NUTRITION AND HEALTH

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Nutritional Health

Strategies for Disease Prevention

Third Edition

Foreword by Joan Sabaté

Humana Press

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To Luciana, my wife, with love.

–Norman

To Jack, my youngest son: I am always sorry to remind you that cookies are not a healthy regular part of a 2-year old's diet.

–Ted

There is Maya and Zeke, there is Carlyle and Max. We dedicate our work to the next generation.

–David

Foreword

Given the choice, everyone would choose to be healthy. Given the choice, everyone would also choose to eat foods they like. Although for many these two options are generally available, these choices are often incompatible. The foods we like, the foods we have eaten since childhood, are not necessarily the foods that lead to health. Given the epidemic of obesity and overweight that is so widespread, health promotion does not appear to be a decisive factor in personal diet choices. Yet the sales of medicines and annual expenditures for surgical procedures indicate that health is a vital concern. Understanding this incongruent situation is a challenge.

The motivation for choosing the foods we eat is complex. Among the factors involved, eating food that is familiar, food that was served to us by our mothers and grandmothers is probably the most compelling. These are the foods we like. Some of us are adventuresome eaters, willing to experiment, and try new foods. This may result in the incorporation of foods we didn't eat at home, but for the most part our diet is centered on the foods we grew up eating. With the advent of fast-food restaurants and microwave ovens in the 1960s, family meals veered away from natural and whole foods. Animal protein became standard fare and fresh fruits and vegetables diminished. The foods we like, the foods we're used to, have changed in the last 50 years, without a comprehension of the implications to our health.

Other factors impact our food choices. Time availability is a primary consideration. It takes less time to eat out than to purchase food, cook it, and serve it. Even many foods that are "cooked" at home are microwaved and include ingredients that we can't pronounce. Budgetary concerns also influence what we eat. Foods that are faster to cook are usually less expensive. We buy foods that can stay on the shelf or in the freezer because they are cost-effective and don't require daily trips to the market. Cooking expertise has become a novelty, something to be admired on reality television. And many foods that are recommended for health aren't readily available at the supermarket. If health concerns factor into our thinking about our meals, they have to compete with many other concerns.

For those consumers who do consider health implications regarding their food choices, the situation is especially challenging. A myriad of food containers display health claims, each slightly different. Television commercials entice us with

messages of reduced weight and added vigor. The blogosphere offers an ever-changing emphasis from the latest study of the effects of food on our health. Those who have been entrusted with formulating our food policy (i.e., the USDA) have the ambivalent charge of protecting the market for subsidized foods, which may not be the most appropriate for health, while at the same time protecting the health of those purchasing the foods. It is not always clear which of these two roles is taking precedence.

The most reliable source of nutrition information and dietary advice that consumers can access is from their health-care professional. It is imperative therefore that those working in health care and the health science fields be properly informed and educated. For that reason, this book, *Nutritional Health*, is an invaluable resource for nutrition research and health. Beginning with a research overview, the book then addresses the role of diet in relation to several chronic diseases—diabetes, obesity, heart disease, and cancer, among others. Chapters on phytochemicals, food synergy, and food supplements are included. These topics are essential for health-care professionals and for students working towards careers in this area.

However, *Nutritional Health: Strategies for Disease Prevention*, now in its third edition, goes beyond most reference books connecting nutrition with health. Food policies, official nutrition messages, and their relationship to the food industry are also addressed. Food choices have economic, political, social, and environmental consequences that could place improvements to the health of individuals or populations in conflict with other considerations. This treatise offers a comprehensive, integrated review of the scientific knowledge connecting diet and health, and presents some needed food policy strategies to address the current epidemic of chronic degenerative diseases.

Loma Linda, CA, USA

Joan Sabaté

Series Editor Introduction

The great success of the Nutrition and Health Series is the result of the consistent overriding mission of providing health professionals with texts that are essential because each includes (1) a synthesis of the state of the science, (2) timely, in-depth reviews by the leading researchers in their respective fields, (3) extensive, up-to-date fully annotated reference lists, (4) a detailed index, (5) relevant tables and figures, (6) identification of paradigm shifts and the consequences, (7) virtually no overlap of information between chapters, but targeted, inter-chapter referrals, (8) suggestions of areas for future research and (9) balanced, data-driven answers to patient as well as health professionals questions which are based upon the totality of evidence rather than the findings of any single study.

