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The American Diet: A Costly Health Problem

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Scientific evidence increasingly suggests that diet plays an important role in the onset of chronic diseases—contributing to increased illnesses, reduced quality of life, and premature death. Although there is still much that scientists do not know about how diet affects health, there is significant agreement on the components of a healthy diet. In particular, diets high in calories, fat, saturated fat, cholesterol, and salt, and low in fiber-containing foods (such as fruit, vegetables, and whole grain products) are associated with increased risk for coronary heart disease, certain types of cancer, stroke, and diabetes. Diet also plays a role in other health conditions, such as overweight, hypertension, and osteoporosis. And, new research suggests that low intake of folic acid is associated with increased risk of certain birth defects, heart disease, and stroke.

Taken together, these health conditions cost society an estimated \$250 billion each year in medical charges and lost productivity. The extent to which these costs might be reduced by an improved diet cannot be calculated precisely, but some researchers estimate that proper diet might forestall at least 20 percent of

the annual deaths from heart disease, cancer, stroke, and diabetes.

Poor Diets Associated With Leading Causes of Death. . .

Of the 10 leading causes of death in the United States, 4—including the top 3—are associated with diets that are too high in calories, fat, saturated fat, cholesterol, and sodium, or too low in fiber-containing foods. These conditions—coronary heart disease, cancer, stroke, and diabetes—account for over half (53.5 percent) of the deaths occurring each year in the United States (table 1).

Coronary heart disease

Coronary heart disease (CHD)—the type of heart disease commonly associated with diet and which accounts for approximately two-thirds of all deaths from heart disease—caused over 480,000 deaths in 1995, second only to cancer. The American Heart Association estimates there are about 1.5 million heart attacks annually, and that CHD costs the United States \$56.3 billion each year (\$48.3 billion in direct health care costs and \$8 billion in lost productivity) (table 2). The major risk factors for CHD which can be modified by an individual are high blood cholesterol levels, hypertension, ciga-

rette smoking, and physical inactivity. Diet—especially intake of saturated fat and cholesterol—can influence blood cholesterol levels in some people, as well as influence other risk factors for CHD, such as obesity and diabetes. In addition, new research suggests that low intake of folic acid—found in many fruits, vegetables, and legumes, as well as in fortified cereals—may increase the risk for heart disease and stroke in adults.

Cancer

Over 500,000 people died of cancer in the United States in 1995—averaging nearly one person every minute. Over 1 million new cases of cancer are diagnosed each year. The American Cancer Society estimates that overall costs for cancer amount to \$104 billion each year, with \$35 billion in direct medical charges, \$12 billion due to lost productivity associated with illness, and \$57 billion due to lost productivity associated with premature death. Diets high in fat and low in fiber-containing foods are associated with increased risk of certain types of cancer. Some researchers estimate that about one-third of all cancer deaths could be prevented through dietary changes alone.

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Table 1
Four of the Top 10 Causes of Death in the United States Are Diet-Related

Disease	Number of deaths
*Heart disease ¹	738,781
*Cancer	537,969
*Stroke	158,061
Chronic obstructive pulmonary diseases	104,756
Accidents and adverse effects	89,703
Pneumonia and influenza	83,528
*Diabetes	59,085
HIV infections	42,506
Suicide	30,893
Chronic liver disease and cirrhosis	24,848
Other causes	442,073
All causes	2,312,203

Note: *Diet-related diseases. ¹Coronary heart disease, the type of heart disease commonly associated with diet, was responsible for 482,185 deaths in 1995, nearly two-thirds of the deaths from heart disease. Source: Preliminary estimates from Rosenberg, Harry M., Stephanie J. Ventura, Jeffrey D. Maurer, Robert L. Heuser, and MaryAnne Freedman. "Births and Deaths: United States, 1995," *Monthly Vital Statistics Report*, Vol. 45, No. 3, suppl. 2, Hyattsville, MD: National Center for Health Statistics, Oct. 4, 1996.

Stroke

Strokes affect over 500,000 people each year and killed over 150,000 people in 1995. According to the American Heart Association, stroke is the leading cause of serious disability, and accounts for half of all patients hospitalized for acute neurological disease. More than 3 million people in the United States suffer from stroke-related disabilities, at an annual cost of \$19.7 billion (\$16.9 billion in direct medical costs and \$2.8 billion in lost productivity). Risk factors include a diet high in saturated fat and cholesterol, as well as obesity, diabetes, and hypertension. Some of the observed 57-percent reduction in mortality rates from stroke in the past two decades is likely associated with improvements in the detection and treatment of hypertension (see below).

