

MEETING THE NEEDS OF THE FUTURE  
IN DIET AND HEALTH RESEARCH

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In November 1985, the National Academy of Sciences signed a three year contract for approximately two million dollars to establish a Committee on Diet and Health as part of the Food and Nutrition Board.

An initial charge to the Committee was the development of criteria for evaluating the evidence linking diet to health maintenance and reduction of risk of chronic diseases. The Committee was also asked to attempt to formulate dietary guidelines for reducing the risk of chronic diseases, propose strategies for implementing these guidelines and identify areas for further research.

Concurrent with this activity of the National Academy of Sciences, the International Life Sciences Institute - Nutrition Foundation (ILSI-NF) planned a symposium, scheduled for October of 1986, entitled "Diet and Health: Concepts and Principles". The ILSI-NF symposium will review contemporary dietary patterns and health status with the intent of defining a series of dietary recommendations that can be translated into food selections while maximizing health status.

Many of you are aware of a recent request for proposal (RFP) issued June 17 by the USDA, to study factors affecting dietary status as measured in the continuing survey of food intake of individuals (CSF II-85). The scope of effort identified by this RFP includes personal, demographic and household factors that affect the intake of foods, food groups and nutrients that may in turn determine associated health-related factors.

The proposal allows for study of methodological factors that affect measurement of dietary status. These include techniques for dietary surveys and the influence of eating patterns on nutrient intake.

In reflecting upon my assignment for today, it became evident that I was to accomplish in 30 minutes what one committee will take three years to accomplish, what one international symposium will attempt to achieve in three days and what the USDA will do with contracts totalling \$600,000 in 18 months.

Dietary standards have evolved over the past 235 years from the reports by Lind in 1753 on the prevention of scurvy with citrus fruit through standards set during World Wars I and II for feeding members of the armed forces and other nationals. The Recommended Dietary Allowances or RDA's established by the Food and Nutrition Board in 1943 were intended as a "guide for planning and procuring food supplies for national defense". By 1980 the RDA represented an effort to define levels of intake of essential nutrients adequate to meet the nutritional needs of practically all health persons.

While the 1985 Committee on Dietary Allowances was able to reach agreement on the RDA's to be proposed for the Tenth Edition of this publication, this report was not accepted by the Food and Nutrition Board or the National Research Council (2). Failure to define the concept of "requirement for what" was partially responsible for lack of agreement among these groups. It is obvious that interpretations of dietary intake

data in relation to estimated requirements required consideration of the particular biochemical, physical, clinical or functional criteria used to establish requirement.

In 1958, Dr. Charles May upon acceptance of The Borden Award from the American Academy of Pediatrics addressed the question of optimal nutrition (3). He posed the question of: "Do we seek the best diet for material achievement - through maximal growth (size), freedom from disease (health), postponement of death (longevity), fitness for work and war (strength and endurance), survival (reproduction)? Or do we have more concern for the relation of diet to cultural achievement - through function of the mind (thought), behavior (social relations), emotional well being (happiness)?"

Dr. May suggested that "the preoccupations of scientific nutritionists at any one time may be directed as much by the limitations of available techniques as by current concepts or attitudes."

The elusive nature of optimal nutrition remains undefined, 30 years after Dr. May's provocative challenge. There are those in society who opt for freedom from disease, those who desire fitness, those concerned with neurobehavior and others seeking happiness. The number of books on Diet and Nutrition that promise means for achieving the various goals of health, longevity, happiness or endurance attest to the fact that the state of optimal nutrition continues to elude us in spite of an exploding data base that has identified additional essential nutrients (selenium, chromium, vanadium), improved food composition tables, computers capable of handling large informational loads, new analytical approaches (HPLC, radioimmunoassays) and improved techniques for epidemiologic and genetic studies.

Advances in biotechnology that will result in genetically altered plant and animal products for human use will make our current food composition nutrient data base obsolete. In a recent supplement to the Journal of Animal Science entitled An Assessment of The Role of Meat in Diet/Health Issues, Dr. Guarth Hansen of Utah State University cautioned about seeking simple solutions to complex health problems (4). Hansen is concerned that in so doing, nutritional misconceptions threaten to undermine the improved health we have only recently gained.

