

Health Care Costs

Chronic health problems account for a substantial part of health care costs. Annually, three diseases, cardiovascular disease (including stroke), cancer, and diabetes, make up about \$700 billion in direct and indirect economic costs (Eyre, et al., 2004). The costs of these chronic diseases are increased due to acute and chronic complications and co-morbidities. Furthermore, co-morbidities associated with chronic disorders can worsen disease outcomes and increase health care costs (Mikulis, 2003; Peter, et al., 2004). One study of the costs of dialysis for end-stage renal disease revealed higher costs for patients with diabetes or cardiovascular disease (Peter, et al., 2004).

The lack of health insurance for more than 45 million people in the United States limit access to prompt diagnosis and treatment and increase morbidity, mortality, and health care costs. As a result, many people who do not have access to regular health care, will not take advantage of preventive health services, will delay in obtaining in health care, and will rely on expensive emergency care services for primary care medical conditions. As a result of these socioeconomic disparities, health care costs are higher than they would be if the people had access to and used a regular source of health care.

The malpractice crisis in the U.S., with its escalating malpractice insurance rates, increasing numbers of malpractice claims, and greater emphasis on practicing defensive medicine, has had

adverse effects on the health care system. The costs of hospital and physician services have increased, thus resulting in an increase in the costs of employer-provided health insurance, which in turn, has reduced the number of workers and their families covered by employer-provided health insurance (Rubin and Mendelson, 1994). Rubin and Mendelson (1994) estimated that comprehensive medical malpractice reform on a systemwide basis could produce \$41 billion in savings over five years.

The rapid aging of the U.S. population results in higher direct and indirect health care costs because of the large numbers of older patients who suffer from multiple chronic, disabling diseases which require expensive, long-term treatment and rehabilitation (Berto, et al., 2002; Daviglus, et al., 2004).

Daviglus et al. (2004) found that the increasing prevalence of overweight and obesity in the U.S. population increases the direct and indirect costs of health care since these conditions are related to an increased incidence of costly chronic disorders, such as diabetes, cardiovascular disease, cancer, and arthritis. They evaluated the relationship between body mass index in young adulthood and middle age and Medicare expenditures associated with cardiovascular disease and diabetes in older age. Using data from the Chicago Heart Association Detection Project in Industry and Medicare data, they reported that overweight and obesity among young and middle-aged adults resulted in subsequently higher Medicare charges in later life. The total average annual Medicare charges for non-overweight, overweight, obese, and severely obese men were \$7,205, \$8,390, \$10,128, and \$13,674, respectively.

Inadequate "health literacy" is a major contributor to the rising costs of health care. "Health literacy" refers to the ability to read, comprehend, and act on health information. Andrus and Roth (2002) noted that up to 48% of English-speaking patients have insufficient health literacy. Such patients have communication problems which may lead to adverse outcomes (American Medical Association, 1999). Patients with inadequate health literacy are more likely to report poor health status, have less understanding about their health problems, use preventive and clinical services less, have poorer compliance rates, poorer health status, and are

more likely to be hospitalized for their health conditions than more literate individuals (Andrus and Roth, 2002; Williams, et al., 2002; American Medical Association, 1999).

Other factors that increase health costs are: cultural and ethnic obstacles to health care provider/patient communication, the practice of defensive medicine which results in the use of unnecessary procedures and hospitalizations, inappropriate or inadequate diagnostic and treatment procedures, unnecessary hospitalizations, and excessive length of hospital stays (Rizzo and Simons, 1997).

Technological innovations in diagnostic, therapeutic, and health care information technologies such as electronic medical records and telemedicine offer the potential of reducing health care costs (Hersh, et al., 2001). However, more research is needed to determine the cost reductions associated with the use of these technologies.

The costs related to specific chronic disorders are evaluated below.

Diabetes

Diabetes costs make up one of every four Medicare dollars and one of every seven health care dollars spent in the United States for a total of \$98 billion each year (<http://www.diabetesliving.com>). The direct annual medical cost of diabetes-related blindness per patient is \$2,000 (<http://www.diabetesliving.com>). The overall cost is expected to increase to \$48 million per year because of the approximately 24,000 new cases of diabetes-related blindness projected to occur each year. Diabetes is also the leading cause of kidney failure and is involved in 40% of all new dialysis patients. Because the annual cost per patient for dialysis is \$45,000, new cases of kidney failure increase the cost of diabetes by more than a billion dollars per year.

In addition, diabetes is the most frequent cause of lower limb amputations, with an annual loss of 56,000 limbs. The cost per amputation is \$29,500, resulting in a \$1.5 billion escalation in the cost of diabetes each year. Overall, diabetic patients incur a total

annual per capita medical expenditure of \$10,071 compared to \$2,669 for persons without diabetes.

Arthritis, Osteoporosis, Fibromyalgia, and Low Back Pain

Arthritis and other rheumatic conditions and musculoskeletal disorders place a huge economic burden on society in terms of direct medical costs as well as the social costs associated with disability and social impairment. It is estimated that the social and economic costs of arthritis accounts for 1 to 2.5% of the gross national product of developed countries (Reginster, 2002). In the United States, the total cost of arthritis and other rheumatic disorders was \$116.3 billion in 1997, with \$51.1 billion in direct costs and \$65.2 billion in indirect costs (MMWR Morbidity Mortal Wkly Rep, 2003). The total costs related to arthritis and other rheumatic disorders ranged from \$163 million in Wyoming to \$11.3 billion in California.

Michaud, et al. (2003) found that for patients with rheumatoid arthritis, the mean total annual direct costs of medical care in 2001 was \$9,519, with the costs of drugs being \$6,324, and that of hospitalization was \$1,573. For patients receiving biologic therapy, the mean total annual direct costs were \$19,016.

