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# Elders and Health Care Utilization and Costs

## Health Care Utilization

Older adults use a wide range of health care services at a higher rate than other age groups. For example, seniors spend more time in hospitals than younger persons. An analysis of short-stay hospitals showed that persons, 75 years of age and older, had an average length of stay (ALOS) of 6.8 days, individuals in the 65 to 74 year age group had an ALOS of 5.9 days, those 45 to 64 years of age had an ALOS of 4.5 days, and persons 18-44 years of age had an ALOS of 3.5 days (USDHHS, Health, United States, 2002; Shi and Singh, 2004).

Seniors have more ambulatory office visits than younger persons. A study of the rate of national ambulatory office visits revealed that individuals in the 65-74 year age group had 5.8 visits per year, those 75 years of age and older had 6.5 visits per year, compared to persons in the 25-44 year age group who had 2.4 visits per year (USDHHS, 2002; Shi and Singh, 2004).

In addition, most long-term care services (a range of health care, mental health, social support, and residential services, including home health care, adult day care, hospice care, assisted living facilities, skilled nursing facilities, subacute care facilities, and continuing care retirement communities) are used by persons age 65 years and older (Shi and Singh, 2004).

Neither age nor diagnosis of a disease can completely determine if a person will need long-term care services. In fact, the prevalence of chronic disability among seniors has declined in recent decades (Manton and Gu, 2001). Nevertheless, with the aging boom, the elderly population's growing need for long-term care services is expected to place severe financial pressures on a shrinking group of working taxpayers. To help control costs and maintain quality of care, case management services are used to

coordinate the wide variety of potential long-term care services available for seniors and help reduce unnecessary and duplicated services (Shi and Singh, 2004).

With the aging of the baby boomers, Medicare costs are expected to increase significantly in the future. To address the spiraling costs of Medicare, the Balanced Budget Act of 1997 mandated the development of Medicare + Choice program (also known as Part C), which allows Medicare beneficiaries to enroll in either a managed care (MC) plan, such as a health maintenance organizations (HMO) or Preferred Provider Organizations (PPO) or a private fee-for-service plan (FFS) (Shi and Singh, 2004). The Medicare + Choice program primarily enrolls beneficiaries with lower income.

Initially, there was growth in the enrollment of Medicare beneficiaries in managed plans (Shi and Singh, 2004). However, since 1999, many MC care plans have terminated their participation in the program. Inadequate Medicare payments have been one of the primary reasons for their withdrawal from Medicare Part C. At the present time, about 11% of all Medicare beneficiaries participate in this program.

Because of limited health care resources and increased costs, one major concern is that health care will be rationed based on age. Since the development of MC, some experts fear that MC organizations, along with physicians at the bedside, may withhold or delay treatment for the elderly and other vulnerable patients (Soumerai, et al., 1999; Kapp, 2002; Churchill, 2005; Ubel, 2001; O'Malley, 1991). A related moral-ethical and social issue deals with the desirability of using expensive life-extending procedures, such as dialysis and transplants, for older adults (Kaufman, et al., 2006; Rodriguez and Young, 2006). Experts are evaluating the extent to which life-sustaining procedures extend life, enhance quality of life, maintain or improve biological functioning, and assist patients on a short-term basis (Rodriguez and Young, 2006). Some rationing plans have been formulated which consider chronological age. However, Kapp (2002) points out that it is unlikely that these schemes will be adopted because of ethical and political factors.

To address concerns over utilization of health resources and quality of care for seniors, investigators have compared health care utilization and quality of care outcomes for Medicare recipients in MC plans and FFS plans. These investigations have yielded mixed results (Retchin, et al., 1997). Retchin, et al. (1997) analyzed health care utilization and survival patterns for stroke patients in MC

programs compared to fee-for-service programs. Based on samples of 402 HMO patients from 71 hospitals and 408 FFS patients, the authors discovered HMO patients had a higher probability of being sent to a nursing home than FFS patients following a stroke. HMO patients were also less likely to be sent to a rehabilitation facility than FFS patients. However, at follow-up, there were no significant differences in the relative risk of dying between HMO and FFS patients.

