

Part 1

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Chapter 1

Chronic illness

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Introduction

The demographic landscape of the United States has changed significantly. Americans are living longer than ever before. The average life span has increased from 47 years for individuals born in 1900 to 78 years for those born in 2006 (National Center for Health Statistics [NCHS] 2010). The result has been an exponential growth in the number and percentage of older Americans, which is unique to our nation's history. This longevity is primarily due to advances in modern medical science that have produced new screening and diagnostic technologies, pharmaceuticals, and medical procedures, as well as comprehensive initiatives that have greatly diminished or eliminated infectious diseases and improved public health problems. Americans living in the twenty-first century can expect to live longer than any previous generation. Longer life expectancy combined with the baby-boom generation, individuals born after World War II from 1946 through 1964, will double the number of individuals who are 65 years and older during the next 25 years.

This aging of America has created problems and challenges for our health care system. As longevity has increased so have the numbers of Americans living with chronic illnesses. Chronic illnesses afflict people of all ages, and although a majority of individuals living with chronic illnesses are not elderly, the likelihood of having a chronic illness increases dramatically with advancing age. Current projections estimate that approximately 66% of Americans 18 years of age and older suffer from at least one chronic illness, and as much as 80% of individuals 50 years of age and older suffer from at least one chronic illness (Machlin *et al.* 2008). These individuals seek and receive health care in a system that is designed, structured, and financed for treating acute episodes of care. The current system has been extensively criticized for being overly deficient in providing coordinated care for individuals with chronic illnesses who are primarily insured through Medicare and Medicaid (Institute of Medicine [IOM] 2001), and who are not receiving optimum chronic illness care (McGlynn *et al.* 2003).

The new generation of older Americans, the baby boomers, will be distinctly different from previous generations. They will be more educated, have more discretionary income, be more racially diverse, have fewer children, and have less disability compared

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to their parent's generation (Federal Interagency Forum on Aging-Related Statistics 2008; IOM 2008). Their sheer numbers alone will dramatically affect the future of our health care system. During the next two decades the number of older adults will double, from approximately 37 million to over 70 million, accounting for an 8% overall increase within the total population, currently from 12% to 20% (IOM 2008). While this approaching demographic shift has been anticipated for over 50 years, our health care system is not prepared for its arrival. More providers with specialized training and resources, and new approaches to delivering chronic care are needed to meet the aging population's health care needs (Bodenheimer *et al.* 2009; IOM 2008). Presenting a stark reality, the IOM (2008) asserted that providers are inadequately prepared in general knowledge of geriatrics, the health care workforce is not large enough to meet older patients' needs, and the scarcity of workers currently specializing in geriatrics is even more pronounced. These shortages will become more pronounced in the future.

According to the IOM (2001), improving care for the chronically ill is one of the most important health care challenges facing our nation today. The IOM report makes clear that there are no easy means or readily available answers to improving this care. Despite some consensus regarding what optimum chronic care should resemble, its delivery remains elusive (Wolff & Boulton 2005). Research has demonstrated that achieving and sustaining improvements in the care coordination and medical management of these chronically ill adults is extremely difficult and is hindered by a general lack of knowledge, experience, and financial mechanisms necessary for the optimal care for this large and ever expanding segment of the population (Norris *et al.* 2008; Wallace 2005). Dysfunctional incentives have created fragmentation within our current system which fails to address the underlying causes of disease, and far too many care decisions are not under the control of clinicians and patients.

In this chapter we (1) define chronic illness, its general prevalence, and the main causes for its dramatic increase; (2) present a demographic profile of the adult population 55 years of age and older, (3) present a demographic profile for adults 65 years of age or older, with additional characteristics related to Medicare beneficiaries; and (4) present specific characteristics of chronically ill adults. A basic understanding of the scope and magnitude of chronic illness is necessary in order to begin to design, implement, and evaluate effective comprehensive care coordination programs for the tidal wave of chronically ill adults who will hit the health care system, especially Medicare, with brute force in the very near future.

