Use of food nutrition labels is associated with lower fat intake

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ABSTRACT

Objective The Nutrition Labeling and Education Act of 1990 mandated that standardized nutrition information appear on almost all packaged foods manufactured after May 1994. This study describes the demographic and diet-related psychosocial correlates of nutrition label use, and examines the relationship between label use and diet.

Design/subjects Data are from a random-digit-dial telephone survey of 1,450 adult residents of Washington State. The questionnaire assessed nutrition label use, fat-related diet habits, fruit and vegetable consumption, diet-related psychosocial factors, health behavior, and demographic characteristics.

Statistical analyses Analyses examined associations of demographic characteristics with nutrition label use; diet-related psychosocial factors and health behavior with nutrition label use, controlled for demographic characteristics; and nutrition label use with fat and fruit and vegetable intake, controlled for demographic characteristics and psychosocial factors.

Results Nutrition label use was significantly higher among women, residents younger than 35 years, and residents with more than a high school education. When controlled for demographic characteristics, the strongest predictors of label use were believing in the importance of eating a low-fat diet, believing in an association between diet and cancer, and being in the maintenance stage of change for adopting a low-fat diet. Label use was significantly associated with lower fat intake and, after controlling for all demographic, psychosocial, and behavioral variables, explained 6% of the variance in fat intake ($P<.001$). Label use was not associated with fruit and vegetable consumption.

Applications/conclusion Persons successfully limiting their fat intake use nutrition labels, suggesting that the new nutrition labels are helpful. Dietetics professionals can use the results of this study to emphasize to their clients the importance of reading nutrition labels in maintaining a low-fat diet. *J Am Diet Assoc. 1999;99:45-50,53.*

In 1990, the US Congress passed the Nutrition Labeling and Education Act (1), and in May 1994, food manufacturers were required to comply with the first major changes in food labeling regulations since 1973 (2-4). In brief, the new regulations required almost all packaged foods under the jurisdiction of the US Food and Drug Administration (FDA) to carry nutrition labeling information presented as standardized "Nutrition Facts." The US Department of Agriculture (USDA) has similar rules for foods under its jurisdiction (5). The required elements of the Nutrition Facts label emphasize nutrients associated with chronic disease, such as fat and cholesterol. In addition, the regulations mandated standardized portion sizes in common household units across similar foods, standardized ingredient labeling, and introduced "Percent Daily Value" (%DV) as a measure of the percentage of recommended intake provided by a single serving. Furthermore, the legislation required that nutrient descriptors such as "lite," "free," and "reduced" adhere to established definitions, and that health claims on food products be restricted to those with FDA approval (5).

Health professionals and consumer groups anticipated that the new nutrition labels would guide consumers to select foods consistent with the Dietary Guidelines for Americans (5), and thereby reduce the risk of chronic diseases associated with diet, such as coronary heart disease and breast, prostate, and colon cancers (6-8). Although several studies have evaluated consumer understanding and use of both the old and new nutrition labeling (9-16), to our knowledge only a single study has examined associations of the new label information with diet. In a sample of adults drawn from a medical clinic, Kreuter and Brennen (16) found that 80% of their sample had read nutrition labels in the past year, and that label users had diets lower in fat and higher in fruits and vegetable intake compared with nonusers. In this report, we give a more comprehensive examination of label use based on results from a population-based, cross-sectional telephone survey of adults in Washington State. Our objectives are to describe the demographic and diet-related psychosocial correlates of nutrition label use, and to examine the relationship between nutrition label use and diet.

