Introduction

Poor nutrition and physical inactivity are among the leading causes of morbidity and mortality in the United States and widespread behavior modification is needed to improve health now and in the future. There is growing evidence that modifications in the physical environment and in social policies will be required to accomplish this goal. There is also growing recognition that economic factors have contributed to current eating and physical activity patterns, and that economic factors need to be considered when developing strategies for improving these behaviors. Identifying where economic and public health priorities converge could suggest new avenues for sustainable policy changes, which will, in turn, promote healthy choices on both an individual and population-wide level.

To review the effect that economics has on eating and physical activity behaviors, the Partnership to Promote Healthy Eating and Active Living convened an Economic Analysis Forum. Two working groups were formed—one focusing on eating behaviors and one on physical activity, and both with equal representation from health-related and economic disciplines. The groups examined how economics has contributed to present eating and physical activity patterns and how economics could be used to develop interventions to improve these patterns. This article describes the challenges the groups faced in their work, the way in which the public health and economic approaches were integrated, and the questions left unanswered.

(Economic Analysis of Eating and Physical Activity: A Next Step for Research and Policy Change)
effects. Further, maintenance of change produced by the programs is notoriously poor.

There is growing evidence that eating and physical activity behaviors are strongly affected by policies and physical environments.\textsuperscript{15–17} Conceptual and empirical work on how environments and policy influence eating and physical activity behaviors is now progressing rapidly.\textsuperscript{15,18–22} Alternatives to psychosocial approaches to nutrition and physical activity behavior change have been proposed, based on the concept that changes in physical environments and policies are needed to support individual efforts to change behavior.\textsuperscript{12,21,23–27}

Improving understanding of how the environmental and social policies influence behavior is a priority for public health, because such understanding could lead to population change approaches that are fundamentally different from psychosocial approaches. Policy and environmental changes could affect entire populations that are exposed to the changes, could be designed to improve social equity, and could have impacts on behavior that should be as permanent as the changed environments and policies.\textsuperscript{17} It is not clear whether modifying environments and policies is a practical strategy for changing behavior. Creating environmental and policy changes is a complex political process that is likely to take time and face opposition. Nevertheless, substantial population-wide improvements in nutrition, physical activity, and obesity may not be possible without creating major changes in environments and policies. The ecologic framework posits that behavior change will be most effective when change efforts work on individuals, social environments, physical environments, and policies.\textsuperscript{21,28} This kind of multilevel approach has been credited with reducing the smoking rate by over 50\% since the 1960s.\textsuperscript{28}

Approaches to changing behavior are evolving, and there are additional factors that should be considered. One such factor is economics. A better understanding of economic factors that influence food intake and physical activity could provide the basis for creating incentives that could counter those currently driving behavior. Identifying where economic and public health priorities converge could suggest new avenues for sustainable policy changes.

The Development of the Present Economic Analysis

The papers in this supplement begin to explore the role of economics in nutrition and physical activity patterns. The papers are the culmination of an 8-month process in which two expert working groups, comprised of prominent economists and public health experts, considered how economic factors contribute to current eating and physical activity patterns and how economic analyses could lead to new approaches to changing lifestyle behaviors. The process was initiated by the Partnership to Promote Healthy Eating and Active Living (the Partnership), a nonprofit, public–private collaboration whose mission is to inspire Americans to choose healthy lifestyles.

This economic analysis followed the development by the Partnership of “a conceptual framework to guide understanding, thinking, planning, action, and evaluation”\textsuperscript{29} that would contribute to developing long-term solutions to unhealthy eating and activity patterns. The framework illustrates the multiple factors within individuals and across environments that seem relevant for determining eating and physical activity behaviors, and it identifies a large number of sectors of society that need to be involved in developing and implementing solutions.\textsuperscript{12}

The previous Partnership activity analyzed disparate social change movements to identify principles that could be applied to changing physical activity and eating behaviors.\textsuperscript{30} There was substantial overlap in the experiences and recommendations of leaders in the movements to promote seat belt use, breast feeding, recycling, and tobacco control. One of the primary lessons that had not been adequately integrated into efforts to change nutrition and physical activity patterns was the critical role of economics, and “it could be argued whether any social transformation or social marketing can ever be successful unless the prevention benefits can be quantified in dollar terms.”\textsuperscript{30} Communicating the economic benefits might motivate change, but understanding the economic drivers of eating and physical activity could guide specific actions. The health field has yet to examine how to turn the power of economics into individual and social change to combat obesity and improve health and quality of life. This is a huge gap in knowledge that needs to be filled. Understanding and harnessing the economic forces that drive current eating and physical activity patterns are likely to be essential for sustainable behavior change.

