



Improving Compliance With Dietary Recommendations

Time for New, Inventive Approaches?

Dennis M. Bier, MD
Doris Derelian, PhD, JD, RD
J. Bruce German, PhD

David L. Katz, MD, MPH
Russell R. Pate, PhD
Kimberly M. Thompson, ScD

For more than a century, experts have produced dietary guidance aimed at increasing consumption of certain nutrients and food groups, yet compliance is poor. As the planning stage for the *Dietary Guidelines* begins and it is clear that dietary change has been difficult to accomplish, perhaps, the right question to ask is “Which dietary changes are most likely to have the greatest impact on Americans’ health?” There is a compelling need to assign the highest priority to those messages that will have the greatest impact on health. One approach is to use *prioritized risk* for determining the need for establishing population-based guidelines. A symposium held in December 2007 examined the challenges of how best to have a more meaningful impact on public health through nutrition guidance. *Nutr Today*, 2008;43(5):180–187

For more than a century, experts have produced dietary guidance aimed at increasing consumption of certain nutrients and food groups, yet compliance remains poor. The most visible example to date is the campaign to increase consumption of fruits and vegetables. Only 3% of Americans consumed the recommended number of servings of vegetables and at least 1 serving daily of a dark green or orange vegetable¹ during 1989 and 1996. Despite extensive nutrition education efforts, men, women, and children still fall far short of the recommended intake. According to the 2005 Dietary Guidelines for Americans Committee Report, intake of fruits and vegetables, legumes such as beans, as well as whole grains and fat-free and low-fat dairy products falls short as well. As the planning stage for the 2010 Dietary Guidelines begins and it is clear that dietary change has been difficult to accomplish,

perhaps, the right question to ask is “Which dietary changes are most likely to have the greatest impact on Americans’ health?”

In December 2007, an interactive workshop, “Improving Compliance With Dietary Recommendations: Time for New, Inventive Approaches?” was held at the US Department of Agriculture (USDA)/ARS Children’s Nutrition Research Center at Baylor College of Medicine to address the challenge of how best to have a more meaningful impact on public health through nutrition guidance. One of the purposes of the meeting was to encourage the flow of ideas on how to best improve compliance with dietary guidance. Dennis M. Bier, MD, director of the USDA/ARS Children’s Nutrition Research Center, served as the workshop chair, and Doris Derelian, PhD, RD, professor in and department head of the Department of Food Science and Nutrition California Polytechnic State University served as discussion facilitator. The highlights of the workshop and the discussions that followed are presented here.

The Compliance Conundrum

Public health officials concur that Americans are not adhering to current healthful lifestyle recommendations. Only 1 in 5 of the US population follows recommendations for fruit and vegetable consumption.² Only 1 in 4 adheres to the recommendations for exercise,² and 3 of 4 adhere to recommendations not to smoke.² Possibly, the most telling statistic is that only 3 of every 100 US adults follow all recommendations to consume 5 fruits and vegetables daily, get regular physical activity, maintain a healthy weight, and not smoke.³ The Healthy Eating Index, a measure of healthful eating developed by the USDA’s Center for Nutrition Policy and Promotion to assess Americans’ diets, has been used to show that approximately 74% of Americans need to improve their diets.⁴

Questions Posed at the Workshop

- Should dietary guidance be developed with consumer compliance in mind?
- Should dietary guidance messages be prioritized to include only those that will have the most impact? If so, how can this be accomplished?
- What approaches can be used to close the gap between dietary guidance and consumer compliance?
- Is current dietary guidance too complex for consumers to implement?
- What can be done to address the challenge of simplifying the complex nutrition information that is the basis for dietary guidance while at the same time making recommendations for changes that will have the most impact on the largest number of people?
- How can successful nutrition marketing communications be created without having unintended consequences?
- How can physical activity guidelines be successfully integrated with dietary guidance?
- What lessons have been learned from previous efforts at marketing nutrition guidance messages that could be applied to future nutrition guidance to improve consumer compliance?