Ware, et al. (1996) used data from the Medical Outcomes Study to compare physical and mental health outcomes of chronically ill seniors and other patients treated in HMO and FFS settings. They found that Medicare patients in HMOs were more likely to have significant declines in physical health than those in FFS settings. Mental health outcomes were better for Medicare patients in HMOs compared to those FFS systems at one site, but these findings were not evident at two other sites.

Soumerai, et al. (1999) compared the timeliness and quality of care for elderly patients with acute myocardial infarction (AMI) in HMOs and FFS settings using a sample of 2,304 Medicare patients who were admitted to 20 urban community hospitals in Minnesota. The authors found that timeliness and quality of care were the same for HMO patients with AMI compared to FFS patients and that two measures of quality of care, use of emergency transportation and aspirin treatment, were slightly better for HMO patients than for FFS patients.

Drug therapy is one of the most effective interventions for improving health outcomes. However, some medications are less appropriate for older patients (Monane, 1998). The toxic effects of prescription and over-the-counter (OTC) medications have major adverse health effects and can lead to excess health care utilization and increased costs (Roumie and Griffin, 2004; Goulding, 2004; Fick, et al., 2003). For example, seniors who use OTC analgesics on a long-term basis, may use excessively high doses, which can result in the development of gastrointestinal hemorrhage, cardiac, kidney and liver toxicity (Roumie and Griffin, 2004). In addition, the concurrent use of pain medications, alcohol, hypertension drugs, and regular caffeine use may result in adverse risks (Amoako, et al., 2003).

To assist emergency physicians in prescribing safe and effective medications for seniors, Terrell, et al. (2006) reviewed the risks related in the use of non-steroidal anti-inflammatory drugs,

benzodiazepines, and anticholinergic medications. They found that these drugs may produce adverse outcomes and should be prescribed with caution.

Fick, et al. (2003) used the results of a U.S. consensus panel of experts to update the widely used and cited Beers criteria for potentially inappropriate drug use in adults 65 years and older. The authors identified 48 separate drugs or classes of drugs to avoid in the treatment of 20 diseases or conditions. Sixty-six of these specific drugs had highly severe adverse outcomes. The authors suggest that using the Beers criteria and related procedures would help reduce medication-associated costs, overall health care costs, and medication-related problems.

Goulding (2004) used data from the large scale National Ambulatory Medical Care Survey to determine the extent of inappropriate medication prescribing to elderly for pain relievers and central nervous system drugs, e.g., anti-anxiety drugs, sedatives, and antidepressants. The probability of prescribing inappropriate drugs at these visits increased with multiple drugs and doubled for women.

A study of inappropriate medication use by elderly persons in 10 HMOs in 2000-2001 revealed that 28.8% of the patients were prescribed at least one of 33 potentially inappropriate drugs (Simon, et al., 2005). Across the 10 HMOs, this rate ranged from 23.0% to 36.5%. The results indicated that about 5% of the seniors were prescribed at least one of the 11 drugs categorized by an expert panel as "always avoid," 13% were prescribed at least one of the 8 drugs that would rarely be regarded as appropriate, and 17% were prescribed at least one of 14 drugs that are appropriate but are frequently misused. Women in this study were more likely than men to be prescribed inappropriate drugs.

Older adults are also at high risk of mismanaging their medications (Curry, et al., 2005). The most prevalent types of medication errors made by seniors include combining OTC and prescription drugs, discontinuing essential prescriptions, using incorrect doses, using inappropriate methods of drug administration, and eating the wrong food with their medications.

There are a number of human and environmental factors that increase seniors' risk of self-management errors (Curry, et al., 2005). First, they take more prescription and OTC medications than any other age group (Curry, et al., 2005; Amoako, et al., 2003).

Second, older adults, who are often on fixed incomes tend to self-medicate with OTC because they are cheaper than the more expensive prescription medications (Amoako, et al., 2003). As more drugs become available as OTC medications, as the population ages, and as the prevalence of chronic diseases increases, there will be an increased risk of adverse drug effects in this population.