For the economic analysis, members of the two working groups—one focusing on eating and one on physical activity behaviors—were identified from literature reviews and referrals. Working groups had almost equal representation from health-related and economic disciplines. The working group efforts were guided by two major questions. The first question was: How can economics help explain the current situation with eating, physical activity, and the prevalence of obesity? Economic incentives for individuals to behave in certain ways were identified, and economic trends over the past few years were analyzed to examine how they might help explain recent population changes in behavior and obesity. The second question was: How can economics be applied to develop new intervention strategies or prioritize among various intervention strategies? Criteria were developed to evaluate the economically based interventions and to identify any potentially negative side effects. Economic principles were re-
viewed to identify innovative change strategies that have not been proposed to date.

As the project progressed, concepts, methods, and data from economics, public health, and the behavioral sciences were combined to create a transdisciplinary analysis. This method required each member of the working group to learn new terms and concepts, and it resulted in an analysis and set of recommendations that represented neither a completely health-oriented nor an economics-oriented approach, but a blending of perspectives and values.

Results of the working groups were presented at an Economic Analysis Forum on April 10, 2003, in Washington DC. Attendees included leading academicians, government representatives, research funders, policymakers, advocates, corporate representatives, and media professionals.

**Applying Economics to Develop Sustainable Solutions to Unhealthy Eating, Physical Inactivity, and Obesity**

The intent of this process was not to suggest that we abandon behavioral and social theories addressing the problems of nutrition and physical activity in favor of economic approaches, but to understand better how economic principles could be included within theories used widely in public health. Economics, for example, might help us think about how to develop an external incentive framework to replace or supplement the current incentive framework within which economic incentives strongly encourage and reinforce consumption of biologically preferred foods and physical inactivity.

**The Economics of Personal and Social Utility**

Economics is the study of how people and societies achieve desirable goals within the limitations of available resources. It concerns making choices about how to allocate limited resources so as to maximize gains while minimizing tradeoffs and undesirable consequences. The term “utility” is often used in economics to describe the effectiveness with which desired goals are met within the constraints of available resources. This construct can be viewed at the level of both the individual and society. For individuals, one might consider that behavior is a collection of decisions designed to allocate resources (e.g., time, money) in order to maximize personal “utility,” or happiness. At the level of society, economics provides a view of decision making about resource allocation that is aimed at maximizing social utility. This is often done primarily for understanding rather than in trying to change individuals’ or societies’ utilities. In fact, many economists would advocate intervention to change resource allocation only when a “market failure” exists. Specific reasons for market failures are discussed by Cawley, but they include lack of information (information deficits), transfer of external costs (externalities), and lack of rationality in decision making.

The aim of this analysis is not to identify the economic costs of unhealthy lifestyle behaviors; that has been done previously. Rather, the intent is to understand the economic drivers of eating and physical activity behaviors and to identify economic levers that may increase our success in developing effective lifestyle interventions. The market forces that influence behaviors today are very powerful, and it is the intention of this analysis to begin considering how to use these forces as instruments of change. How can we use economic forces to create an environment that supports healthier lifestyle behaviors?

Economics represents just one model for understanding human behavior, and the emphasis on the psychological construct of utilities contrasts sharply with the various models of interacting personal, social, environmental, and policy influences that are used in public health. Our intent is not to abandon other models in favor of the economic approach, but rather to consider what we might learn from economics that could be integrated into other models of individual and population behavior change. Our approach is to ask how economics can inform us in ways that other models cannot. Additionally, the process may help economists who are interested in drivers of poor lifestyle and obesity to understand important issues related to the biology of obesity and other dimensions of this complex issue.

There are different approaches to economics, and the approach used in the current analysis is one that may be somewhat specific to the United States, which readily accepts the notion of rational individual choice. We believe this is the economic approach that shapes economic and social policy in the United States, but other economic approaches exist and may be more applicable in other countries.

**Challenges.** Numerous challenges were encountered in conducting the economic analysis. The first was learning the terminology and methods of other disciplines. The groups had to reach agreement on the principles to be used for guiding their work. In general, the economists preferred applying microeconomic models to understand how individuals make decisions to maximize perceived personal utility (i.e., “happiness”), whereas the health professionals were more interested in how the macroeconomic system produced environments and incentives that constrain individual decision making.