What is a chronic illness?

Chronic illness is a general term that refers to a diagnosed illness, functional limitation, or cognitive impairment that lasts at least a year, places limits on a person's daily activities, and often requires regular attention and medical care (Hwang *et al.* 2001; Anderson 2010). Chronic illnesses are often preventable, usually develop in later adulthood, and last for years. They are typically managed with proper care from clinicians, self-care activities, and often with help from family members acting as informal caregivers. Some of the most prevalent chronic illnesses include arthritis, asthma/bronchitis, cancer, cardiovascular

disease, depression, and diabetes (American Association of Retired Persons [AARP] 2009a; Center for Disease Control and Prevention [CDCP] 2009).

Having a chronic illness affects people in multiple ways. Many chronic illnesses reduce a person's quality of life and/or limits their performance of normal activities without some form of assistance. Approximately 20% of people who have a chronic illness also have one or more limitations in activities of daily living (ADLs) or instrumental activities of daily living (IADLs; Agency for Healthcare Research and Quality [AHRQ] 2006). Typically, people with multiple chronic illnesses have significantly higher rates of hospital admissions and emergency room (ER) visits, and experience higher medical expenses compared to people without a chronic illness. Chronic illnesses account for 70% of annual mortality rates; heart disease, cancer, and stroke are the causes of 50% of all deaths each year (CDCP 2009).

The prevalence of chronic illness is steadily on the rise, and will increase exponentially in the future. In 1995 there were approximately 118 million individuals living with a chronic illness. This number is projected to increase 45% by 2030 to 171 million (NCHS 2010). In 2006, over 20% of all individuals had at least one chronic illness, and 28% had two or more (Anderson 2010). Hypertension was the most common chronic illness (33%), followed by lipid disorders (22%), upper respiratory diseases (19%), non-traumatic joint disorders (17%), heart disease (14%), diabetes mellitus (13%), eye disorders (11%), asthma (10%), and chronic respiratory infections (10%; Anderson 2010).

There are several factors that contribute to the increase of these illnesses. An aging population is a prominent factor, as the proportion of individuals with chronic illnesses increases dramatically with age. For example, one in fifteen children has multiple chronic illnesses (7%) compared to three out of four elderly individuals (75%). National statistics highlight these differences for distinct age groups (AHRQ 2006): 27% of children from birth to age 19 have one chronic illness, 7% have two or more; 40% of adults aged 20 to 44 have one chronic illness, 17% have two or more; 68% of adults aged 45 to 64 have one chronic illness, 43% have two or more; and 91% of the elderly have one chronic illness while 73% have two or more. In comparison, respiratory disease (36%) and asthma (30%) are the most prominent pediatric chronic illnesses, while hypertension (60%), cholesterol disorders (41%), arthritis (28%), heart disease (25%), and eye disorders (23%) are the most common in adulthood (Anderson 2010).

The increased use of evidence-based clinical guidelines have broadened the definitions of disease, and advances in treatment modalities have led to more people being screened and subsequently diagnosed with chronic illnesses. Treatment advances have allowed providers to diagnose chronic illnesses and identify people who might benefit from medications or therapies at an earlier age, while public awareness of certain chronic illnesses has led to more people requesting testing and treatment (AARP 2009a). Two examples that highlight these advances are the increased percentage of adults that are either under surveillance or are being actively treated for hypertension (Ostchega *et al.* 2007) and/or high cholesterol (Hyre *et al.* 2007), with the intent of preventing or delaying the onset of heart disease or stroke. As a result, the most prominent form of chronic illness treatment with adults is hypertension and elevated cholesterol.

