lowering of nutrition-related chronic disease rates. □

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