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Table 1
Associations of demographic characteristics with use of nutrition labels

	n	Usually/often/ sometimes read nutrition label	Usually read serving size information[a]	Usually read calories information[a]	Usually read calories from fat information[a]	Usually read grams of fat information[a]	Usually read percent Daily Value from fat information[a]	Usually read cholesterol information[a]
		← % →						
Total	1,450	80.0	44.8	68.6	64.0	75.7	38.5	60.5
Sex								
Male	587	72.6	34.4***	60.8***	57.6***	71.5**	35.5	62.2
Female	863	87.1	53.0	74.8	69.1	79.0	41.0	59.1
Age (y)								
18-34	440	80.0	50.9[b]***	71.9	69.1**	82.4[b]***	40.7***	50.6[b]***
35-54	649	82.3	43.1	66.5	60.1	74.3	33.3	60.9
55+	361	76.4	40.5	68.4	64.9	70.1	45.4	71.6
Education (y)								
≤12	428	69.9[b]***	50.1	69.5	63.4	74.3	44.3[b]***	65.5
13-15	604	83.6	42.5	69.8	66.7	75.7	40.4	58.6
16+	417	85.2	43.8	66.1	60.7	76.9	31.4	58.8

[a]Percentages based on 1,188 respondents who reported that they "usually," "often," or "sometimes" read nutrition labels. Number of participants in each row group may vary because of missing values.
[b]χ^2 for trend.
*$P<.05$.
**$P<.01$.
***$P<.001$.

METHODS

Study Population

Data are from the Washington State Cancer Risk Behavior Survey, a random-digit-dial survey of 1,450 adults (aged 18 years and older) designed to monitor attitudes and behavior related to cancer risk and prevention. Data were collected between September 1995 and September 1996.

Details of our survey procedures have been published elsewhere (17). In brief, telephone numbers were purchased from GENESYS Sampling System (18). To complete the interviews with 1 adult selected randomly from each household, we made up to 15 attempts to call within 1 month and, if necessary, made an additional 11 attempts 3 months later. The conservatively estimated effectiveness rates (completed interviews divided by known plus estimated eligible subjects) was 63.5%, which is similar to or better than rates reported for other random-digit-dial surveys (19).

Survey Instrument

Four sets of questions from the survey were used in this analysis: demographic characteristics (age, sex, education, and income); diet-related psychosocial factors, health behavior, and health status; an estimate of dietary fat intake and fruit and vegetable consumption; and nutrition label use.

Health beliefs, attitudes, and behavior Respondents reported how important it was to them to eat low-fat foods using the response categories: "very important," "somewhat important," or "not important." We assessed belief in a diet-cancer connection by asking respondents whether they believed in such a relationship and, if yes, whether the relationship was weak, moderate, or strong. Respondents answered a series of questions on readiness for dietary change (20) and were categorized into 1 of 5 stages of change for adopting a low-fat diet: precontemplation, contemplation, decision, action, or maintenance. Respondents in the maintenance stage reported that they had eaten a low-fat diet for 6 months or longer; those in the action stage had only recently reduced dietary fat, and those in the remaining stages (combined into preaction for analysis) had made no diet changes. Health-related behavior questions included exercise (how many times per week they participated in physical exercise such as running or sports for a duration of at least 20 minutes) and regular use of nutrition supplements such as vitamins and minerals (yes or no response). We also assessed history of chronic disease, height, weight, and current smoking practices.

Nutrition label use The nutrition label–related survey items were divided into 3 sections. The first asked how often respondents used labels when purchasing packaged foods and whether, when used, the labels gave the information desired. Response options to this set of questions were on a 4-point scale ranging from "usually" to "never." We collapsed "usually," "often," and "sometimes" responses to obtain an estimate of those who ever read labels, and collapsed "usually" and "often" responses to perform other selected analyses. The second section asked how often respondents looked for 18 types of information on labels, including cholesterol, calories, serving size, and fat. Response options to these questions were "usually," "sometimes," and "never." The final section asked about barriers to nutrition label use, specifically reasons respondents did not use labels, and what aspect of the labels they would like changed. Response options were "yes," "no," and "don't care." Many questionnaire items were based on a survey conducted by the Food Marketing Institute (21) and were modified before and after pilot testing to more specifically address health-related questions.