Third, older adults may stop using high priced prescription medications because they cannot afford them. This is especially true for those with chronic diseases such as diabetes, hypertension, cardiovascular disease, and cancer, who must take a number of medications daily.

Fourth, they may be confused by complicated drug regimes involving drugs with different doses, times of administration, and methods of administration (Curry, et al., 2005).

Fifth, patients frequently have insufficient knowledge about their medications (Curry, et al., 2005). Studies of the general population have found that more than 60% of individuals are unable to identify the active ingredient in their pain medication, and approximately 40% of Americans believe that OTC medications are harmless (Roumie and Griffin, 2004).

Sixth, older adults are at risk for cognitive, sensory, and motor deficits which impair their ability to take prescription and OTC medications properly (Curry, et al., 2005).

Seventh, alcohol-drug interactions and use of complementary and alternative remedies can lead to adverse effects (Curry, et al., 2005). Sleath, et al. (2001) conducted a study of 27 resident physicians and 205 of their Hispanic and non-Hispanic white patients age 50 years and older, and found that almost 18% of the patients reported using one or more alternative treatments during the previous month. The most commonly used treatment was herbal medicine.

Eighth, communication problems between the health care practitioner and patient can contribute to medication errors (Curry, et al., 2005). In some cases the physicians may be unaware that some of their patients are cognitively impaired. In other cases, patients may not inform their physicians that they are using complementary and alternative medicines (CAM). Sleath, et al. (2001) discovered that 83% of patients who had used an alternative treatment in the previous month did not inform their physicians about it. In only 3.4% of office visits did physicians ask one or more questions about their patients' use of CAM. Only 2% of patients asked their clinicians one or more questions about CAM.

Ninth, polypharmacy or the concurrent prescription of multiple medications for seniors increases the risk of medication errors (Curry, et al., 2005). Age-related and disease-related changes in drug absorption, distribution, elimination, and clearance in older adults may increase the risk of adverse consequences from polypharmacy, medication errors, and mismanagement (von Moltke, et al., 2000; Herrlinger and Klotz, 2001).

Tenth, improper storage of medications will result in ineffective medications.

Finally, the lack of clearly marked expiration dates on drugs increases the risk that patients will continue to take medications that are no longer efficacious (Curry, et al., 2005).

A number of strategies can help reduce medication errors and mismanagement in older adults. Terrell, et al. (2006) suggest that opioids, although not without risks, are safe with slow titration, the use of precautions, and constipation treatment. They recommend estimating creatinine clearance when prescribing drugs that necessitate dosage adjustment in patients with potential or actual renal insufficiency. They also urge that more research be undertaken to determine the correct dosing and safety of drugs for older patients. Moreover, the authors recommend more research to determine if prescribing with electronic decision support will help physicians in their prescribing decisions.

Improved patient and health provider education can reduce the risk of medication problems (Curry, et al., 2005; Bergman-Evans, 2006; Joanna Briggs Institute, 2006; Roumie and Griffin, 2004; Amoako, et al., 2003; Goulding, 2004). Curry, et al. (2005) recommends that nurses take advantage of formal and informal teaching opportunities to ensure that patients are thoroughly assessed in terms of their abilities to administer their medications safely. Bergman-Evans (2006) advocates the use of the AIDES method: Assessment that is comprehensive, Individualization of the therapy, Documentation that is appropriate, Education that is customized to the patient's age, and Supervision which is continued after initiation of the treatment.

Online drug utilization review linked to a telephone pharmacy alert may help physicians reduce medication errors (Simon, et al., 2006; Monane, et al., 1998). Simon, et al. (2006) found that age-specific alerts maintained the effectiveness of drug-specific alerts in reducing the number of potentially inappropriate prescriptions for seniors. In addition, written feedback to physicians about

medication discrepancies may help physicians correct medication discrepancies, such as patients not taking their charted medications, patients taking medications that were not charted, and errors in drug dosage and schedule (Forjuoh, et al., 2005).

Enhanced labeling of medications can help patients better understand the active ingredients, adverse effects, and contraindications of their medications (Roumie and Griffin, 2004).