Several behaviors identified with the American lifestyle are also responsible for the increase in chronic illnesses. Three modifiable health risk behaviors, lack of

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physical activity, tobacco use, and poor nutrition (CDCP 2009), are linked to several chronic illnesses, including chronic obstructive pulmonary disease (COPD), diabetes, and cancer (AARP 2009a). Less than half of all adults (48.8%) meet Healthy People 2010 minimum recommendations for physical activity, and 23% report no leisure-time physical activity at all during the month (Carlson *et al.* 2008). Approximately 20% of adults (NCHS 2010) and 23% of high school students are cigarette smokers (CDCP 2008).

Obesity has reached epidemic proportions in America and is one of the biggest public health challenges the country has ever faced (U.S. Department of Health and Human Services 2001). An estimated 34% of adults aged 20 years and over are overweight, 34% are obese, and 6% are extremely obese (Flegal *et al.* 2010), while over 20% of children and teens between the ages of 6 and 19 are obese (Ogden *et al.* 2008). Body Mass Index (BMI), calculated as weight in kilograms divided by height in meters squared (kg/m^2), is commonly used to classify people as overweight (BMI 25.0-29.9), obese (BMI equal to or greater than 30.0), and extremely obese (BMI equal to or greater than 40.0). Researchers at RAND Health (2002) estimated that obese individuals have 67% more chronic illnesses than normal-weight individuals, and long-term smokers have 25% more chronic illnesses compared to individuals who have never smoked.

A profile of adults aged 55 years and over

In this section we present selected sociodemographic characteristics of the adult population aged 55 and over. This age cohort was selected because they will constitute nearly one-third (31%) of the total population by 2030 (U.S. Census Bureau 2008), and it is during the ages of 55 to 64 that some adults begin to experience chronic illnesses typical of older adults (Paez *et al.* 2009). Most of the information presented in this section is based on data from the U.S. Census Bureau (2008) and the 2004-2007 National Health Interview Survey (Schoenborn & Heymen 2009). This overview incorporates the latest data available and covers demographics, health status and specific chronic illnesses, specific health behaviors, and health service utilization. Comparisons are made between the following age groups: 55 to 64 (near elderly); 65 to 74 (elderly); 75 to 84 (old); and 85 and over (very old). The data are summarized in Table 1.1.

Demographics

In 2007, adults aged 55 and over accounted for approximately 24% of the population (U.S. Census Bureau 2008). When examined by age category, 11% represented the near elderly, 7% elderly, 5% old and 1% very old. Approximately 55% were female, a percentage that increased with older age: 52% of the near elderly; 56% of the elderly; 59% of the old; and 66% of the very old. Minorities comprised 20% of the total population as well as the four age groups.

Marital status followed a similar pattern: 62% were married, but this figure decreased to 50% of the old and 28% of the very old. Widowhood reflected a mirror image: 18% were widowed, but this figure increased to 39% of the old and 63% of the very old

(U.S. Census Bureau 2008). Educational attainment was quite high; 83% graduated from high school, and 26% were college graduates (15% with an undergraduate degree and 11% with an advanced degree).

Household income primarily reflected differences in employment and retirement status. The median household income in 2008 for adults 55 to 64 years of age was about \$57,000, and \$30,000 for individuals 65 years and older (DeNavas-Walt *et al.* 2009); 54% of the total population had household income of \$35,000 or more (U.S. Census Bureau 2008). About 13% of very old individuals (85 years of age and older), compared to 9% of the total population, lived below the poverty level (poor). Health insurance coverage was also governed by employment and age. Approximately 88% of individuals aged 55 to 64 had some form of health insurance, either through employment-based health benefits/individually purchased coverage (68%) or public coverage (20%), which includes the disabled (10%) and those covered by Medicaid (7%; DeNavas-Walt *et al.* 2009). Almost all individuals aged 65 and over were covered by Medicare (93%), with 10% covered by both Medicare and Medicaid (U.S. Census Bureau 2008). About 59% of the 65 and older age group had some type of private health insurance, and a little over 7% had military-based health insurance, Tricare (Administration on Aging [AoA] 2009).