A recent symposium organized in part by ILSI-NF on the relationship of dietary energy and fat intake to cancer emphasized the complexity of drawing conclusions about the relationship of dietary fat intake to incidence of breast cancer (5). Most if not all epidemiological studies have failed to consider the effect of total energy intake on body size, obesity, the dietary source of energy i.e. calories from fat, carbohydrates or protein, the fatty acid composition of ingested fat, polyunsaturated versus saturated fats or the role of body fat stores in controlling the production of hormones such as estrogen. Dr. William DeWys of NCI addressed some of these issues in a recent overview of cancer risk factors of dietary origin (6).

More emphasis needs to be placed upon total diet composition rather than individual foods in our efforts to resolve diet-related disease problems and risk statements relating diet to health must be based upon

unbiased evaluation of the scientific facts.

The subcommittee on Criteria for Dietary Evaluation of the Coordinating Committee on Evaluation of Food Consumption Surveys recently recommended the development of nutrient requirements based on multiple criteria of adequacy (7). For a given nutrient, one might focus on the intake adequate to prevent clinical deficiency, to maintain functional integrity of metabolic systems or to maintain tissue stores. Such definitions would permit multitiered population assessments. In many respects this resembles the efforts to define optimal nutrition as described by May 30 years ago.

Each of us is acutely aware of the increasing complexity of our food supply. The limited number of processed and fresh foods available at the turn of the century has been multiplied many fold so that today's consumer selects from a variety of foodstuffs presented in a variety of processed forms. To further compound the problem more meals are being eaten out of home i.e. within the work place, the school system, in restaurants whether fast food or conventional. We need accurate food composition tables that are commensurate with the wide variety of foods eaten so that nutrient intake can be adequately assessed.

Specifically we need to improve our analytical methods for quantification of vitamin A, carotenoids, vitamin B<sub>12</sub>, vitamin C and folacin in foods. These nutrients have been implicated in major public health problems such as cancer and anemia. Unless the nutrient data base is accurate little purpose is served by attempts to relate dietary intake of these nutrients to health status.

Major environmental variables that influence nutrient requirements need further study. One such example is the importance of sunlight exposure in the determination of vitamin D requirement.

On the down side of compounds in foods it seems desirable to list those substances such as heavy metals that are known to affect human health. Thirty years ago federal and state agencies were concerned about the health effects of radionuclides in contaminating our food and water supply as the result of atmospheric testing of nuclear devices. Elaborate monitoring systems were in place so that appropriate counter measures could be undertaken (8). The recent experiences in Chernobyl has triggered this system again.

It is reassuring to note that if the nutrient data base contains accurate information on food composition an increase in the number of foods included in the diet record can be shown to decrease the relative variance of total intake estimate (7).

It is sobering to reflect on a report by Kent Stewart who examined the 42 USDA Food Categories and classified them according to the percent of foods in their respective categories for which substantial analytical data exist. Total protein content in a substantial number of foods was known for 82 per cent of the 42 food categories (9). For calcium, iron, zinc, magnesium, sodium, potassium, phosphorous, and cholesterol, these values ranged from 40 to 46 per cent.

Knowledge of copper and fatty acid content was limited to 34 to 37 per cent of the 42 food categories and vitamin A and B<sub>6</sub> content a mere 20 to 27 per cent.

Efforts to relate diet to health will be hampered as long as there is:

- \* A substantial number of foods for which nutrient values are missing.
- \* A lack of inexpensive and rapid analytical methods to measure certain key nutrients such as vitamin A, carotenoids, folacin and vitamin C that appear related to public health problems.
- \* An inability to agree on a definition of "requirements for what" or optimal nutrition.
- \* A food supply that is increasing in complexity that includes changes in processing, packaging and genetic alterations.
- \* Failure to increase understanding of the potential for nutrient-nutrient interaction that may influence nutrient bioavailability or requirement.
- \* Failure to appreciate the need for assessment of total diet rather than specific nutrient effects.
- \* Continuing changes in eating patterns.
- \* An attempt to resolve the interaction of diet to health on the basis of consensus rather than the scientific process.

It will require an investment of monies on the part of federal and state governments, the private sector and academia, to meet the needs of the future in diet and health research.

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