Dietary assessment We assessed dietary fat intake with a modified version of the Fat-Related Diet Habits Questionnaire. The development and validation of this instrument is described elsewhere (22,23). The 12-item questionnaire asks about diet over the past 3 months, and assesses avoiding fat as a flavoring, substituting specially manufactured low-fat foods, modifying meats to be low in fat, replacing high-fat foods with fruits and

Table 2
Associations of diet-related psychosocial factors, health-related behavior, and body mass index with nutrition label use

	Adjusted[a] odds ratios for nutrition label use					
	n[b]	Usually/often/ sometimes read nutrition label	n	Usually read calories information[c]	Usually read grams of fat information[c]	Usually read percent Daily Value for fat information[c]
Importance of eating low-fat diet						
Not important	146	1.0	68	1.0	1.0	1.0
Somewhat important	640	4.4**	520	1.5	2.0**	1.7
Very important	655	9.7***	596	2.5***	4.7***	3.1***
Belief in diet-cancer relationship						
None	451	1.0	324	1.0	1.0	1.0
Moderate	426	1.6**	350	1.1	1.1	1.1
Strong	491	3.2***	447	1.2	1.6**	1.4*
Stage of change for fat intake						
Preaction	329	1.0	196	1.0	1.0	1.0
Action	637	3.8***	549	2.0***	1.8**	1.8*
Maintenance	482	6.3***	441	1.7***	2.5***	1.8*
Use nutrition supplements (vs not)	800	2.0***	701	1.0	1.1	1.3*
Exercise						
None	273	1.0	198	1.0	1.0	1.0
1-3 times/wk	329	1.5*	268	1.0	1.2	1.1
4+ times/wk	842	2.1***	719	1.1	1.0	1.7*
Current smoker	312	0.6**	228	0.6**	0.8	1.0
Body mass index[d]						
Normal	989	1.0	810	1.0	1.0	1.0
Overweight	243	1.2	204	1.5*	1.2	0.8
Obese	158	1.0	125	1.9**	2.1**	1.0

[a]Adjusted for sex, age, and education.
[b]Number of participants in each row group may vary because of missing values. See text for details.
[c]Odds ratios based on 1,188 respondents who reported that they "usually," "often," or "sometimes" read nutrition labels.
[d]Body mass index calculated as weight (kg)/height (meters)^2. Men: normal= <27.3; overweight: 27.8-31.0; obese= ≥31.1. Women: normal= <27.3; overweight= 27.3-32.2; obese= ≥32.2.
*$P<.05$.
**$P<.01$.
***$P<.001$.

vegetables, and avoiding fried foods. Responses were on a 4-point scale ("usually," "often," "sometimes," or "rarely/never") and coded 1 to 4 so that a low score corresponded to a low fat intake. The summary score was calculated as the mean of the nonmissing items. In a recent validation study of a similar instrument, the correlation of the Diet Habits Questionnaire summary score with percent energy from fat from a 94-item food frequency questionnaire was .53 (23). We assessed fruit and vegetable intake over the previous month using items from the National Cancer Institute's 5 A Day for Better Health program evaluation (24,25).

Statistical Analysis

We first examined the associations of demographic characteristics with nutrition label use, using the χ^2 statistic to test for differences across age, sex, and education. These results were adjusted for sampling probability and to the intercensal estimates of the age-, sex- and county-specific Washington State population. Statistical tests were based on weighted numbers so that the sum of the weights equaled the number of persons interviewed. We next examined associations of diet-related psychosocial factors, including health beliefs, health status, and preventive health behavior with nutrition label use. These analyses used logistic regression to adjust odds ratios for age, sex, and education. Finally, we examined associations of nutrition label use with diet. These analyses used linear regression, with the Diet Habits Questionnaire score as the dependent variable and label use as the independent variable. Covariates included demographic characteristics (age, sex, and education), body mass index (BMI), and diet-related psychosocial variables (attitude toward the importance of eating a low-fat diet and belief in diet-cancer relationship). We give results of regression models with and without covariates and use ΔR^2 as a measure of the association of nutrition label use with diet, which is independent of confounding variables.