Health status

Overall, about 23% of adults aged 55 and over rated their health as fair or poor (Schoenborn & Heymen 2009), ranging from 20% in the near elderly to 32% in the very old. There were no differences in health status by gender, except males in the very old age group were more likely than women to rate their health as fair or poor. Individuals whose household income was below the poverty level, who were not married, and who had Medicaid health insurance coverage were more likely to be in fair or poor health.

Total chronic conditions varied accordingly with age. A little over 20% of adults 55 to 64 years had one chronic condition in 2005, and 57% had two or more. This prevalence was in sharp contrast to older adults. Almost 15% of elderly adults had one chronic condition, and 77% had two or more (Machlin *et al.* 2008). About 50% of adults aged 55 and over had hypertension, ranging from 41% in the near elderly group to 56% in the old age group (Schoenborn & Heymen 2009). Between the ages of 55 and 64 men were more likely than women to have hypertension, but the difference was just the opposite for those 65 years and older; women were more likely than men to have hypertension. African American adults and those with Medicaid coverage had the highest rates of hypertension compared to all adults 55 years of age and older.

Heart disease increased with age; 25% of adults aged 55 and over had the disease, but rates more than doubled when comparing the near elderly (17%) with the very old (40%; Schoenborn & Heymen 2009). Compared to all adults 55 years and older, men were more likely than women to have heart disease, and so were men or women who lived in poverty. The prevalence of diabetes did not consistently increase with age. About 16% of the total population had diabetes, with a high of 19% in the elderly group compared to a low of 13% in the very old. Individuals who were poor or had Medicaid coverage were more likely to be diagnosed with diabetes.

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Overall, 32% of adults aged 55 and over had some form of hearing impairment and 14% had vision problems, even when wearing glasses (Schoenborn & Heymen 2009). These incidences increased substantially with age; approximately 62% of the very old had hearing difficulties and 27% had vision impairments. The highest rates of vision impairments were again associated with poverty and Medicaid coverage.

Aging takes its toll on performing everyday activities (Schoenborn & Heymen 2009). The percentage of adults 55 years and older who had difficulty performing physical and social activities increased with age. At least 20% to 25% had some limitations in walking any distance, walking up steps, or standing for any length of time. Researchers have suggested that these disability rates among the near elderly will rise over 40% in the future if depression, diabetes, and nervous system conditions continue to be diagnosed in record numbers (Martin *et al.* 2010). These limitation rates more than doubled for old and very old individuals. About 10% of all adults had difficulties shopping or socializing, and once again these numbers doubled with the old and very old age groups. Arthritis and other musculoskeletal conditions and heart or circulatory problems were the primary causes of their physical limitations (NCHS 2010). As a general trend, women were more likely than men to have limitations performing physical or social activities with prominent differences emerging among the elderly. Adults with Medicaid coverage and who lived in poverty had higher rates of difficulty, and individuals who were married had lower rates of difficulty compared to individuals who were not married.

Health behaviors

About half of adults aged 55 and over (52%) participated in some type of leisure-time physical activity in the past year (Schoenborn & Heymen 2009). The prevalence decreased to less than 30% in the very old. There was little variation in physical activity between men and women. The percentage of adults who did some type of leisure-time physical activity on a regular basis plummeted to 24%. Individuals who were living in poverty, were covered by Medicaid, or were not married were less likely to engage in any type of physical activity.

This cohort of adults contributed to the nation's obesity epidemic. About 23% were considered obese in 2002 (Rhoades 2005). The old and very old age groups were the least likely to be obese (14%). African American and Hispanic adults (34%) were more likely to be obese compared to Caucasian or Asian individuals (12%). Only 34% of all adults were at a healthy weight, ranging from 30% for the near elderly to 53% for the very old (Schoenborn & Heymen 2009). Typically, women were more likely to be at a healthy weight than men. Half of adults aged 55 and older had never smoked cigarettes (50%) and another 27% were former smokers (Schoenborn & Heymen 2009). These percentages increased with age, and women usually were more likely than men to have never smoked.