Another important component of health care utilization is surgery, and with improvements in surgery, longer life expectancy, and improved surgical outcomes, seniors are increasingly being referred for certain types of surgical operations (USDHH, Health, United States, 2005; Kolh, et al., 2001). For example, for adults age 75 years and older, the rate of hospitalization for coronary stent insertion procedures increased three-fold from 23 per 10,000 population in 1996-97 to 73 in 2002-03 (USDHH, Health, United States, 2005). The rate of hospitalization for this procedure more than doubled for adults age 65-74 from about 35 per 10,000 population in 1996-97 to about 80 in 2002-2005.

As surgery has been extended into older populations, health-related quality of life (HRQL) has been used as an important indicator of surgical success (Hornick, 2006). HRQL measures can be used to determine the appropriateness of surgery for seniors who face substantial surgery-related morbidity and mortality. New techniques, such as laparoscopic or minimally invasive surgery, have great potential for reducing perioperative problems and improving HRQL in younger age groups. However, these techniques have not been used extensively in older age groups, who may derive even greater potential benefits from these procedures than younger age groups.

## Health Care Costs

A significant amount of health care expenditures are for Medicare beneficiaries (persons 65 years of age and over and disabled persons). In 2003, 30% of hospital expenditures were paid by Medicare (USDHH, Health, United States, 2005). However, Medicare paid only 12% of nursing home care in 2003. Despite the availability of Medicare, seniors may still have substantial out-of-pocket health care expenditures. This is particularly true for those with poor health and higher total expenditures and individuals with significant prescription

medication expenses since drug expenses are less likely to be covered by health insurance than hospital and physician expenses. More than 40% of non-institutionalized adults, aged 65 years and older with medical expenses spent at least $1,000 out-of-pocket in 2002.

The costs of chronic diseases consist of both direct medical costs and indirect costs such as lost workdays and reduced productivity. However, it is difficult to calculate total health care costs for non-employed elderly since in the general population the calculations of indirect costs involve determining changes in work status (Katz, 2006).

It is difficult to evaluate the true costs of care to the non-employed older population because few studies deal with them. I have, therefore, considered the problems as studied in the broader population in order to obtain some estimates of the probable costs for the elderly.

Estimates of the costs of chronic diseases underestimate the true burden of these diseases since they may omit the costs associated with pain and suffering, the care given by family and other caregivers, and the services of other health providers that are necessitated by the patient's chronic condition (Hogan, et al., 2003). Nevertheless, the direct and indirect costs of chronic diseases are enormous.

## Diabetes Mellitus (DM)

Diabetes mellitus (DM) costs are increasing worldwide (Logminiene, et al., 2004). Between 1969 and 1997, the direct medical costs of DM increased from 1.7 billion U.S. dollars to 44.4 billion U.S. dollars. Indirect DM costs during this period increased from 1.6 billion U.S. dollars to 54.1 billion U.S. dollars.

In 2002, the total economic costs of DM in the U.S. were estimated to be $132 billion (Hogan, et al., 2003; Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion). The total direct medical costs were $91.8 billion dollars. DM care accounted for about 23.1 billion dollars, chronic complications accounted for 24.6 billion dollars, and increased prevalence of general medical conditions accounted for 44.1 billion dollars (Hogan, et al., 2003). Major DM expenditures consist of hospitalizations (43.9%), nursing home care (15.1%), and office visits (10.9%). Persons over age 65 years incurred 51.8% of direct medical costs. The total indirect costs of DM, such as the

number of days away from work, number of days of restricted activity, and impairment associated with the condition were about $39.8 billion dollars.

Certain older diabetics face risks of financial burdens. The greatest financial burden is borne by those with private non-employment-associated insurance; then come those who have Medicare only; they are followed by those with employment-associated coverage; and then those with the least financial burden – the Medicaid beneficiaries. The second greatest financial burdens are faced by older diabetics who have Medicare only, followed by those with employment-associated coverage. Among aged persons, 62% to 69% of out-of-pocket expenditures are for prescription medications and diabetic supplies (Bernard, et al., 2006).

