

PREFACE

Preventive nutrition can be defined as dietary practices and interventions directed toward the reduction in disease risk and/or improvement in health outcomes. Preventive nutrition is a critical component of preventive medicine approaches that seeks to prevent disease rather than treat the condition after it manifests clinically. Examples of preventive nutrition include current recommendations to reduce fat and saturated fat intakes for cardiovascular disease prevention, the inclusion of iodine in salt for the prevention of iodine deficiency disease, and the inclusion of certain B vitamins, vitamins A and D, iron, and calcium in staple foods, such as grain products, milk, and cereals, for the prevention of essential nutrient-related deficiencies. These preventive nutrition strategies have been underway as part of public health policy for more than a generation and have been shown to be extremely effective.

Within the past 20 years, further nutrient-based research has demonstrated the potential for essential micronutrients to reduce the risk of many common chronic diseases. Thus, the overall goal of the second edition of *Preventive Nutrition* is to assess and describe the most recent nutritional approaches for promoting health and preventing, delaying, or modifying disease processes, with increasing recognition of the role of nutrition in health promotion and disease risk prevention.

This second edition of *Preventive Nutrition* provides updates of most of the original chapters in the first edition by documenting and reviewing recent advances described in the literature over the last few years. The new research results on dietary components that are not considered to have traditional “nutritional value,” but have been shown to have important health consequences, such as fiber, specific long-chain fatty acids, non-pro vitamin A carotenoids, and other phytochemicals, are placed in perspective with regard to the available knowledge to date.

The first objective of our revised volume is to provide practicing health professionals, including physicians, nutritionists, dentists, pharmacists, dietitians, health educators, policy makers, and research investigators, with the newest research indicating that the risk of many of the major diseases affecting middle-aged adults can be prevented, or at least delayed, with simple nutritional approaches. Many health professionals are asked daily about the new studies with vitamins or other nutrients discussed in their local newspaper or on the evening news. As examples, patients want advice from their health care providers about β -carotene, antioxidants, fiber, and the myriad of bioactive phytochemicals, such as those found in garlic and other foods.

Preventive Nutrition, 2nd edition, like the first, provides answers based on the totality of evidence, rather than on the findings of any single study. Major disease categories are included, such as the leading two causes of mortality in the United States and elsewhere, cardiovascular disease and cancer, as well as such progressively debilitating conditions as diabetes, cataracts, and osteoporosis. The potential of nutrients to affect immunocompetence, which may be an underlying factor in many of the abovementioned and other conditions, is examined.

The second objective is to examine key research linking nutritional status with the prevention of birth defects and optimization of birth outcomes. Recent evidence that micronutrient status can also improve the potential for the health, vision, and intellectual capacity of children is discussed. The need for physicians and nutritional care providers as well as both potential parents to strongly advocate a new paradigm of long-range planning for pregnancy is underscored. Research clearly shows that the preconceptional period, about three months before conception, through the third month of pregnancy is the time when many serious birth defects occur; thus, the old paradigm that women can wait for prenatal care until weeks or months after conception is no longer valid.

A unique feature of this volume is the section that examines the successes, and consequent public health implications, of national preventive nutrition strategies, not only in the United States and Europe, but also in “Westernizing” nations and developing countries. As the demographics of US and European populations change and become more multicultural, it is increasingly important for health professionals to understand the nutritional backgrounds and diversities of their patients. As important, there may be significant national dietary initiatives that provide roadmaps for effective implementation of preventive nutrition within an overall strategy of health improvement, especially for vulnerable members of the population, such as the poor.

The evaluation of the totality of the evidence will be critical in leading to recommendations that can lower risk of disease, morbidity, and mortality and at the same time reduce the burden of health care costs for all. The economic consequences of preventive nutrition cannot be easily overlooked. Based on the annual costs associated with hospitalizations alone, documented in the 1992 National Hospital Discharge Survey, the estimated savings associated with reducing chronic disease risk has been shown to be substantial. For coronary heart disease, the chronic disease responsible for the largest number of hospitalizations per year in the United States, the total for hospitalization charges, excluding physician fees, was approximately \$57.6 billion in 1995 dollars. Using the recent epidemiologic literature examining the reduction in risk of heart disease associated with the highest antioxidant status, it can be estimated that \$22 billion per year could be saved in this disease category alone once preventive nutrition measures were fully implemented (Chapter 9, 1st edition).

The costs associated with hospitalizations resulting from cancer are also substantial. The average annual hospitalization charges for stomach cancer are about \$1 billion; breast cancer costs about \$1.8 billion; for head and neck cancers, which are more rare than the two other cancers discussed, the hospitalization costs are still high, although under \$1 billion per year. It is estimated that hospitalization costs associated with stomach and breast cancer could each be reduced by one-third; head and neck cancers could be halved based on projections that use published estimates of risk reduction associated with the highest intakes of antioxidant micronutrients.

