

Chapter I

OVERVIEW



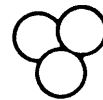
vitamins



fats



minerals



carbohydrates



proteins

OVERVIEW

Modern nutrition science dates from the turn of the century when vitamins were first discovered. Since that time, nearly all elements in foods essential for health have been identified—vitamins, amino acids, minerals, and fatty acids. Indeed, a patient can be maintained for a long period by intravenous feeding with a purified diet that contains the known necessary nutrients. This indicates that few essential nutrients remain to be found.

Early nutrition research was spurred by the finding that many severe diseases such as rickets, pellagra, beriberi, and scurvy were caused by vitamin deficiencies. These nutrition deficiency diseases were practically eliminated in the United States by the 1940's as a result of better nutritional knowledge, food enrichment, agricultural advances, and socioeconomic changes. Consequently, a belief spread among scientists that little of practical importance for the United States would result from further research in human nutrition. Attention was instead shifted increasingly to the biochemical functions of essential nutrients and infant and childhood malnutrition in developing nations.

Over the past 50 years, the basic goal of nutrition strategy in the United States has been to ensure an adequate intake of all essential nutrients for the population. Nutritional advice to the public has consistently stressed a balanced diet that provides necessary protein, minerals, and vitamins. This strategy has been largely successful. However, it was developed and carried out with little understanding of the long-term effects of the abundant diet currently consumed by the majority of Americans.

Studies during the past decade have indicated that overconsumption of food and relative overconsumption of certain kinds of food are important contributing factors in heart disease, stroke, hypertension, cancer, diabetes, osteoporosis, and dental disease. Increased research into the role of diet in causing and preventing such major chronic diseases may lead to findings which could reduce their incidence or delay their onset.

These diet-related diseases take a heavy toll in the United States. For example, cardiovascular disease, diabetes, and hyperten-

sion share the common risk factor of obesity, which is caused by overeating and lack of exercise. About 30 percent of men and 40 percent of women in the United States between the ages of 40 and 49 are overweight. Many are technically "obese"—more than 20 percent above desirable weight. This fact is reflected in disease statistics. Some 23 million Americans suffer from hypertension and 10 million from diabetes. Diabetics are twice as prone to heart disease and stroke. Every year, 850,000 Americans suffer fatal heart attacks.

Five of the leading causes of death are believed to be diet-related. These are heart disease, cancer, stroke, diabetes, and cirrhosis of the liver. The mortality statistics for these diseases are shown in table 2. The impact of chronic diseases extends beyond the obvious mortality figures. Chronic diseases account for many days of work lost, major hospitalization costs, and personal suffering because of activity limitation.

The links between diet and these diseases are based on epidemiological studies, and

Table 2.—Death Rates Per 100,000 Population for Leading Causes, by Sex and Age: 1974
(Excludes deaths of nonresidents of the United States)

Sex and age group (in years)	Heart disease	Cancer	Stroke	Accidents	Pneumonia ^a	Homicide	Suicide	Diabetes	Cirrhosis of liver	Emphysema
Male	400	191	87.8	71.1	28.9	16.3	18.1	14.7	21.2	15.3
15-24	3	8	1.5	99.1	1.9	22.1	17.1	0.5	0.5	0.1
25-44	44	29	7.7	69.6	4.8	29.5	23.1	3.2	13.7	0.5
45-64	591	338	73.1	71.0	24.9	16.9	28.2	20.8	60.9	18.4
65 and over ..	3,081	1,293	810.7	144.2	233.7	8.9	36.7	110.4	61.9	131.8
Female	301	151	107.9	29.0	23.0	4.4	6.5	20.5	10.6	3.8
15-24	2	5	1.3	23.9	1.5	6.3	4.6	0.6	0.3	0
25-44	15	35	7.9	17.4	3.1	7.0	9.5	2.7	7.4	0.2
45-64	195	261	56.2	24.9	12.5	3.7	11.8	20.3	28.8	5.7
65 and over ..	2,159	723	791.8	94.6	150.7	3.2	7.3	130.1	22.7	21.4

^aIncludes influenza.