The costs of rheumatoid arthritis care may be associated with the patient's level of work disability and other health status. In a study of medical care costs for 1,471 rheumatoid arthritis patients in Japan, Hashimoto, et al. (2002) showed that work disability, physical disability, and rate of functional decline were strong predictors of total out-of-pocket medical care costs.

For osteoarthritis, a review of clinical trial outcome research showed that total hip replacement and total knee replacement were the most efficacious and cost-effective treatments. Total hip replacement and total knee replacement surgery have an estimated cost per quality-adjusted life-year (QALY) of \$7,500 and \$1,000, respectively. Other cost-effective treatments include exercise and strength training for knee osteoarthritis (less than \$5,000 per QALY), knee bracing, and use of Capsaicin or Glucosamine Sulfate (less than \$1,000 per QALY). The researchers found that measurement of the cost-effectiveness of non-specific and COX-2 inhibitor non-

steroidal anti-inflammatory drugs were influenced by treatment-related deaths and very sensitive to the discounting of lost life-years (Segal, et al., 2004).

With the increase in the prevalence of arthritis and related conditions, the direct and indirect costs of arthritis will also grow (Reginster, 2002). For example, the numbers and rates of hip and knee replacements for older persons increased significantly between 1982 and 1999, but the length of hospitalization for both types of surgeries declined (Millar, 2002).

More than 1.5 million osteoporosis-related fractures occur annually (Orsini, et al., 2005) and the aging population will increase the social and economic costs of osteoporosis on the United States health care system (Burge, et al., 2003). One study evaluated commercial claims involving osteoporosis patients with and without a concurrent fracture and a control group of non-osteoporosis patients enrolled in U.S. plans (Orsini, et al., 2005). The results showed that osteoporosis patients with concurrent fracture had total health care expenditures that were more than twice those of osteoporosis patients who did not have a concurrent fracture (\$15,942 vs. \$6,476) and almost 3 times those of the control patients (\$15,942 vs. \$4,658).

The costs of osteoporosis in the United States have also been estimated for individual states. Burge, et al. (2003) found that Florida, with its large over-65 population, had an estimated 86,428 osteoporotic fractures that cost more than \$1 billion in the year 2000. It is estimated that by 2025, the incident osteoporotic fractures will rise to 151,622, costing more than \$2 billion. In California, it was estimated that osteoporosis was responsible for over \$2.4 billion in direct health care costs in 1998 and more than \$4 million in lost productivity associated with premature death (Max, et al., 2002).

The costs of fibromyalgia add to the overall costs of health care because of the extensive use of health services made by fibromyalgia patients. Penrod, et al. (2004) found that, in Canada, the average 6-month direct cost among women with primary fibromyalgia was \$2,298 (Canadian dollars), with the indirect costs being \$5,035. Medications (\$758 Canadian dollars), complementary and alternative medicine (\$398 Canadian dollars) and diagnostic services (\$356 Canadian dollars) made up the largest components of direct cost.

The researchers also showed that co-morbid conditions and disability associated with fibromyalgia were important contributors to the direct costs.

Low back pain poses a huge cost to society because of the costs of medical treatment, lost productivity, and non-monetary costs, such as the reduced ability to perform usual activities (Ozguler, et al., 2004; U.S. Agency for Health Care Policy and Research, 1994). It is estimated that 80% of adults suffer at least one episode of low back pain during their lifetimes (Humphreys, et al., 2002; Koes, et al., 1996). Persons who have low back pain and degenerative joint disease make up 4.9% of all adult physician visits. The annual direct medical costs associated with low back pain are more than \$25 billion (Humphreys, et al., 2002).

Cardiovascular Disease

Cardiovascular disease, associated coronary heart disease, and atherothrombotic disease cause a major economic and social burden on society. The direct medical cost of cardiovascular and circulatory diseases was estimated to be \$151 billion in 1995 (Lightwood, 2003).

Hypertension, a risk factor for cardiovascular disease and diabetes, is one of the most commonly diagnosed chronic medical problems and creates a major economic and social burden on Americans. Mullins, et al. (2004) show that uncontrolled hypertension significantly increases health care costs. They discovered that when compared to the costs of the care of controlled hypertensive patients, the average total annualized costs for emergency department visits and hospitalizations for uncontrolled hypertensive patients was greater by 9.3% and 28.0%, respectively.

Resource utilization and costs associated with clinical care for stroke patients have a significant impact on health care costs (Doedel, et al., 2004). In 2004, stroke accounted for an estimated \$53.6 billion in direct and indirect health care costs (MMWR Morbidity and Mortality Weekly Report, 2005).

Various factors may escalate health care costs for patients with cardiovascular disease or those who are at risk for the disease. Based on a longitudinal study of patients with hypertension, Berto,

et al. (2002) found that the average total cost per patient is likely to increase due to age and co-morbidities.

Cancer

In the United States, the economic burden of cancer in 2002 was estimated to be \$172 billion, which included \$61 billion in direct medical costs (United States DHHS, 2003). The most prevalent types of cancer pose the greatest economic burden. One report estimated that colorectal cancer, the second leading cause of cancer death in the United States, and the third most prevalent cancer throughout the world, accounted for \$5.3 billion in direct and indirect costs in the United States in 2000 (Redaelli, et al., 2003; Giovannucci, 2003). The economic impact of cancer is expected to worsen greatly as survival from cancer improves and as the U.S. population ages. Over the next decades, public sector programs, such as Medicare and Medicaid, will have the challenging tasks of paying for comprehensive cancer care with limited fiscal resources (United States DHHS, 2003). More research is needed to determine how economic factors influence clinical outcomes for cancer patients and how to best use cancer prevention, screening and treatment strategies.