RESULTS

The mean age of survey respondents was 44.1 (±15) years; 59.5% were female, 29.3% had a college education, and almost 90% were white. More than 24% read the nutrition labels at least sometimes, 20.1% read them often, and 35.2% read them usually.

Table 1 gives the associations of demographic characteristics with nutrition label use. Results on overall label use are based on the entire study sample, and results on use of label components (such as fat) are based on the subjects who reported at least some label use. Data are also adjusted to be representative of the Washington State population. The most frequently read component of the label was grams of fat, followed by calories (total and percent from fat) and choles-

Table 3
Associations of food nutrition label use and fat-related diet habits

		Fat-related diet habits scale score[a]		
	n[b]	Unadjusted	Adjusted for demographic characteristics[c] and body mass index	Adjusted for demographics, psychosocial factors,[d] and body mass index
		mean±standard error		
Read nutrition label[e]				
Usually/often	765	2.07±0.02[x]	2.09±0.02[x]	2.15±0.02[x]
Sometimes	311	2.41±0.03[y]	2.41±0.03[y]	2.36±0.03[y]
Rarely/never	232	2.78±0.03[z]	2.73±0.03[z]	2.59±0.03[z]
Variance explained (%)[f]				
Covariates only			10	31
Label use		20		
Covariates and label use			26	37
P value, ΔR^2 for label use[g]			<.001	<.001
Read serving size information[h]				
Usually	495	2.07±0.02[x]	2.08±0.02[x]	2.11±0.02[x]
Sometimes	228	2.17±0.03[y]	2.16±0.03[y]	2.16±0.03[x]
Rarely	350	2.31±0.03[z]	2.30±0.03[z]	2.26±0.03[y]
Variance explained (%)[f]				
Covariates only			7	23
Label use		4		
Covariates and label use			10	24
P value, ΔR^2 for label use[g]			<.001	<.001
Read calorie information[h]				
Usually	744	2.12±0.02[x]	2.13±0.02[x]	2.15±0.02[x]
Sometimes	207	2.25±0.04[y]	2.24±0.04[y]	2.21±0.03[xy]
Rarely	122	2.31±0.05[y]	2.31±0.05[y]	2.26±0.04[y]
Variance explained (%)[f]				
Covariates only			7	23
Label use		2		
Covariates and label use			9	23
P value, ΔR^2 for label use[g]			<.001	<.04
Read fat information				
Usually	903	2.11±0.02[x]	2.11±0.02[x]	2.14±0.02[x]
Sometimes	127	2.45±0.05[y]	2.44±0.05[y]	2.30±0.04[y]
Rarely	43	2.60±0.08[y]	2.60±0.08[y]	2.46±0.07[y]
Variance explained (%)[f]				
Covariates only			7	23
Label use		7		
Covariates and label use			13	25
P value, ΔR^2 for label use[g]			<.001	<.001

[a]See text for details of fat scale. Lower score indicates lower dietary fat intake.
[b]Number of participants in each row group may vary because of missing values. See text for details.
[c]Age, sex, and education.
[d]Importance of eating a low-fat diet and belief in diet-cancer relationship.
[e]Values with different superscripts differ significantly ($P<0.05$).
[f]$R^2 \times 100$, from multiple regression model.
[g]P value for ΔR^2, from multiple regression model.
[h]Based on 1,188 respondents who reported that they "usually," "often," or "sometimes" read nutrition labels.

terol; less than 39% read %DV for fat. There were large differences in label use by sex. Compared with men, significantly ($P<.001$) more women read information on serving size, calories (total and percent from fat), and grams of fat. However, slightly more men read information on cholesterol. Compared with those aged 35 years and older, more respondents under the age of 35 read information on serving size, calories from fat, and grams of fat, but those aged 35 years and older reported more frequent reading of cholesterol information. More respondents with an education beyond high school read the nutrition label, although years of education was inversely associated with using %DV for fat. There were no associations of income with label use (data not shown).