Cardiovascular disease, cancer, and cataracts are examples of chronic diseases with long durations of onset; thus, long-term preventive nutrition strategies are needed. Therefore, the economic benefits that are projected would not be realized in a short period of time, and it may take years before the economic as well as personal and national health benefits can be seen. There are, however, other adverse health conditions that are more acute in time frame, and the economic consequences could be measured in a shorter time period than required for prevention of chronic diseases. For example, the effects of

Table 1
Potential Economic Consequences of Preventive Nutrition

<i>Disease</i>	<i>Reductions based on only hospitalization Costs/yr, \$</i>
Cardiovascular disease	22 billion
Cancer	1 billion
Cardiovascular birth defects	800 million
Low birth weight	500 million
Neural tube birth defects	70 million
Cataract	2 million

preventive nutrition strategies on the hospitalization costs involved in adverse pregnancy outcomes could be documented in a relatively short period of time.

Birth defects are the number one cause of hospitalizations associated with birth-related disorders. Low birth weight accounts for the second largest number of hospitalizations. Birth defects and low birth weight are also the two major causes of infant mortality in the United States. Thus, the potential to reduce both infant morbidity and mortality through nutritional interventions provides a real possibility of verifying the economic and consequent health benefits of relatively short-term dietary changes.

As a specific example, within the past decade, significant research has documented that women who take a folic acid-containing multivitamin daily for at least one month before conception and during their pregnancies have approximately a 50% decrease in neural tube defect (NTD) outcomes (Chapter 15). The expected annual savings associated with lowered NTD-related outcomes is about \$70 million. By far the greatest savings would be seen in the reduction of cardiovascular birth defects, which are the greatest cause of birth-related hospitalizations. Based on intervention and epidemiologic studies, it is estimated that the annual savings could reach \$800 million. In addition to NTD and cardiovascular birth defects, there are also significant reductions in renal defects, cleft lip/palate, and limb reductions seen in women who use multivitamin supplements before and during pregnancy.

Low-birth-weight infants include those from premature births as well as small for gestational age term infants. In both cases, hospitalization costs are projected to be over \$2 billion annually. There are studies that indicate that reduction in iron deficiency anemia, as well as improved zinc and/or folic acid status, can significantly reduce the risk of low-birth-weight pregnancy outcomes (Chapter 17). The estimated hospital-associated savings would be many millions of dollars per year (Table 1).

Economic estimates have not been made for all of the areas covered in the chapters in this book. However, it seems logical that the improvement seen in the immune responses of the elderly who took a multivitamin supplement (Chapter 13) would result in lowered hospitalizations associated with respiratory infections, for instance. Likewise, improved immune status via vitamin A supplementation in children could prevent infection-associated morbidity and mortality (Chapter 14).

It should be realized that many of the nutrient recommendations provided in this volume that appear to be related to one specific health factor or disease in fact “cross over”

Table 2
Dietary Factors Linked to Health Outcome Improvements^a

	<i>Decrease total and/or saturated fat</i>	<i>Increase antioxidants</i>	<i>Increase folic acid</i>	<i>Increase calcium</i>	<i>Increase complex CHO, fiber</i>	<i>Increase Omega-3 fatty acids</i>
Cardiovascular disease	+	+	+	+	+	+
Some cancers	+	+	+	+	+	+
Diabetes	+	+			+	+
Cataract/AMD	+	+				
Obesity	+					
Osteoporosis				+		
Birth outcomes		+	+		+	+
Immune function	+	+	+		+	+

^a += Positive impact on health outcomes.

and appear valid for many of the health areas discussed (Table 2). Importantly, there are many more commonalities in the recommendations provided for disease risk reduction than there are differences. For example, lowering saturated fat intake and increasing antioxidants, fiber, and calcium intake are suggested for reducing cardiovascular and cancer risks and at the same time may lower the risk of osteoporosis and cataracts. Increased intake of folic acid would likely lead to decreases in NTDs as well as cardiovascular disease. Of critical importance, no single recommendation provided in this volume targeted to a single condition will lead to adverse effects in another health area. Thus, overall, the guidelines suggested in the individual chapters have the potential to not only reduce individual morbidity and health care costs, but also to contribute positively to the national health care debate.

As editors, we are very excited about the contents of the second edition. Generally, each chapter is organized to provide an overview of the field, the author's own research, and how those findings fit with the overview. Extensive summary tables and figures illustrate the depth of knowledge in the area and recommendations for various patient groups. There is an extensive index. Also included is a list of journals that specialize in publishing clinical studies in preventive nutrition and a bibliography of recent, relevant books and a list of websites of importance to nutrition topics. By addressing the nutrition questions most often raised, and by examining the issues based on disease as well as age, it is hoped that this volume will serve as the critical resource for health professionals interested in enhancing their ability to utilize nutrition to improve health outcomes of individuals, and assist in the planning of national disease prevention programs for enhancing the health status of populations.

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