## Arthritis

Arthritis is a leading cause of impairment and results in substantial Social Security disability payments because of chronic absence from work and employment loss (NIH News Release, 1998; National Arthritis Action Plan, 1999). More than 7 million persons in the U.S. are limited in their daily activities because of this disease. Those with more moderate arthritic conditions are not reflected in this number, but still face an economic burden because of their condition. The annual total costs for treating arthritis and disease-related complications and for the disabilities that are produced by these disorders are almost $65 billion dollars. Almost $15 billion dollars of the costs come from 39 million physician visits and more than half a million hospitalizations (About Arthritis).

## Rheumatoid Arthritis (RA)

Researchers have evaluated the costs related to specific forms of arthritis. For example, Birnbaum, et al. (2000) analyzed the annual per capita costs of rheumatoid arthritis (RA) for beneficiaries of a large employer. The authors showed that the annual per capita employer costs for RA employees who were impaired were almost three times those of controls ($17,822 dollars vs. $6,131 dollars).

## Osteoporosis (OP)

The costs of osteoporosis (OP) to society are substantial. The acute and long-term medical care costs of treating OP fractures in the U.S. are estimated to be between $10 billion dollars to $18 billion dollars (Keen, 2003; American Association of Orthopaedic Surgeons, 1999). Hip fractures generate the largest OP-associated health care costs. The repair and rehabilitation of a hip fracture costs about $16,000 dollars (Burge, et al., 1997). A study of OP fractures in France also revealed that median in-patient costs were higher for hip fractures (8,048 to 8,727 Euros) than for fractures of the humerus (3,786 Euros) and radius (2,363 to 2,574 Euros) (Maravic, et al., 2005). Because of the dramatic aging of the population and the increase in the incidence of OP fractures in younger age groups, the disease is considered a major public health problem (American Association of Orthopaedic Surgeons, 1999).

## Fibromyalgia (FM)

Fibromyalgia (FM) poses a huge economic and social burden to both the individual and society. It is estimated that the annual FM costs in the U.S. are between $12 billion to $14 billion. About 1 to 2% of the nation's lost productivity is due to the condition (National Fibromyalgia Association, 2006).

Robinson, et al. (2003) investigated the economic cost of FM using administrative claims data of a Fortune 100 manufacturer. They compared 4,699 patients with at least one FM claim between 1996 and 1996 and a 10% random sample of the total beneficiary population. The results of their study showed that the prevalence of disability among employees with FM was two times as high as among all employees. The total annual costs for FM claimants were more than twice as high as the costs for the typical beneficiary ($5,945 vs. $2,486). For every dollar the employer spent on FM claims, they spent another $57 to $143 on additional direct and indirect costs.

## Low Back Pain (LBP)

The total costs of low back pain (LBP) in the U.S. are more than $100 billion dollars annually (Katz, 2006). Of this amount, two thirds are indirect, resulting from lost employment and decreased

productivity. Annually, less than 5% of the patients with LBP make up 75% of the total costs. The substantial costs associated with LBP are reflected in the large number of office visits made for the treatment of BP. In 2003, adults, aged 18 years and older, made 3.6 million visits to physician offices and hospital outpatient facilities for treatment of BP (USDHHS, Health, United States, 2005). Office visits and hospital outpatient departments for BP account for only a portion of total health care costs for this condition since they only include persons who have used the health care system. Additional medical costs are incurred by individuals who self-treat BP with OTC medications and CAM.

Weiner, et al. (2006), using outpatient national and Pennsylvania Part A Medicare beneficiary data related to non-invasive or minimally invasive evaluation and treatment of non-specific LBP, discovered that between 1991 and 2002, there was a 42.5% increase in total Medicare patients and a 131.7% increase in patients with LBP. During this same period there was a 310% increase in total charges and a 387.2% in charges related to LBP. An analysis of Pennsylvania Part A Medicare beneficiary data between 2000 and 2002 revealed that there was a 5.5% increase in patients with LBP and 33.2% increase in LBP charges. The investigators also discovered that out of 111 older adults with chronic LBP who were interviewed, 61% had MRIs (29% with neurogenic claudication and 24% with failed back surgery), although none of them had "red flags" or indications that necessitated imaging. The authors conclude that in Medicare beneficiaries, documentation of LBP and related diagnostic studies are increasing. In addition, they suggest that MRIs may frequently be undertaken unnecessarily. A significant proportion of the LBP-related costs are for injection and imaging procedures

A study conducted in the Netherlands found that the costs were higher for chronic low back pain (CLBP) (8,533 Euros) and FM (7, 813 Euros) than for ankylosing spondylitis (3,205 Euros) (Boonen, et al., 2005). The study also revealed that the level of well-being was lower in patients with FM and CLBP than in patients with ankylosing spondylitis.