Table 2 gives associations of diet-related psychosocial factors, health-related behavior, and health status with nutrition label use. These odds ratios estimate the strength of association of label use and health variables with diet, and are adjusted for age, sex, and education, which strongly confound these associations. An odds ratio of 1.0 indicates no association, <1.0 an inverse association, and >1.0 a positive association. Overall, the strongest predictor of label use was a person's understanding of the importance of eating a low-fat diet to his or her health. Those who reported that eating a low-fat diet was very important were almost 10 times more likely to read the nutrition label and nearly 5 times as likely to read the grams of fat information compared with those for whom eating low-fat foods was not important. Compared with those who did not believe there was a relationship between diet and cancer, those who believed the relationship was strong were more than 3 times as likely to read the label, and they were also more likely to read information about grams of fat and %DV for fat. Compared with respondents in the preaction stage of adopting a low-fat diet, those in the action and maintenance stages were 4 and 6 times more likely, respectively, to read labels. Those in the action and maintenance stages were also twice as likely to read information about calories, grams of fat, and %DV for fat. Regular use of dietary supplements (vitamins and minerals) and exercising at least 4 times per week were modestly associated with increased label use, whereas smoking was associated with less label use. Obese respondents were twice as likely to read calorie and grams of fat information, compared with normal-weight respondents. There were no significant associations between nutrition label use and history of chronic disease (data not shown).

Table 3 gives results of multiple regression analyses examining associations of nutrition label use with diet. The first column gives mean unadjusted summary scores for the Diet Habits Questionnaire, the second column gives means adjusted for demographic characteristics and BMI, and the third column gives means additionally adjusted for diet-related psychosocial factors. A lower Diet Habits Questionnaire score corresponds to consuming a lower percent of energy in the diet from fat, and we found a strong inverse association between reading nutrition labels and mean questionnaire scores.

The regression models that included all covariates plus label reading explained sizable proportions of the variance in Diet Habits Questionnaire scores: as high as 37% for use of the nutrition label and 25% for reading the amount of fat. Approximately 6% of the variance in Diet Habits Questionnaire scores was uniquely attributable to nutrition label use after controlling for all covariates, but only 1% and 2% for specific label information, such as serving size and fat, respectively. Therefore, although reading nutrition labels in general explained a considerable amount of variance in Diet Habits Questionnaire scores, there was little independent association among label users that was attributable to reading component parts of the label.

We also examined associations of label use with daily servings of fruits and vegetables. There were no associations of label use, or use of any part of the label, with fruit and vegetable intake (data not shown).

DISCUSSION

The Nutrition Labeling and Education Act of 1990 (1) brought extensive reform to the US marketplace. For the first time, standardized scientific information concerning the nutrient value of packaged foods and their place in a healthful diet became available to consumers on a regular basis. Nearly 4 years after implementation of the legislation, very little is known about the effects of the new food labels on the dietary intake of Americans. This report is, to our knowledge, the first population-based investigation to examine the associations of the new nutrition labels and diet.

There was a highly statistically significant association of reading nutrition labels with eating a lower-fat diet; this is evidence that persons who wish to reduce fat intake are using nutrition labels to help them select lower-fat foods

The most important finding of this study is that there were significant associations of label reading with fat intake. The magnitude of these associations was only modestly reduced after controlling for demographic characteristics and, as expected, was further reduced after controlling for diet-related psychosocial factors. However, even after these statistical adjustments there was a highly statistically significant association of reading nutrition labels with eating a lower-fat diet. We interpret this finding as evidence that persons who wish to reduce fat intake are using nutrition labels to help them select lower-fat foods. We support these findings by noting that previous studies have shown that 1 unit of the 4-point score on the Fat-Related Diet Habits Questionnaire corresponds to 8 percentage points in percent of energy consumed in a diet from fat (23,26). In our study, the differences in mean Diet Habits Questionnaire scores between respondents who usually read labels compared with those who do not are 0.70 without adjustments and 0.44 with adjustments for demographic and psychosocial factors. Thus, these differences correspond to 9% and 5% energy from fat, respectively. This estimate of reduction in dietary fat intake associated with label reading is much lower than the 13.0% association projected by Zarkin et al (8). Still, a reduction in dietary fat of this magnitude (5%) would result in meaningful decreases in risk for diet-related chronic diseases.