Health service utilization

The use of almost all types of health care services increased with advancing age (Schoenborn & Heymen 2009). Most adults 55 years of age and older had a regular

source of care (94%). Uninsured adults were less likely to have a regular source of care than any other group (65%). A majority of these adults visited their doctors at least yearly (88%); almost all adults 65 years and older (over 95%) visited a doctor at least once in the past year.

Approximately one-fifth (22%) of adults aged 55 and over had at least one ER visit in the past 12 months, ranging from 19% in the near elderly age group to 33% in the very old age group. Poor adults and those with Medicaid coverage were more likely than other adults to have an ER visit regardless of age. ER visit rates were also higher for unmarried individuals compared to those who were married, regardless of age. In 2007, approximately 13% of adults 55 to 64 years of age were hospitalized at least once in the previous year compared to 33% of adults 65 years of age and older (NCHS 2010). The primary reasons for these admissions were either cardiac or respiratory related and were similar between age groups (Russo *et al.* 2009). The primary reasons for hospitalization among near elderly adults were (1) coronary arteriosclerosis, (2) osteoarthritis, (3) nonspecific chest pain, (4) pneumonia, and (5) congestive heart failure (CHF)/acute myocardial infarction. For adults 65 to 74 years of age reasons included (1) coronary arteriosclerosis, (2) osteoarthritis, (3) CHF, (4) pneumonia, and (5) COPD/cardiac dysrhythmias. For adults 80 years of age and older reasons in 2002 included (1) CHF, (2) pneumonia, and (3) cardiac dysrhythmias (NCHS 2010).

People who receive their health insurance coverage from Medicaid present a different picture of chronicity compared to the general population of adults 55 years of age and older. The Medicaid program is the largest single purchaser of nursing home and long-term care services in the country, and in 2006 Medicaid spending accounted for approximately one in six health care dollars. It accounted for 7% of all federal outlays and consistently averages at least 20% of state budgets, placing substantial pressure on public resources (Kronick *et al.* 2007). Adults comprised approximately 27% of the total Medicaid population, the disabled accounted for 16%, and the elderly accounted for 9% (Williams 2004). More than 60% of adult Medicaid enrollees had a chronic or disabling illness, primarily diabetes, hypertension, asthma, psychoses, or chronic depression.

Nearly half (48%) of adult Medicaid enrollees also had at least one physical or cognitive limitation, and almost half of these individuals (46%) had a mental health problem. People with physical or cognitive disabilities were more likely to have three or more chronic illnesses (35%) compared to non-disabled adults (10%). The most common occurring chronic illnesses for disabled beneficiaries were hypertension (23%), diabetes (14%), and behavioral health disorders, such as affective psychoses (9%) and schizophrenia (9%; Kronick *et al.* 2007).

Medicaid beneficiaries with disabilities and the elderly had different types of chronic illnesses (Kronick *et al.* 2007). The elderly were more likely to have cardiovascular disease (52%) compared to people with disabilities (32%), while individuals with disabilities were more likely to have a psychiatric diagnosis (29%) than the elderly.

Medicaid enrollees with multiple chronic illnesses and disabilities had complex health problems that resulted in more intensive health care use and subsequently much higher expenditures. For example, the elderly and disabled account for only 25% of the total Medicaid population, yet they consume 70% of Medicaid's resources (Williams 2004). Average annual expenses for these beneficiaries were more than 15 times compared to beneficiaries without these conditions.