The gap between recommendations and compliance should not be surprising, considering the many barriers that consumers encounter. A constellation of cultural forces, societal norms, family influences, changes in meal patterns, food availability, and commercial advertising potentially influence individual behaviors. A recent study in *The New England Journal of Medicine* suggested that a “social network phenomenon” seems to be relevant in obesity.⁵ That is, obesity seems to spread through social ties. It is not surprising then to learn that nutrition decisions are commonly made because of recommendations from friends and family, neighbors, or blogs instead of from experts. However, the presence of social influence may present an opportunity to harness that same force to spread positive health messages and behaviors.⁵

Environmental Hurdles to Healthful Eating

Environmental forces, such as large portions served at restaurants, lack of information on calorie content at point of purchase, and the cost and availability of fruits and vegetables, are generally beyond the consumer’s control. Moreover, many eating decisions

are not conscious but are made under the subtle influence of factors in the food environment, such as the size of dishes, flatware or glassware used, or even the proximity of the food itself. Changes in the food environment can potentially make a substantial difference in consumers’ ability and willingness to follow nutrition guidance.⁶

One impediment to long-term change is the desire among American consumers for instant gratification—a characteristic that is inconsistent with maintaining a healthful diet throughout the lifespan. There is a somewhat uniquely American idea, perhaps associated with the instant gratification promised in popular advertising, that changing behavior will lead to an immediate and measurable benefit. Experiencing the consequences of dietary change is a much longer process. The future promise of a longer, healthier life may not be enough to motivate most consumers to permanently change the way they eat.

Prioritizing Dietary Guidance Messages

Dietary recommendations ideally would be individualized. However, because dietary guidance for the nation cannot, at this time, realistically be individualized for everyone, prioritizing dietary guidance messages and selecting those that will provide the greatest health benefits for the most people are a realistic alternative. In the absence of individualization, dietary guidance should be made to feel personal to consumers. With that in mind, those who develop dietary guidance need to consider consumers’ health goals. Do they strive for more energy, improved cognition, a more responsive immune system, or protection from familial chronic disease? The aspects of health that drive people to comply with dietary guidance should be incorporated into guidance messages.

Clearing up the Dietary Message Clutter for Consumers

There are 4 important aspects of changing eating behaviors that should be considered when striving to achieve compliance among consumers:

- People need evidence that the changes they make will be effective.
- Changes should allow for individual latitude in implementation.
- An accountability and reinforcement tool, such as a daily checklist of goal achievement, is needed to help implement dietary discipline.
- Consumers need individual encouragement and reassurance. Where face-to-face contact is not

possible, electronic follow-ups, reports, and feedback can help.

Even in an ideal environment, the sheer number of nutrition messages reaching consumers often results in confusion, and consumers cannot realistically be expected to make the right decisions. Given the evidence that the overwhelming quantity of nutrition messages is confusing, that compliance with existing dietary guidance is poor, and that the barriers are many, it is important to develop a “filtering” system to identify and prioritize those changes that will make the most difference.

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New, innovative approaches are needed so that government agencies and nutrition scientists can work together to develop a dialogue with consumers. The more that is learned about consumers' existing skills and knowledge regarding food and nutrition and to what degree they affect implementation of dietary guidelines, the more effective dietary guidance can become.

Lost in Translation: Untangling Complex Nutrition Messages

The 6 editions of the *Dietary Guidelines* have been based largely on primary research relating diet to disease risk. The scientific rationale behind the guidelines was strengthened in the development of the 2005 *Dietary Guidelines*, but “real-world” factors that affect compliance were virtually ignored.³ Although nutrition research findings serve as the basis for current guidance messages, nutritional needs differ considerably among individuals.

The proposition behind dietary guidance messages is fundamentally different from other health messages such as “don't smoke,” “buckle your seat belt,” and “don't drink during pregnancy.” These are black and white, dos or don't. However, the relationships between diet and health outcomes are far more complex, making it challenging to translate the information

into consumer-friendly, relevant dietary guidance messages.

Simplify, Then Stratify Messages

“Food synergy” is a component of that complexity, that is, foods and beverages are not consumed in isolation,^{7,8} and in fact, food patterns act synergistically to influence the risk of several chronic diseases.⁹ However, food has become divorced from nutrition science in the minds of academic researchers and consumers. Scientists and educators will need to integrate the two, moving away from a reductionist approach, which has been the norm.