Two other findings in this study suggest that nutrition labels on packaged foods can be helpful for persons wishing to lower their fat intake. First, label use is common; 80% of Washington State residents report reading the nutrition labels on packaged foods. These results are comparable to those obtained by Guthrie et al (12), who found that 71% of a national sample read nutrition labels before the new legislation, and Kreuter and Brennen (16), who reported label use by more than 80% of their sample. Second, the strong relationships between health beliefs and nutrition label use, which are consistent with the broader literature on predictors of healthful dietary patterns (27-29), suggest that people interested in health seek the information on food labels to make food purchasing decisions (12). We did not find, however, that persons with a history of chronic disease such as diabetes, hypertension, or cancer were more likely to read the nutrition label than healthy persons after statistical adjustments for age, sex, and education (odds ratio=1.1). Guthrie et al (12) also did not find a statistically significant association between label use and history of chronic disease, but Kreuter and Brennen (16) found that patients with hypertension or elevated cholesterol levels were more likely to look for sodium and fat, respectively, but not other label information.

Label use is common; 80% of Washington State residents report reading the nutrition labels on packaged foods

The 1990 labeling legislation required that detailed information on nutrients associated with chronic disease risk, including total fat, saturated fat, and cholesterol, appear on food labels. Most label users read this information, with the exception of the %DV for fat. Less than 39% of the label users in Washington State reported use of this information. Although %DV was intended to help consumers select diets consistent with the Dietary Guidelines for Americans (5), dietitians clearly need to educate their clients about the interpretation and use of the %DV in meal planning (9,30).

This study has several limitations. First, analyses are based on cross-sectional data, and do not allow conclusions regarding causal relationships between label use and dietary patterns. It would also be helpful to conduct a prospective investigation to determine if food label use predicts adoption of low-fat diet patterns. Second, although our response rate of 65.3% is similar to or better than other random-digit-dial surveys (19), there may be limitations to generalizing to the entire population. Studies are needed to address how labels are used by minorities and low-income groups (31). Third, because our measures are based on self-report, we cannot rule out the possibility of social desirability bias (32,33), which would result in a false correlation of label use and healthful diet.

APPLICATION

Our results suggest that most Washington State residents use the "Nutrition Facts" from food labels. However, only 38.5% reported using the %DV in their food choices. Persons successfully limiting their fat intake use nutrition labels, suggesting that the new nutrition labels are helpful. Dietitians can use the results of this study to emphasize to their clients the importance of reading nutrition labels in maintaining a low-fat diet. ■

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References

1. Nutrition Labeling and Education Act of 1990, Publ L No. 101-535, 104 Stat 2353.

2. Kessler DA. The federal regulation of food labeling, promoting foods to prevent disease. *N Engl J Med.* 1989;321:171-725.

3. Marwick C, Merz B, Gunby P. Changes brewing for food labels as national concern about diet and health continues to grow. *JAMA.* 1989;262:2354-2355.

4. Geiger CJ, Wyse BW, Parent CR, Hansen RG. Review of nutrition labeling formats. *J Am Diet Assoc.* 1991;91:808-812.

5. Nightingale SL. New food label to enhance healthful diets. *JAMA.* 1993;269:974.

6. Committee on Diet and Health, National Research Council. *Diet and Health: Implications for Reducing Chronic Disease Risk.* Washington, DC: National Academy Press;1989.

7. *The Surgeon General's Report on Nutrition and Health.* Washington, DC: US Dept of Health and Human Services;1988:9-11. DHHS publication PHS 88-50210.

8. Zarkin GA, Dean N, Mauskopf JA, Williams R. Potential health benefits of nutrition label changes. *Am J Public Health.* 1993;83:717-724.