It became evident that there was a major opportunity to merge the individual utility emphasis of economics with the social utility emphasis of public health professionals. While it is useful and important to recognize that individuals make behavior decisions based on
many factors not related to health, it is equally important that we understand how these individual decisions add up in aggregate, and whether this social direction is desirable in the long run. As individuals and as a society we should be examining our decisions to make sure we are making sound choices that lead us toward our goals, not away from them. Too often, it seems, our individual and social decisions are influenced more by immediate perceived gain rather than the integrated gain over the long term. Perhaps the public health view can add value to classic economic approaches by helping to keep the longer view in mind as we shape policies that influence individual behavior.

The general approach taken by the working groups was to begin with the public health goals, and to evaluate proposed interventions against criteria based primarily on economic principles. Pursuing this strategy in the nutrition and physical activity working groups proved to be a major challenge. The economic forces driving eating behavior are concentrated in the food-related industries and a narrow range of government agencies, but physical activity and sedentary behaviors are related to a highly diverse set of industries and government agencies, many of which do not perceive themselves as relevant to physical activity or as having a “stake” in the obesity issue. Thus, the methods of analyzing economic drivers of behavior were quite different for the working groups. The groups did agree on a common set of economic and noneconomic criteria that could be used to evaluate interventions.

Both groups were challenged to find appropriate data that could be used to identify economic drivers of eating, physical activity, and obesity. Each group used different methods of compiling relevant data. With more time and resources, it would be possible to secure additional data, so other investigators are encouraged to build on the current analysis.

It quickly became apparent that there are complex economic forces underlying eating and physical activity behaviors; that new conceptual models to guide analysis of the economic drivers are needed; that the economic drivers are currently poorly understood, especially for physical activity; and that there was inadequate time for the working groups to propose and evaluate a comprehensive set of economic interventions. The ability of economics to contribute to improved health behavior interventions was found to be so rich and promising that the working groups realized that the economic analysis could not be completed in the time available. Thus, the papers in this supplement should be viewed as a first step in the economic analysis of eating and physical activity and the presentation of conceptual tools to identify and evaluate economic interventions. The present set of papers is a good beginning, but extensive follow-up is needed to integrate economics into a comprehensive approach to improving eating, physical activity, and obesity.

Unanswered questions. Economics and health are both highly valued by people, and it is unclear how individuals and society as a whole will reconcile a situation in which the two seem to be in conflict. Is it possible to maximize short-term happiness and long-term health? Because many industries are making profits on the current eating and physical activity habits of individuals, and poor consumer choices lead to death and disability, there is an apparent conflict between the broader goals of the current free market and the health goals of individuals and society. The present economic analysis was unable to evaluate the implications of this apparent conflict. Perhaps it is time for our society to examine in more detail its goals for the free market, and whether there are ways of allocating resources differently in order to improve social and individual health.

Economists could argue that markets are working well. Most Americans have access to an abundance of food at historically low prices. Technologic advances have eliminated many unpopular jobs involving physical drudgery, and provided more people the opportunity to develop and use their intellects for personal and societal economic advancement. Technologically based options for sedentary entertainment are very popular. But is it true that people are making free and informed choices about physical activity and eating that maximize their happiness? There are strong inborn preferences for sweet and fat tastes. There are genetic and neurochemical mechanisms that influence physical activity. These basic biological drives may be influencing choices that have short-term advantages (i.e., pleasure or utility) but long-term disadvantages (i.e., obesity and chronic diseases).

The existence of the massive weight-loss industry suggests that people are not satisfied with the consequences of their eating and physical activity choices (i.e., their utility is not being maximized). The group developed a number of questions related to this issue that could be explored in more detail.

1. Do markets have mechanisms for adjusting their practices under such circumstances that create unsustainable health burdens on individuals and healthcare cost burdens on society, or is intervention required to adjust the market?
2. As a society, how do we make trade-offs between short-term economic growth and the long-term health of the population?
3. How can business, government, and other sectors collaborate on such decisions?
4. How can the public interest be represented most effectively as decisions are made?
5. Are new structures, processes, or laws needed that consider both economic and health consequences?
6. Who is responsible for unintended consequences of public policies that have contributed to the obesity epidemic?
7. What are the responsibilities of industry for the health consequences of its products and practices?
8. What are the responsibilities of governments for creating policies conducive to unhealthy lifestyles?
9. What level of evidence of negative health consequences of industry practices is needed before change in those practices can be expected, and will consumer behavior support better practices?
10. What is the responsibility of industry to share the costs of negative health consequences?
11. Because laws and regulations affecting multiple industries are likely to affect eating, physical activity, and obesity, how can those health consequences be considered in government decision making?
12. Can “health impact statements” be used to ensure that health consequences of government decision making are taken into consideration?
13. What is a reasonable balance of individual, corporate, and government responsibility, and how is such a decision reached?