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Table 1.1 Selected Characteristics of Adults 55 Years of Age and Older

Characteristic	Percent of Population
Total population	24
Total population by age category	
55–64 years	11
65–74 years	7
75–84 years	5
85+ years	1
Female	55
55–64 years	52
65–74 years	56
75–84 years	59
85+ years	66
Minority race	20
Not Married	48
Education	
Less than high school	17
College degree (bachelor's or above)	26
Household income below poverty level	9
Health insurance coverage	
55–64 years	88
Employer/private	68
Disabled	10
Medicaid	7
65+ years	
Medicare	93
Medicare and Medicaid	10
Medigap	59
Military-based	7
Health rated fair/poor	23
Chronic Illnesses	
55–64 years	
1 chronic condition	20
2+ chronic conditions	57
65+ years	
1 chronic condition	15
2+ chronic conditions	77
Hypertension	55
Heart disease	25
Diabetes	16
Hearing problems	32
Vision problems	14
Obesity	23
Any difficulty with physical activities	25
Any difficulty with social activities	10
Health Behaviors	
Leisure-time physical activity	52
Current smoker	23
Prior healthcare use	
Regular source of care	94
Any ER visit	22
Any hospital admission	
55 to 64 years	13
65+ years	33

Sources: DeNavas-Walt *et al.* 2009; Machlin *et al.* 2008, NCHS 2010; Schoenborn & Haymen 2009; U.S. Census Bureau 2008.

A profile of older adults aged 65 years of age and older

The increasing number of Americans 65 years of age and older, coupled with their complex health needs, is one of the leading causes of escalating costs of health care. The 65-and-over age group has grown twice as fast as the rest of the U.S. population in the past 20 years. One out of eight Americans is now 65 or older (AoA 2009). These growing numbers of older Americans, especially those 75 years of age and over, will present the greatest challenge from economic and human service perspectives because age 75 appears to be the point in the lifespan when disability, morbidity, and mortality rates begin to rapidly increase.

The Medicare program enables older Americans to obtain health care services. However, in its current form, Medicare lacks many of the essential components of a high-quality, efficient health system (Medicare Payment Advisory Commission [MedPAC] 2010a). Program spending and utilization have increased substantially over the last three decades, primarily because for Medicare beneficiaries chronic illness is the norm rather than the exception (Wolff & Boulton 2005). It is estimated that if current spending and utilization trends continue, the long-term viability and sustainability of Medicare is in jeopardy (MedPAC 2010a).

Despite the increased prevalence of chronic illness, generalizations about health concerning the elderly are difficult because they are not a homogeneous group. Many people remain relatively healthy and vigorous into their 70s and beyond, while others develop serious illnesses and functional impairment in their 50s and 60s. Chronic illnesses are associated with varying levels of severity (Anderson 2010). Some chronic illnesses are extremely debilitating and others produce effects that are hardly noticeable on an individual's health. Some chronic illnesses are not disabling when diagnosed, but may lead to poorer health later on in life if not treated early and effectively. Some people with chronic illnesses live full, productive lives even with limitations; others experience depression, isolation, and a reduced quality of life.

In this section, we present a summary of demographic and health-related characteristics of adults 65 years of age and older and also specific characteristics of Medicare beneficiaries. The principal sources of data for this section are from the U.S. Bureau of the Census, the NCHS, the Bureau of Labor Statistics, and the Centers for Medicare & Medicaid Services (CMS) Medicare Current Beneficiary Survey. All summary statistics are based on the latest published data available. Selected characteristics are summarized in Table 1.2.

Demographics

Adults 65 years and older represented 13% of the total population in 2008, and are estimated to be over 19% by 2030 (AoA 2009). Females outnumbered males at a 1.36 to 1.0 ratio (136 women for every 100 men). Minorities comprised 19% of the population but are projected to account for 38% of the population by 2050 (Federal Interagency Forum on Aging-Related Statistics 2008). Older men were more likely to be married than older women (72% versus 42%), and widowhood was more common among older women than men (AoA 2009). Marital status had a direct relationship with living arrangements; 19% of older men lived alone compared to 39% of older women. Approximately 78% of both women and men were high school graduates, and about 20% were college graduates.