9. Bender MM, Derby BM. Prevalence of reading nutrition and ingredient information on food labels among adult Americans: 1982-1988. *J Nutr Educ.* 1992;24:292-297.

10. Glanz K, Rudd J, Mullis RM, Snyder P. Point of choice nutrition information, federal regulations, and consumer health education: a critical view. *J Nutr Educ.* 1989;21:95-100.

11. Fullmer S, Geiger CJ, Parent CRM. Consumers' knowledge, understanding and attitudes toward health claims on food labels. *J Am Diet Assoc.* 1991;91:166-171.

12. Guthrie JF, Fox JJ, Cleveland LE, Welsh S. Who uses nutrition labeling, and what effects does label use have on diet quality? *J Nutr Educ.* 1995;27:163-172.

13. Hrovat KB, Harris KZ, Leach AD, Russell BS, Harris BV, Sprecher DL. The new food label, type of fat and consumer choice. A pilot study. *Arch Fam Med.* 1994;3:690-695.

14. McCullum C, Achterberg CL. Food shopping and label use behavior among high school adolescents. *Adolescence.* 1997;32:181-197.

15. Kristal AR, Levy L, Patterson RE, Li SS, White E. Trends in food label use associated with new nutrition labeling regulations. *Am J Public Health.* 1998;88:1212-1215.

16. Kreuter MW, Brennen LK. Do nutrition label readers eat healthier diets? Behavioral correlates of adults use of food labels. *Am J Prev Med.* 1997;13:277-283.

17. Kristal AR, White E, Davis JR, Corycell G, Raghunathan T, Kinne S, Lin T. The effects of enhanced calling efforts in random digit dial surveys in response rates and population level estimates of health behavior and costs. *Public Health Rep.* 1993;108:372-379.

18. *An Introduction to the GENESYS Sampling System.* Fort Washington, Pa: GENESYS Sampling Systems; 1995.

19. Center for Health Statistics, Washington State Department of Health. *Annual CDC Core Tabulations, 1995.* Olympia, Wash: Washington State Department of Health; 1996.

20. Glanz K, Patterson RE, Kristal AR, DiClemente CC, Heimendinger J, Linnan L, McLerran DF. Stages of change in adopting health diets: fat, fiber and correlates of nutrient intake. *Health Educ Q.* 1994;21:499-519.

21. *Shopping for Health 1995, New food labels, same eating habits?* Washington, DC: Food Marketing Institute; 1995.

22. Kristal AR, Shattuck AL, Henry HJ. Patterns of dietary behavior associated with selecting diets low in fat: reliability and validity of a behavioral approach to dietary assessment. *J Am Diet Assoc.* 1990;

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90:214-220.
23. Shannon J, Kristal AR, Curry SJ, Beresford SAA. Application of a behavioral approach to measuring dietary changes: the fat- and fiber-related diet behavior questionnaire. *Cancer Epidemiol Biomarkers Prev.* 1997;6:355-361.
24. Havas S, Heimendinger J, Damron D, Nicklas TA, Cowan A, Beresford SA, Sorensen G, Buller D, Bishop D, Baranowski T, Reynolds K. 5-A-Day for Better Health—nine community research projects to increase fruit and vegetable consumption. *Public Health Rep.* 1995; 110:68-79.
25. Krebs-Smith SM, Heimendinger J, Subar AF, Patterson BH, Pivonka E. Using food frequency questionnaires to estimate fruit and vegetable intake: association between the number of questions and total intakes. *J Nutr Educ.* 1995;27(2);80-85.
26. Kristal AR, Beresford SA, Lazovich D. Assessing change in diet intervention research. *Am J Clin Nutr.* 1994;59(1 suppl):185S-189S.
27. Kristal AR, Patterson RE, Glanz K, DiClemente CC, Linnan L, Heimendinger J, Ockene J. Psychosocial correlates of healthful diets and intention to improve diet: baseline results from the Working Well Study. *Prev Med.* 1995;24:221-228.
28. Patterson RE, Kristal AR, White E. Do beliefs, knowledge and norms about diet and cancer predict dietary change. *Am J Public Health.* 1996;86:1394-1400.
29. Patterson RE, Kristal AR, Lynch J, White E. Diet-cancer beliefs, knowledge, norms, and their relationship to healthful diets. *J Nutr Educ.* 1995;27:86-92.
30. Pennington JAT, Hubbard VS. Derivation of daily values use for nutrition labeling. *J Am Diet Assoc.* 1997;97:1407-1412.
31. Michel PM, Korslund MK, Finan A, Johnson J. Food label reading habits of WIC clients. *J Nutr Educ.* 1994;26:146-148.
32. Kristal AR, Andrilla CAH, Koepsell TD, Dieht PH, Cheadle A. Dietary assessment instruments are susceptible to intervention-associated response set bias. *J Am Diet Assoc.* 1998;98:40-43.
33. Hebert JR, Clemow L, Pbert L, Ockene IS, Ockene JK. Social desirability bias in dietary self-report may compromise the validity of dietary intake measures. *Int J Epidemiol.* 1995;24:389-398.