These and other related questions need to be debated by ethicists, economists, public health professionals, industry leaders, government administrators, and lawmakers. Lawmakers need sound guidance if they are to make informed decisions that improve public health without creating undue economic hardships on any sector of society.

**Searching for Economic Solutions**

The Partnership to Promote Healthy Eating and Active Living seeks to engage all sectors of society in searching for solutions to some of the most costly and challenging health problems of our time. A major outcome of the economic analysis was the clear demonstration that adding the voice of economics is essential if we are to devise effective and sustainable strategies to improve nutrition, physical activity, and obesity. Economic analyses have the potential to lead to previously imagined intervention strategies and to avoid pursuing what appear to be reasonable strategies that are politically unfeasible or likely to have unintended negative consequences. Economists need to join the already rich mix of disciplines that are seeking to improve understanding of the complex influences on eating and physical activity behaviors and devising promising intervention approaches. We are optimistic that continued economic analyses of eating and physical activity can lead to more effective change strategies for individuals and organizations.

It is important to reiterate that economics does not have all of the answers for how to improve lifestyles. Not even all of the economic experts agree on how to use economics to address obesity and unhealthy lifestyles. However, the economic approaches need to be integrated with other models used in public health to generate innovative solutions for improving eating and physical activity behaviors. The focus on understanding how to maximize both individual and social utility is a more holistic approach than many other models used in public health, since it tries to include all reasons why people and societies make choices, not just those reasons that tie directly to health. For example, focusing on personal utility allows for decisions about what to eat that are influenced by the immediate pleasure obtained from high-fat, high-sugar foods versus the long-term negative impact of these foods on health. Likewise, when looking at short-term social utility, it is not surprising that these individual behaviors are supported by well-developed value chains that produce and distribute these foods widely, at very low cost.

The Partnership is pursuing a strategy of motivating and educating individuals to change while working with the private and public sectors to provide environments and incentives that make it easier for people to make healthful choices regarding eating and physical activity. Economically based strategies will now be added to the range of approaches considered by the Partnership. Participants in the April 2003 forum created a new framework that can be used to identify and evaluate economically based interventions. We hope that the participants and readers of the papers in this supplement to the *American Journal of Preventive Medicine* will build on the promising start of this project.

The Partnership created “America On The Move,” a national initiative aimed at bringing multilevel approaches to motivate positive change in physical activity and eating based on public–private partnerships (www.americaonthemove.org). This project is based on our commitment to engage industries to work with health professionals and other sectors of society to create meaningful changes in community environments, industry practices, and individual behavior that will improve the health of Americans.

Introducing economic principles into the health promotion area can be the first step in creating a more effective transdisciplinary approach to improving lifestyle to deal with obesity. A next challenge is to integrate key concepts and methods from economics with effective strategies for individual, social, and environmental change used in public health, to create hybrid approaches to long-term behavior change.

**Organization of This Supplement**

The papers in this supplement are organized to reflect the format of the April 2003 Forum and the results of the efforts of the two working groups.

John Cawley,

John Cawley,31 describes the economic framework within which both nutrition and physical activity choices are made, and sets forth the implications of
using this framework to create and analyze population-wide interventions.

Roland Sturm references examine the economic forces affecting physical activity and use of leisure time. Michael Pratt et al. evaluate interventions designed to increase physical activity choices. They apply both economic and public health criteria in evaluating their likely effectiveness and feasibility.

Lawrence Frank reviews the economic factors that shape land use and transportation infrastructure decisions, and how the built environment influences physical activity.

Adam Drewnowski examines how costs of foods differ and how cost may influence food consumption. He notes that foods high in energy density tend to be lower in cost and, if lower costs increase consumption, may be one factor that helps explain the higher rates of obesity in low-income groups.

Eric Finkelstein et al. evaluate interventions to promote healthy eating by using criteria developed in this economic analysis.

References
14. Roland Sturm examines the economic forces affecting physical activity.
42. Pratt M, Macera CA, Wang G. Direct medical costs associated with physical activity.