Diabetes

Diabetes killed nearly 60,000 people in 1995, and is estimated to contribute to an additional 300,000 deaths each year. Diabetes is the single leading cause of kidney disease, and a risk factor for coronary heart disease and stroke. It is also the leading cause of blindness, can cause nerve damage and result in amputations, and can cause birth defects in babies born to diabetic women. Diabetes affects 13-14 million people in the United States, half of whom are not even aware they have it. There are two types of diabetes. Type I, also called insulin-dependent or juvenile-onset diabetes, is characterized by an absolute deficiency of insulin, usually appears well before age 40, and is not diet-related. Type II diabetes, or noninsulin-dependent or adult-onset diabetes, appears in midlife, most often among overweight or obese adults, and can often be controlled by diet

and exercise. Of the estimated 7.2 million diagnosed cases of diabetes, 90-95 percent are Type II (undiagnosed cases are likely to be Type II, since the severity of Type I symptoms is likely to lead an individual to a doctor and thus a diagnosis). The total economic costs of diabetes—including direct medical costs and the indirect costs of lost productivity associated with illness and premature death—are estimated at more than \$40 billion annually. The maintenance of desirable body weight is the most effective intervention known in the prevention of noninsulin-dependent diabetes. About 80 percent of people with Type II diabetes are overweight, and it is estimated that half of Type II diabetes cases can be prevented by controlling obesity.

... And With Other Health Conditions

Diet also influences other health conditions that, although not listed as a primary cause of death, contribute to premature mortality or reduce the quality of life—in particular, overweight, hypertension, and osteoporosis. New research also suggests that many cases of neural tube birth defects could potentially be prevented by increased intake of folic acid among women of child-bearing age, and that some of the memory loss and confusion associated with aging may stem from small vitamin deficiencies and poor nutrition. Similarly, preliminary studies suggest a role for antioxidants in the prevention of cataracts and senile degeneration of the retina (the leading cause of blindness in the elderly).

Overweight is associated with elevated blood cholesterol levels, high blood pressure, and noninsulin-dependent diabetes. It also increases

the risk for some types of cancer and is an independent risk factor for CHD. Recent studies also show that being overweight increases the risk of premature death. Despite growing consumer interest in weight-loss programs, two recent national surveys estimate that one-third of the American population is overweight—up from 25 percent just a decade ago. Among the factors within an individual’s control, being overweight is associated with low activity level, excessive intake of calories, and/or high intake of fat.

Hypertension, or high blood pressure, is a common and important risk factor for CHD, stroke, and renal disease, affecting as many as 50 million people over age 6 in the United States. The American Heart

Association estimates that more than 33,000 Americans died from high blood pressure in 1991 (58 percent of them women), and that high blood pressure contributed to thousands of additional deaths from other causes. Hypertensive disease costs an estimated \$14.9 billion each year in direct medical care charges (with drug costs estimated at about \$3.6 billion per year), and \$2.5 billion in lost productivity. Age-related increases in blood pressure—as occurs in the United States—are associated with excessive weight and physical inactivity, high sodium and alcohol intakes, and low potassium intake. Although not all people are equally susceptible to the effects of sodium, a low sodium intake might prevent blood pressure from increasing with

age. Improvements in the detection, treatment, and control of hypertension are believed to have contributed substantially to the decline in mortality rates from stroke and coronary heart disease in the past two decades.

Osteoporosis affects some 25 million people in the United States—including over half of all women over age 50 and one-third of all men by age 75. Osteoporosis is responsible for 1.5 million bone fractures a year, mostly at the wrist, spine, and hip. Hip fractures alone are estimated to cost \$10 billion in medical costs each year. However, this figure does not include productivity losses (see “Osteoporosis-Related Hip Fractures Cost \$13 Billion to \$18 Billion Yearly,” elsewhere in this issue). Low intake of calcium and inadequate physical activity appear to be important risk factors. Recent research suggests that 30-60 percent of fractures in individuals 65 and older could be prevented through improved calcium intake.