PRACTICE POINTS: Translating research into practice

Food labels benefit consumers and dietetics professionals

By most accounts, the National Labeling and Education Act of 1990 (1) can be considered a success: Survey and trend data (2) show that most consumers read Nutrition Facts labels and pay attention to the health claims that appear on the foods they buy. And research shows that label reading is leading to lower fat intake (3). So is the job said and done for dietetics professionals? Not if one considers opportunities for dietitians to work with the food manufacturers who are vying to grab a corner of the label-reading consumer market. "Dietetics professionals' knowledge of communicating about and working with food makes for a natural fit with food producers," says **Maureen Scaramella**, MBA, RD, president of Amberfield Nutrition Company, Cherry Hill, NJ, and member of the Nutrition Entrepreneurs dietetic practice group.

Recognizing the opportunities for dietetics professionals created by consumers' use of food labels led Scaramella to combine her skills in dietetics and marketing to create a niche for herself with food manufacturers. In addition to performing nutrient analysis of ingredients, Scaramella develops new ways for manufacturers to market their products to target audiences, reviews marketing research of consumers' shopping and media habits, and investigates the cost-differentials of changing to more healthful or less expensive ingredients while maintaining product taste and quality.

"To seek out clients I attend conferences such as trade shows and The American Dietetic Association Annual Meeting and Exhibition and talk to food manufacturers about their products and how they are currently being promoted. My first criterion for taking on a client is that I would feel comfortable using the product myself or buying it for my family."

Enthusiasm for the product is important, says Scaramella, but so are skills like writing. "In addition to working with the words that appear on product packaging, I may be called on to write press releases and brochures for promotional campaigns and to stimulate product sales to supermarkets." Scaramella also writes for a local newspaper to hone her writing skills and add to her visibility and credibility.

Being aware of industry and consumer trends is equally important. "Today's consumers want to see more than just that a product is low in fat. They also want to see that it is 'certified', whether that means certified as organic or certified by groups such as the American Heart Association and the American Diabetes Association. I have to know where to look to find out about certification programs and be able to analyze a product's ingredients for appropriateness and the program itself for validity." Familiarity with restaurant claim laws, trends in supermarket selling, and the various databases available to analyze foods and ingredients are also cited by Scaramella as important to meeting client needs.

Scaramella doesn't see opportunities for dietitians in the food manufacturing industry waning any time soon. "The food demands of aging baby boomers are creating a new generation of label-conscious consumers. I've already been asked to work on a Web site for one manufacturer."

References

1. Nutrition Labeling of Food. 58 *Federal Register* 17085-17091 (1993) (Codified at 21 CFR §101.9).
2. *The American Dietetic Association 1997 Nutrition Trends Survey.* Executive Summary. Chicago, Ill: American Dietetic Association; 1997.
3. Neuhouser ML, Kristal AR, Patterson RE. Use of food nutrition labels is associated with lower fat intake. *J Am Diet Assoc.* 1999;99:45-50,53.