People tend to have limited nutrition knowledge from which to draw, so it stands to reason that dietary guidelines should be simplified and desirable behavioral changes should be ranked according to importance, focusing on 1 or 2 high-priority behaviors for change. The decisions for prioritizing those changes should be based on the impact that they will have on the quality of the diet and their relationship to health outcomes. Prioritization also needs to be performed separately for specific groups that may have distinct nutrition needs, such as children, young adults, pregnant women, and persons with diabetes. Those groups in the most need of dietary change should be identified, and efforts to meet those needs should then be stratified.

Looking ahead, future dietary guidance should encourage incremental steps toward permanent changes in healthful eating that will impact Americans' health over the long-term. Recommending radical changes has been proven ineffective. Moreover, it should be acknowledged that dietary guidelines are not necessarily the basis for effective consumer messages. There is a compelling need to assign the highest priority to those messages that will have the greatest chance of consumer adoption by making them as user-friendly and practical as possible.

Collaborative Efforts Are Essential

To date, the government has borne the chief responsibility for developing and disseminating dietary guidelines, but government agencies traditionally have neither the means nor the manpower to do it all. One way to make dissemination of nutrition guidance information more effective is to build alliances and create collaborations among government agencies, the media, and industry. The issue then becomes how to marshal resources and efforts for recommending those changes identified as being the most likely to improve Americans' health status.

Complexity Versus Simplicity of Nutrition Messages—Unintended Consequences

Messages on diet and health require considerable sophistication to process.¹⁰ Because of this complexity, there is an impulse to include everything possible in nutrition guidance, rather than only those elements that will impart the greatest public health benefit. This impulse may have contributed to the establishment of 41 guidelines (23 for the general population and 19 for special population groups) in the *2005 Dietary Guidelines for Americans*. The USDA's MyPyramid conveyed 6 general messages regarding a healthy diet,³ which have also been proven too complex for many consumers to implement.

When Simple Messages Backfire

Market research/social marketing shows that simple messages have the greatest impact on behavior. Nutrition messages need to be clear, positive, and consistent to avoid a "nutrition backlash," which can result in the opposite of the intended effect; that is, an association has been demonstrated between less healthful diets and skepticism about nutrition information. A recently published article highlights the idea that there is potential for harm, even in well-meaning innocuous lifestyle recommendations.¹¹ The admonition to eat less fat, for example, has been suggested as a potential contributor to the current epidemic of obesity in the United States.¹¹ "Choose low-fat foods" was a way to simplify more than 1 guidance message, but it seems to have backfired. Although the simple, straightforward message quickly became familiar to most Americans, it also gave unintended permission to consume more low-fat foods, which were not always lower in calories. As a result, although the percentage of calories from fat decreased significantly between 1971 and 2000 from 36.9% to 32.8% for men and 36.1% to 32.8% for women, the decrease was attributed to an increase in total kilocalories consumed. In reality, the absolute fat intake in grams increased.^{12,13} During that time, the rate of overweight and obesity among Americans continued to climb until it reached its current high record of 142 million Americans aged 20 years or older being either overweight or obese.¹⁴ This association does not prove causation but raises the possibility of a harmful effect of a seemingly innocuous dietary advice.¹¹

Filtering Nutrition Messages for the Greatest Impact

Nutrition messages to consumers must be filtered so that they reflect how people think. Differences in how

people view the world around them can sometimes result in messages being received very differently than intended. The 5-a-day campaign to eat more fruits and vegetables seemed to be a very straightforward, simple message. However, consumer research found that it needed to be translated into very specific actions, such as "drink a glass of orange juice in the morning; that counts as a fruit."

Although messages must be actionable to make an impact with consumers, the initial challenge lies in developing decision-making criteria for selecting the exact message to be promoted. One approach is to have 2 separate panels to develop guidelines—a dietary guidelines science panel and a consumer messages panel.

Integrating Physical Activity Guidelines With Dietary Guidance

Because diet does not operate in a vacuum, representing only 1 part of a healthful lifestyle, it is important to consider the complex interplay between diet and physical activity. If the focus is on healthful behaviors that will have the most impact on consumer health, it is difficult, if not impossible, to consider diet without taking physical activity into consideration. While emphasizing food patterns, physical activity should be stressed as a complement to the total diet approach. Separation of dietary guidance and physical activity guidance has so far resulted in confusion between the messages being disseminated. One way to avoid the disconnect is to strengthen the linkages between the government groups working on dietary guidelines and those working on physical activity guidelines.