The Series volumes are not the outcome of a symposium. Rather, each editor has the potential to examine a chosen area with a broad perspective, both in subject matter as well as in the choice of chapter authors. The editor(s), whose training(s) is (are) both research and practice oriented, have the opportunity to develop a primary objective for their book, define the scope and focus, and then invite the leading authorities to be part of their initiative. The authors are encouraged to provide an overview of the field, discuss their own research and relate the research findings to potential human health consequences. Because each book is developed *de novo*, the chapters are coordinated so that the resulting volume imparts greater knowledge than the sum of the information contained in the individual chapters.

Nutritional Health: Strategies for Disease Prevention, Third Edition, edited by Norman J. Temple, Ph.D., Ted Wilson, Ph.D., and David R. Jacobs, Jr., Ph.D. clearly exemplifies the goals of the Nutrition and Health Series. The major objective of this comprehensive volume is to review the growing evidence of the importance of nutrition-related decisions at all stages of life to healthful living.

Nutritional Health, again in this third edition, provides the reader with a comprehensive compilation of the newest data on the ways to conduct nutrition research as well as the many challenges associated with clinical research. It is to the credit of Drs. Temple, Wilson, and Jacobs that they have organized this volume so that it provides an in-depth overview of the role of diet and dietary components in chronic disease prevention; the importance of public health actions, regulatory decisions,

and academic research in assuring the safety and efficacy of claims made on foods and dietary supplements.

The volume is organized into 26 comprehensive chapters. The Third Edition contains five completely new chapters, in-depth updates of all chapters from the Second Edition, and several chapters have new authors who provide their perspectives in many areas of nutrition research. The first five chapters include reviews of nutrition research methodologies, beginning with cell culture studies and continuing to clinical research including all aspects of epidemiological research. The recent methods used to develop meta-analyses and systematic reviews are discussed in detail. There is a new chapter on eating disorders that contains important definitions and explanations of anorexia, binge eating, pica, and bulimia and provides information about treatment strategies. There is an updated chapter by Dr. David Barker on recent findings concerning the Barker hypothesis that emphasizes the critical importance of fetal growth and weight gain in the first year of life in predicting diseases in middle age. Dr. Barry Popkin's chapter on the nutrition transition provides an excellent global perspective of how dietary changes affect the health of emerging nations.

Ten chapters are devoted to examining medical nutrition modalities used in the care of patients with diabetes (Types I and II, as well as gestational diabetes), obesity, cardiovascular disease, hypertension, and cancer. Specific sources of bioactive food components such as *n*-3 polyunsaturated fatty acids, fiber, garlic, carotenoids, phenolics, and foods with low glycemic indices are discussed in detail. Similarly, food components that can adversely affect chronic diseases are also reviewed including *trans* fats, saturated fats, sugar, animal protein, and food contaminants. The importance of physical activity in addition to healthful eating is also discussed in several chapters.

Four chapters are devoted to examining dietary patterns and whole foods and food groups. Alcoholic and nonalcoholic beverages each have their own chapter. The alcohol chapter includes reviews of benefits as well as risks including fetal alcohol syndrome. Included in the nonalcoholic beverage chapter are discussions of water, green tea, coffee, milk, fruit juices, sports drinks, weight loss drinks, and energy drinks. Dr. Ted Wilson, author of this chapter, has coedited an entire well-referenced volume in the "Nutrition and Health" Series entitled "Beverages in Health and Disease."

Seven chapters examine the role of governments and public health issues in the development of national food policies. The major food and dietary supplement companies introduce hundreds of new products into the global marketplace annually and the decision-making process in new product development, label development, and new claims development is explored in several chapters. Important, up-to-date information on the newest sugar, fat, and salt substitutes as well as novel sources of fiber is reviewed.

The final three chapters examine cutting edge topics that are critical to the understanding of the complexity of nutrition research. In one chapter, there is an insightful examination of the importance of biotechnology for the enhancement of food production including genetic modifications for disease and drought resistance. The chapter on nutritional anthropology looks at cultural patterns and societal norms

and taboos with relation to food included in diets and compares culturally related eating behaviors to biological requirements for consumption of sources of essential nutrients. The final chapter, written by the volume's editors, outlines nutritional strategies available currently and proposes new strategic global nutrition strategies to reduce overeating and improve overall nutrient density of foods consumed.

The logical sequence of chapters enhances the understanding of the latest information on the current standards of practice for clinicians, related health professionals including the dietician, nurse, pharmacist, physical therapist, behaviorist, psychologist, and others involved in the team effort required for successful treatment of cardiovascular and other relevant diseases as well as conditions that adversely affect normal metabolic processes. This comprehensive volume also has great value for academicians involved in the education of graduate students and postdoctoral fellows, medical students, and allied health professionals who plan to interact with patients whose health is affected by their diet. Of great importance, the editors have provided chapters that balance the most technical information with discussions of its importance for clients and patients as well as graduate and medical students, health professionals, and academicians.