## Cardiovascular Disease

In 2006, the total direct and indirect economic cost of heart disease and stroke in the U.S. is estimated to be $403 billion dollars, including health expenditures and lost productivity from disability

and death (Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion). The estimated direct and indirect cost of hypertension in 2006 is $64 billion dollars. It is estimated that more than 6 million hospitalizations annually are due to cardiovascular disease.

The concurrent prescription of multiple medications for older heart disease patients increases the costs of health care. Masoudi, et al. (2005) evaluated the chronic medications prescribed at hospital discharge to patients, aged 65 years or older, hospitalized for heart failure (HF). The authors discovered that between 1998 and 1999, the mean number of drugs prescribed was 6.8. This represented 10.1 doses daily at a cost of $3,142 dollars annually. In 2000 to 2001, the mean number of drugs increased to 7.5, with 11.1 doses daily at a cost of $3,823 dollars. A number of factors were predictive of the increased complexity and costs of health care for HF patients: having DM, previous revascularization, and chronic pulmonary disease.

The Screening for Heart Attack Prevention and Education (SHAPE) Task Force suggests that mass cardiovascular screening of American men over 45 years of age and most women over 55 could prevent 90,000 deaths from heart attack each year (Naghavi, et al., 2006; Edelson, 2006). The SHAPE Task Force recommends that physicians evaluate the arteries of apparently healthy individuals to determine their levels of arterial plaque and the thickness of the wall of the carotid artery, the primary blood vessel leading up the neck to the brain. Plaques consist of fatty deposits that can build up in the arteries, causing heart attack or stroke. The task force estimates that these mass examinations would reduce the number of Americans who have heart attacks, currently estimated at 13.2 million, by 25%. The task force suggests that universal screening would save more than $21.5 billion dollars in health care costs each year by identifying individuals at risk much sooner than they are identified now.

## Cancer

The total cancer cost in 2004 was estimated to be $189 billion dollars (Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion). Of this amount, direct medical costs amounted to $69 billion dollars

and indirect costs such as lost work-days and productivity amounted to $120 billion dollars.

The costs of cancer to employers in the U.S. can be significant. A case-control study of cancer costs to a large U.S. employer revealed that $224 dollars per active employee or 6.5% of the company's total health care expenditures was spent on the care of cancer patients in 1997 (Barnett et al., 2000). The annual health care and disability costs for cancer patients were about 5 times higher than for those who did not have cancer.

The costs associated with specific cancers have been analyzed. One study using data from 2000 estimated that the costs of treating breast cancer in the U. S. are more than $7 billion dollars per year (Centers for Disease Control and Prevention, The National Breast and Cervical Cancer Early Detection Program, 2006). Redaelli, et al. (2003) estimated that the costs of colorectal cancer in the U.S. were between $5.5 and $6.5 million dollars.

## Lifestyle and Behavioral Factors

Lifestyle and unhealthy behaviors create a huge economic and social burden for society. It is estimated that smoking-associated diseases cost more than $155 billion dollars each year (Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 2006). Direct annual costs attributable to tobacco use are more than $75 billion dollars and indirect costs are $80 billion dollars.

The economic and social burden of obesity is also substantial. In 1995, direct health costs associated with obesity were estimated to be $52 billion and this increased to $75 billion in 2003 (Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 2006). Over the past two decades, hospital costs related to overweight and obesity more than tripled.

http://www.springer.com/978-0-387-70856-0

Aging and Chronic Disorders
Morewitz, S.J.; Goldstein, M.L.
2007, XIV, 236 p., Hardcover
ISBN: 978-0-387-70856-0