Source. U.S. National Center for Health Statistics, *Vital Statistics of the United States*, annual

direct cause-and-effect relationships have not been established. It is therefore impossible to estimate the economic benefits to be derived from funding research in this area. This does not imply that attention should not be directed to this research. Clearly, reducing the incidence and severity of these diseases or preventing the early expression of them would reap large economic and social benefits.

There is evidence that nutrition research can make an impact on chronic diseases. Intensive studies on the relationship of diet to heart disease, the greatest cause of death in the United States, have yielded results. As the connections have become clearer, at least 16 national and international groups have developed similar dietary recommendations to combat cardiovascular disease. With varying degrees of emphasis, these recommendations have urged reduced intake of cholesterol and fats, especially saturated animal fats. In addition, they have stressed weight control, more physical activity, and a halt to smoking.

These recommendations, widely and repeatedly publicized, have had an impact on Americans. Recent reports indicate that while the age adjusted mortality rate from coronary heart disease rose 19 percent between 1950 and 1963, the rate has declined more than 20 percent during the past

decade. The causes of this favorable trend are not conclusively known, but better nutrition education, changes in formulation of processed food, and changing eating habits appear to have played an important role. The statistics are consistent with reported per capita reductions in the consumption of saturated animal fats and cholesterol, increases in the consumption of vegetable oils, alterations of the ratio of polyunsaturated to saturated fats in the diet, a decrease in smoking, and the attention of many Americans to exercise. These shifts belie the widespread assumption that it is impossible to change American habits, including eating habits, for the better. They also indicate that a major chronic disease can be combated by modifying dietary behavior.

These findings are significant to future nutrition research in light of growing epidemiological evidence linking diet to other chronic and degenerative diseases such as cancer, diabetes, hypertension, and osteoporosis. There has been little direct research, however, into the dietary factors involved in these diseases. Specific aspects of diet that contribute to physical or biochemical changes leading to the onset of such diseases are still unknown. Current knowledge is now at the point where knowledge of diet and heart disease was in the late 1950's, when intense research began to establish the relationship. Possibly the most

productive and important area of nutrition research will be the identification of specific dietary links to other chronic diseases. Such research will inevitably require the development of new techniques and approaches.

There are other areas where more nutrition research is needed. While severe malnutrition is now relatively rare in the United States, moderate degrees of iron deficiency, folic acid deficiency, and possibly other deficiencies remain relatively common. For a variety of social, economic, or physiological reasons, some groups in the population are particularly prone to nutritional deficiencies. These groups include the poor, the elderly, pregnant women, alcoholics, and

patients with chronic diseases or special metabolic problems of genetic origin.

The identification of all or nearly all of the essential nutrients has opened up new areas of clinical patient care. The development of purified diets allows complete nutrition by intravenous feeding. Diets can now be tailored to meet the needs of a wide variety of patients. It is clear that many patients—those with chronic disease, trauma, genetic defects, and others—have not received adequate nutrition in the past. Since developments in this field are still in their infancy, further research support will be needed to ensure continued improvements in patient care.

WHAT RESEARCH CANNOT DO TO SOLVE NUTRITION PROBLEMS

Increased nutrition research can help solve some of the nutrition problems of American society. Research, however, cannot solve all such problems. Some of our most pressing needs involve the application of existing knowledge rather than the search for new knowledge. If it is unclear how to make use of existing knowledge, research indeed can help. If both the knowledge and means are available but are not

utilized, the failure may lie in the inadequate design and administration of public nutrition education and food programs. People may fail to respond to existing programs. They may be confused by the profusion of sometimes contradictory recommendations and urgings from various experts and authorities. It is the Government's challenge to remedy such problems and reach people with needed nutrition services,