The volume contains 74 detailed tables and figures that assist the reader in comprehending the complexities of the biological significance of nutritional strategies for human health. The overriding goal of this volume is to provide the health professional with balanced documentation and awareness of the newest research and therapeutic approaches including an appreciation of the complexity of this relatively new field of investigation. Hallmarks of the 26 chapters include key words and bulleted key points at the beginning of each chapter, complete definitions of terms with the abbreviations fully defined for the reader, and consistent use of terms between chapters. There are over 1,900 up-to-date references; all chapters include a conclusion to highlight major findings. The volume also contains a highly annotated index.

This unique text provides practical, data-driven resources based upon the totality of the evidence to help the reader understand the basics, treatments, and preventive strategies that are involved in the understanding of the role nutrition interventions may play in healthy individuals as well as those with cardiovascular disease, diabetes, or neurocognitive declines. The overarching goal of the editors is to provide fully referenced information to health professionals, so they may have a balanced perspective on the value of various preventive and treatment options that are available today as well as in the foreseeable future.

In conclusion, *Nutritional Health: Strategies for Disease Prevention*, Third Edition, edited by Norman J. Temple, Ph.D., Ted Wilson, Ph.D., and David R. Jacobs, Jr., Ph.D. provides health professionals in many areas of research and practice with the most up-to-date, well referenced and comprehensive volume on our current understanding of the nutritional sciences. This volume will serve the reader as the most authoritative resource in the field to date and is a very welcome addition to the Nutrition and Health Series.

Adrianne Bendich, PhD., FACN
Series Editor

Preface

The first edition of *Nutritional Health* was published in 2001, and the second edition in 2006. During this first decade of the twenty-first century much water has flown under the bridge of the advancing river that is nutrition research and practice. At the same time huge numbers of new foods are continually appearing in supermarkets, while hundreds of new “breakthrough” diet and health books are published every year. With these large accumulations of developments in the field of nutrition, the need for a new edition of this book is obvious.

During the last century of nutritional advancement, we have frequently been faced with great opportunities that were brilliantly disguised as insoluble problems. Perhaps we are biased but in our eyes problems associated with nutrition are among the most exciting of those in the life sciences. How many other branches of the life sciences offer the promise of slashing the burden of human disease by one third or more?

With a scattering of brilliant exceptions until the 1970s few gave serious consideration to the notion that our diet plays an important role in such chronic diseases as heart disease and cancer. Today, we have a vastly greater understanding of the role of diet in disease; we know, for example, how meat affects colon cancer, how fish fats affect heart disease, and how vitamin D affects osteoporosis. Now, in the early years of the twenty-first century, our vastly improved nutrition knowledge gives us the capability of preventing a sizable fraction of the chronic diseases that afflict the people of our world, but only if we can fully inform its populace about these discoveries.

Ironically, despite overwhelming evidence that nutrition has such enormous potential to improve human well-being—at modest cost and using the knowledge we already have—it still fails to receive the resources it merits. Growth in funding for nutrition research and education remains stunted. By contrast, countless millions of dollars are spent on the glamor areas of biomedical research, such as genetic engineering and gene therapy. But we already know that our genes can only explain a fraction of our disease burden. Even if gene therapy reaches its full potential, it seems most improbable that it will ever achieve a quarter of what nutrition can do for us today.

In the words of Confucius: “The essence of knowledge is that, having acquired it, one must apply it.” But a major barrier is that nutrition information often fails to reach the health professionals who most need to apply it, namely the physicians, dietitians, and nurses who represent the front-line workers in health care. How do we bring this information to others who also need this information, such as the nutrition professors who lack the time to read more than a tiny portion of the literature outside of their main area of interest?

Nutritional Health endeavors to address the needs of those who would most benefit from up-to-date information on recent advances in the field of nutrition. Accordingly, our book contains a series of chapters by experts in a diverse range of nutritional areas. Our aim is not so much to cover all the leading edges of nutrition but rather to discuss recent thinking and discoveries that have the greatest capacity to improve human health and nutritional implementation.

Some readers may disagree with some of the opinions presented, but in nutrition differences of opinion are often unavoidable. Owing to the constant changes in our diet, nutrition is by nature in constant dynamic flow, as are our opinions of what constitutes the best nutritional habits. The views expressed in *Nutritional Health* are in many cases particular interpretations by the authors of each chapter on their areas of specialization.

Athabasca, AB, Canada
Winona, MN, USA
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Norman J. Temple
Ted Wilson
David R. Jacobs, Jr.

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