Nutrition Education: Goals, Tools, Interventions

The goals for developing the nutrition education component of dietary guidance are lofty, some even say unrealistic. It should be simple and comprehensive, yet there is a complexity in people's dietary habits that needs to be factored in while at the same time taking physical activity into account. The guidelines should be consistent, yet there are scientific advances occurring all the time that complicate the process, and they should be developed in such a way as to avoid unintended dietary and health consequences.

One approach to education to make it easier for consumers to make more healthful food choices consistent with dietary guidance is to develop nutrient profiling schemes on individual foods that would provide summary nutrition assessment at a glance in the supermarket. The concept is currently under consideration by the Food and Drug Administration.

As priorities are developed for targeted messages and effective interventions are identified, government agencies should engage organizations that can commit resources over the long-term. The industry has shown that it will respond to consumer demands for specific types of food. Ideally, there would be agreement among food suppliers, marketing policy makers, and health policy developers that the *Dietary Guidelines* would be the basis for all nutrition guidance provided to consumers.

Exploring Alternative Ideas: Shifting Focus to Elements With Greatest Impact on Public Health

Dietary guidance messages may ultimately provide the biggest public health benefits if they focus on those elements that pose the greatest risk to most of the population, such as excess calories or intake of saturated fats and *trans*-fats. Establishing a tiered approach to setting guidelines could be a step in the right direction. Although there may be several approaches that could be used as a filtering mechanism, one suggested approach is to use *prioritized risk* for establishing population-based guidelines. (In this context, prioritized risk refers to comparing the impact of changing one health behavior relative to another and placing more emphasis on the behaviors that have the greatest positive impact.) The risk posed to the population by a nutrition factor depends, in part, on exposure to that factor. For example, a nutritional factor that imposes even slight relative risks can be responsible for a sizable percentage of disease risk within a population that is almost universally exposed to that factor.¹⁵ The opposite is also true—a nutritional factor that poses a high risk can be responsible for only a small increase in disease risk in a population that is either not exposed or not vulnerable.

Ranking Dietary Risk Factors

Most risk analysis models are applied to chemical and environmental agents and pathogens in food. However, the concept of risk ranking or prioritizing may be appropriate when analyzing dietary risk factors. A recent risk model analysis of dietary cholesterol and coronary heart disease puts one aspect of dietary risk into perspective.¹⁶ The study found that for 80% to 85% of the population, dietary cholesterol from eggs contributes less than 1% to the incidence of coronary heart disease. That raises the question then whether reducing dietary cholesterol should be as high a priority message as reducing calories or increasing physical

activity. Yet, current dietary recommendations state that everyone should limit cholesterol intake to less than 300 mg/d, which de facto limits consumption of nutrient-dense eggs.

Those who develop dietary guidance for populations need to use appropriate risk estimates. Doing so would allow more precise prioritization of dietary recommendations. Risk estimates must be performed, put into perspective, and viewed relative to other competing risks before recommendations can be made for all Americans to alter their eating patterns.

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There is a need to develop a set of dietary messages that focus on those factors with the greatest absolute risk for the population, personalize them as much as possible, and then develop prioritizing principles for the rest. Although individual guidance is the goal, this approach may offer the best option available until science progresses to the point that dietary guidance can easily be individualized based on the individual's health history and existing risk factors.

Workshop Conclusions

The current process of developing and implementing dietary guidance has not achieved the primary goal of improving public health. After 30 years of relatively consistent guidance, there has been no substantial movement in the public's compliance. It is not that the guidelines are flawed, but rather that the approach and method of instituting lifestyle behavior changes on a population basis have failed.