Neural tube defects (NTD) occur in approximately 2,500 births each year in the United States as a result of the neural tube failing to close during the first month of pregnancy. Many of these babies are born without a brain (anencephaly) and die shortly after birth; others are born with an exposed spinal cord (spina bifida), and survive, but are handicapped as a result of damage to the exposed spinal cord and many die before adulthood. Medical costs and productivity losses are estimated at over \$900 million each year. The Public Health Service estimates that nearly half of all NTD births could be prevented if all women of child-bearing age consumed 400 micrograms of folic acid a day—a significant increase from the average of 222 micrograms consumed daily from food sources by females age 12 and older according to USDA’s 1989-91 food consumption surveys.

Table 2
Costs Associated With Major Diet-Related Health Conditions Add Up

Diet-related health conditions	Annual cost ¹	Medical costs	Lost output
	<i>Million dollars</i>		
Coronary heart disease	56,300	48,300	8,000
Cancer	104,000	35,000	69,000
Stroke	19,700	16,900	2,800
Diabetes	40,000	NA	NA
Obesity	2,400	NA	NA
Hypertension	17,400	14,900	2,500
Osteoporosis	10,000	NA	NA
Neural tube defects	900	NA	NA
Total	250,700	NA	NA

Notes: NA = Not available. ¹In most cases this includes direct health care costs and lost productivity resulting from disability. Sources: For coronary heart disease, stroke, and hypertension: American Heart Association, *Heart and Stroke Facts: 1994 Statistical Supplement*, Dallas, Texas, 1993. For cancer: Brown, Martin L., “The National Economic Burden of Cancer: An Update,” Special Report, *Journal of the National Cancer Institute*, Vol. 82, No. 23, pp. 1811-14, Dec. 5, 1990. For diabetes: American Diabetes Association, *Diabetes 1993 Vital Statistics*, Alexandria, VA, 1993. For obesity: Colditz, Graham A., “Economic Costs of Obesity,” *American Journal of Clinical Nutrition*, Vol. 55, pp. 503S-507S, 1992. For osteoporosis: National Osteoporosis Foundation, “Fast Facts on Osteoporosis,” Washington, DC, 1994. For neural tube defects: adapted from Romano, Patrick S., Norman J. Waitzman, Richard M. Scheffler, and Randy D. Pi, “Folic Acid Fortification of Grain: An Economic Analysis,” *American Journal of Public Health*, Vol. 85, No. 5, pp. 667-76, May 1995; National Center for Health Statistics, Public Health Service, “Advance Report of Final Mortality Statistics, 1992,” *Monthly Vital Statistics Report*, Vol. 43, No. 6 suppl., Hyattsville, MD, 1995; and Centers for Disease Control, “Recommendations for the use of folic acid to reduce the number of cases of spina bifida and other neural tube defects,” *Morbidity and Mortality Weekly Report*, Vol. 41, No. RR-14, Sept. 11, 1992.

Even Small Dietary Changes May Yield Large Benefits

Because genetic predisposition increases some people's risk for some chronic diseases and health conditions, it is difficult to determine to what extent dietary changes could affect the incidence or mortality rates, by either preventing or delaying the onset of these conditions.

A 1993 article in the *Journal of the American Medical Association* provided the first estimate of the influence of diet on overall mortality, based on the underlying risk factor behind each death—those behaviors which may have been controlled by the individual, such as diet, activity level, and smoking—rather than the official cause of death. Thus, for example, when an obese, inactive, middle-aged person died from a heart attack, the underlying cause of death was attributed to poor diet and inactivity, although the official cause of death was heart disease. Of the 2.1 million deaths in 1990, the authors estimated that 300,000 (14 percent) could be attributed to poor diet and/or low physical activity level.

From a narrower perspective, researchers at the University of California at San Francisco looked at the lives that could be saved through reduced fat intake alone. They estimated that 42,000 premature deaths from CHD and cancers could be prevented each year—2 percent of all deaths—if all Americans reduced their intakes of total fat, saturated fat, and cholesterol to the recommended levels. Unfortunately, that study looked only at the average effects on mortality, and not at the age distribution of those saved. Yet, CHD and cancer affect not only the elderly, but are also quite high among those aged 40 and over. Data from a longitudinal study suggest, for example, that 40 percent of all heart attacks occur in people aged 40-65.