There is an urgent need to reconcile the somewhat contradictory goals of providing nutrition guidance that will positively affect the largest proportion of the population while at the same time being as specific as possible, simple, easy to understand, and perceived as personally relevant. However, much more time and money need to be invested in the translation and communication of dietary guidelines to reach those goals. Food companies could benefit tremendously

Possible Solutions for Improving Compliance With Dietary Guidance

- Develop a filtering system to identify nutrition messages and changes of highest priority that will make the most difference in Americans' health.
- Use a *prioritized risk* approach as one possible filtering mechanism for establishing population-based guidelines.
- Perform risk estimates and put them into perspective relative to other competing risks before making recommendations.
- Perform prioritization separately for specific groups that may have distinct nutrition needs—children, young adults, pregnant women, and persons with diabetes.
- Take into account the complex interplay between diet and physical activity and integrate the two.
- Strengthen linkages among government, professional, and industry groups working on dietary guidelines and physical activity guidelines.
- Develop effective methods for widespread dissemination of dietary guidelines once they have been prioritized and integrated with physical activity guidelines.
- Build alliances and create collaborations among government agencies, the media, and industry to accomplish widespread dissemination.
- Create multiple communication tools to address multiple audiences for dietary guidance messages.
- Establish 2 distinct panels—a dietary guidelines panel and a consumer messages panel—to be most successful.

from nutrition science by funding systematic reviews in certain areas of nutrition and health where experts are searching for answers and then using the findings in product development. Experts will need to work on the best paradigms to make the dietary guideline development process work—deciding how to assign risk and which behavioral models to use. Ultimately, the benchmark will be measurable improvements in public health. After 3 decades of dietary guidance, it is time for new, inventive approaches to make more substantive gains in public health.

Workshop Participants

Tom Baranowski, PhD, professor of Pediatrics Children's Nutrition Center, Baylor College of Medicine

Johanna Dwyer, DSc, RD, senior nutrition scientist, Office of Dietary Supplements, National Institutes of Health

Pauline Ippolito, PhD, associate director, Bureau of Economics, US Federal Trade Commission

Janet C. King, PhD, senior scientist and professor, UC at Berkeley and David, Children's Hospital Oakland Research Institute

Dan Kraemer, creative director with IA Collaborative of Chicago

Holly McPeak, MS, nutrition advisor, Office of Disease Prevention and Health Promotion, US Department of Health and Human Services

Esther Myers, PhD, RD, FADA, director, Scientific Affairs and Research, ADA

Theresa Nicklas, DrPH, MPH, LDN, professor, Baylor College of Medicine

Barbara Petersen, PhD, MPH, principal scientist and director, Exponent Health Sciences Center for Chemical Regulation and Food Safety

Sharyn Sutton, PhD, managing director, Communications and Social Marketing, American Institutes for Research

Kimberly Thompson, ScD, associate professor of Risk Analysis and Decision Science, Harvard School of Public Health

Nga Tran, DrPH, MPH, CIH, Senior Managing Scientist, Exponent Health Sciences Center for Chemical Regulation and Food Safety

Questions for consideration while contemplating different approaches to future dietary guidance are as follows:

- Should public health officials consider approaches other than those currently used to determine which guidance messages should be given top priority?
- Is using a risk model the appropriate filtering mechanism for selecting top-priority nutrition guidance messages?
- Should dietary guidance shift from the existing precautionary approach to one that focuses on those messages determined to have the most meaningful impact on public health?
- Are the right questions being asked to make recommendations that will have a meaningful impact on public health?
- Should new standards be considered for creating dietary guidance that use a tiered approach based on prioritized risk?

The Steering Committee of Thought Leaders and Participants in the Workshop

Steering Committee

Dennis M. Bier, MD (chair), is the director of USDA/ARS Children's Nutrition Research Center at Baylor College of Medicine in Houston, Texas. Dr Bier is the current chair of the Institute of Medicine Food and Nutrition Board and a past member of the Dietary Guidelines Advisory Committee (dbier@bcm.tmc.edu).

Doris Derelian, PhD, JD, RD, former president of the American Dietetic Association (ADA), is a professor in and the department head of the Department of Food Science and Nutrition at California Polytechnic State University (derelian@calpoly.edu).

J. Bruce German, PhD, is a professor and chemist in the Department of Food Science and Technology at the University of California (UC), Davis, and senior scientific advisor of the Nestlé Research Center in Lausanne (Switzerland) (jbgerman@ucdavis.edu).

David L. Katz, MD, MPH, is an associate professor (adjunct) of Public Health Practice and is director at and cofounder of the Prevention Research Center at the Yale University School of Medicine (katzdl@pol.net).

Russell R. Pate, PhD, is a professor in the Department of Exercise Science and is associate vice president for Health Sciences at the University of South Carolina. He served on the US Dietary Guidelines Advisory Committee (2003–2004) (kimt@hsph.harvard.edu).

Kimberly M. Thompson, ScD, is an associate professor of Risk Analysis and Decision Science at the Harvard School of Public Health (kimt@hsph.harvard.edu).

Brian Wansink, PhD, John S. Dyson Professor of Marketing and of Applied Economics and Management, Cornell University^a

Catherine Woteki, PhD, RD, global director of Scientific Affairs, Mars Incorporated

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^aDr Wansink is now the executive director of the USDA's Center for Nutrition Policy and Promotion.

Dennis M. Bier, MD, is the director of USDA/ARS Children's Nutrition Research Center at Baylor College of Medicine in Houston, Texas. Dr Bier is the current chair of the Institute of Medicine Food and Nutrition Board and a past member of the Dietary Guidelines Advisory Committee.

Doris Derelian, PhD, JD, RD, is a professor in and the department head of the Department of Food Science and Nutrition at California Polytechnic State University.

J. Bruce German, PhD, is a professor and chemist in the Department of Food Science and Technology at the University of California, Davis, and senior scientific advisor of the Nestlé Research Center in Lausanne, Switzerland.

David L. Katz, MD, MPH, is an associate professor (adjunct) of Public Health Practice and is director at and cofounder of the Prevention Research Center at the Yale University School of Medicine.

Russell R. Pate, PhD, is a professor in the Department of Exercise Science and is associate vice president for Health Sciences at the University of South Carolina.

Kimberly M. Thompson, ScD, is an associate professor of Risk Analysis and Decision Science at the Harvard School of Public Health.

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Corresponding author: Doris Derelian, PhD, JD, RD, Food Science and Nutrition, California Polytechnic State University, One Grand Avenue, 11-243 San Luis Obispo, CA 93407 (derelian@calpoly.edu).

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For Patients With Coronary Artery Disease, B Vitamins May Not Reduce Cardiovascular Events

In a large clinical trial involving patients with coronary artery disease, use of B vitamins was not effective for preventing death or cardiovascular events. Observational studies have demonstrated that the concentration of total homocysteine in blood is associated with risk of coronary artery disease and stroke. However, it is less clear if these are positive effects of homocysteine-lowering treatment with folic acid plus vitamin B₁₂ on mortality and cardiovascular events.

In a randomized controlled study with 3,096 patients in 2 Norwegian hospitals between 1999 and 2006, patients were randomly assigned to 1 of 4 groups receiving a daily oral dose of one of the following treatments: 0.8 mg folic acid, 0.4 mg plus vitamin B₁₂, 40 mg plus vitamin B₆ (n = 772); folic acid plus vitamin B₁₂ (n = 772); vitamin B₆ alone (n = 772); or placebo (n = 780). Patients were followed up with an interview, clinical examination, and blood sampling at 1 month, 1 year, and at a final study visit. The main outcome measure was a composite of all-cause death, nonfatal acute myocardial infarction (heart attack), acute hospitalization for unstable angina pectoris, and nonfatal thromboembolic stroke. The study was stopped early because of concerns among the participants about

preliminary results from another similar Norwegian study, suggesting no benefits from the treatment and a supposed increased risk of cancer from the B vitamins.

Mean (average) plasma total homocysteine concentration was reduced by 30% after 1 year of treatment in the groups receiving folic acid and vitamin B₁₂. During a median (midpoint) of 38 months of follow-up, one or more of the main outcome measures were experienced by a total of 422 participants (13.7%): 219 participants (14.2%) receiving folic acid/vitamin B₁₂ versus 203 (13.1%) not receiving such treatment and 200 participants (13.0%) receiving vitamin B₆ versus 222 (14.3%) not receiving vitamin B₆. The differences were not statistically significant.

The authors could not detect any preventive effect of intervention with folic acid plus vitamin B₁₂ or with vitamin B₆ on mortality or major cardiovascular events among patients with stable coronary artery disease undergoing intensive conventional treatment. They found a numerically lower incidence of stroke and higher incidence of cancer in the groups receiving folic acid, but these observations were not statistically significant. The authors conclude that the findings do not support the use of B vitamins as secondary prevention of heart-related defects in patients with coronary artery disease.

Source: *Journal of the American Medical Association*