Both the Food and Drug Administration (FDA) and USDA also estimated the benefits associated with improved diets in their analysis of the impact of the new nutrition labeling regulations that became effective in mid-1994. Looking only at changes in intake of fat, saturated fat, and cholesterol, the agencies estimated that even small average reductions of only about 1 percent in the intake of total fat and saturated fat and 0.1 percent in the intake of cholesterol would prevent over 56,000 cases of CHD and cancer, avoid over 18,000 deaths, and save over 117,000 life-years over 20 years. They further estimated that the medical savings associated with these benefits totaled \$ 0.8 billion.

The agencies pointed out, however, that this estimate undervalued the true benefits of improved diets since it did not include productivity losses or other losses due to pain and suffering. A more inclusive method of valuing such losses is to estimate the amount people are willing to pay to reduce the risk of suffering a heart attack, stroke, or cancer. People routinely make decisions to accept or avoid some incremental amount of risk, such as choosing a high-risk job, or choosing to use a seat belt in the car. A variety of studies have estimated the values that consumers and workers place on risk reduction, including wage differentials between high- and low-risk jobs. The estimates obtained from these studies, which represent people's willingness to pay to reduce the risk of premature death, range between \$1.5 million and \$8.5 million per life saved.

FDA and USDA estimated the health benefits of mandatory nutrition labeling regulations using two methods and a willingness-to-pay value of \$1.5 million per premature death avoided. Approximately a 1-percent reduction in the intake of total fat and saturated fat and a 0.1-percent reduction in the intake of cholesterol resulted in estimated

Want More Details?

For more information, please see *The American Diet: Health and Economic Consequences*, AIB-711, by Elizabeth Frazão, USDA's Economic Research Service.

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benefits of \$5.6 billion to \$15.3 billion over 20 years.

In addition, recent research on the role and likely health benefits of increased intake of folic acid suggests significant cost savings from both reduced birth defects and reduced deaths from CHD. The Public Health Service estimates that approximately 1,200 annual cases of neural tube defects in the United States could be prevented if women ingested 400 micrograms of folic acid daily before and during the first 4 weeks of pregnancy. A separate study estimated that if all men increased their intake of folic acid by 350 micrograms per day (280 micrograms for women), this could potentially prevent 9 percent of deaths from coronary heart disease among men 45 years and older—30,500 deaths per year (and 5 percent of deaths among women 45 years and older—19,000 deaths per year).

Although these benefit estimates are relatively crude, they suggest that even small improvements in dietary intake may be associated with large benefits.

Consumers Changing Their Eating Habits

The increasing evidence linking diet and health has not been lost among consumers—92 percent of food shoppers interviewed for the 1995 annual survey by the Food Marketing Institute reported having changed their eating habits to make

their diets more healthful. The food industry has also responded actively to consumer demand for foods with improved nutritional profiles. An increasing proportion of new food products carry at least one nutrient content claim—most often claims about reduced fat content—and supermarkets are offering consumers an ever-increasing variety of foods with improved nutritional profiles. The increased availability of lower fat products and lean meats has probably contributed to average fat intake in the United States declining from 40 to 34 percent of calories in the past 20 years. The new nutrition labels, mandated for most processed foods, not only provide an additional incentive for manufacturers to reformulate their products, but should also make it easier for consumers to choose a healthier diet.

However, there is still much room for improvement. Consumption of vegetables, fruits, and dairy products remain below the recommended number of servings (see "Many Americans Are Not Meeting Food Guide Pyramid Dietary Recommendations," elsewhere in this issue). Although fat intake has been declining, consumption is still above the recommended levels, and the prevalence of people classified as overweight has increased.

The difficulty of translating diet and health awareness into effective behavior change is a major challenge to USDA's nutrition education and promotion efforts, since it is well known that dietary advice does not automatically translate into dietary practices. This is particularly true when dietary advice requires large changes in current behavior, or when health problems tend to be concentrated among hard-to-reach populations—those least likely to be aware of the diet-health links or to have adequate nutrition knowledge.

Nutrition education specialists also recognize they must overcome a common belief that the prevention of chronic disease is beyond one's control, and that a healthy diet is more costly, difficult, time-consuming, and less pleasurable. While motivating consumers to make dietary changes, nutrition education must also provide consumers with the knowledge necessary to make effective dietary changes.

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