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Older men had higher rates of college graduation than women (25% versus 20%; AoA 2009; Federal Interagency Forum on Aging-Related Statistics 2008). Median household income was \$44,000 and 10% had incomes below the poverty level (AoA 2009). A greater percentage of minorities lived in poverty than Caucasians. These low-income elderly represent a diverse and complex group that frequently has socioeconomic stressors, limited or low health literacy, and limited access to health care (Counsel *et al.* 2007).

About half of the total population of individuals aged 65 or older (51%) lived in nine states: California, Florida, New York, Texas, Pennsylvania, Illinois, Ohio, Michigan, and New Jersey. In 11 states they comprised 14% or more of the state population: Florida (17%); West Virginia (16%); Pennsylvania, Maine, Iowa, Hawaii, and North Dakota (each 15%); South Dakota and Arkansas (each 14%), and Rhode Island (14%).

Health status

Only 39% of adults 65 and older rated their current health as excellent or very good (AoA 2009). Racial minorities were less likely to rate their health as excellent or very good compared to Caucasians. Over 50% of adults had at least one chronic illness and many had multiple illnesses. The most frequently occurring chronic illnesses were hypertension (53%), arthritis (46%), heart disease (30%), COPD (22%), any cancer (21%), diabetes (18%), and stroke (9%; Federal Interagency Forum on Aging-Related Statistics 2008). Women reported higher rates of arthritis than men (54% versus 43%); men reported higher levels of heart disease (37% versus 26%) and cancer (24% versus 19%) than women. African Americans reported higher levels of hypertension and diabetes than other racial groups. Almost half of men (48%) and approximately one-third of women (35%) reported trouble hearing. Vision trouble affected about 17% of both men and women. Older adults who lived in poverty consistently had higher rates of kidney disease, CHF, heart disease, mental illness, and diabetes, compared to middle or upper-income older adults (AHRQ 2006).

Some form of disability (difficulty with memory, walking, self-care, or independent living) was reported by 38% of older adults, and 16% needed some type of assistance as a result (AoA 2009). There was a strong correlation between disability status and health status. Among those with a severe disability, 64% were in fair or poor health. Based on 2005 data, 42% had at least one ADL or IADL limitation, and women had higher levels of functional limitations than men (Federal Interagency Forum on Aging-Related Statistics 2008).

Health habits

The percentage of older adults who engaged in regular leisure-time physical activity is somewhat small; only about 26% of adults aged 65 to 74 engaged in regular physical activity, and only 19% of persons 75 years of age or older did so (AoA 2009). Based on height and weight combinations 31% were obese; there were no significant differences in obesity based on gender. Only about 9% were still smokers. Poverty was associated with higher levels of inactivity and cigarette smoking but not obesity (NCHS 2010).

Health service utilization

Almost one in every four adults 65 years of age or older had an ER encounter at least once in the previous year (23%) and 9% had two or more visits (NCHS 2010). Poverty

and Medicaid coverage increased the likelihood of ER usage. It has been estimated that ER visit rates will steadily increase among the elderly in coming decades (Wilber *et al.* 2006) which will place more strain on health care resources. The emergency care of older adults is often time and resource intensive, and complicated by underlying chronic illnesses. This increase in future utilization is especially noteworthy since about 33% of elderly patients discharged from the ER are prone to experience an adverse event within 90 days of the index visit, returning to the ER for another visit with or without a hospital admission, nursing home admission, or death (Hastings *et al.* 2008).

About 33% of adults were hospitalized at least once during the past 12 months (Levit *et al.* 2009), and 6% experienced two or more hospital admissions during the same time period (NCHS 2010). Rehospitalization rates among Medicare beneficiaries are high. In 2004, almost one fifth (19.6%) of beneficiaries who had been discharged from a hospital were rehospitalized within 30 days, and 34% were rehospitalized within 90 days; 67% of patients who had been discharged with medical conditions and 52% with surgical procedures were rehospitalized or died within 12 months after discharge (Jenks *et al.* 2009). Among patients rehospitalized within 30 days after a surgical procedure, about 70% were rehospitalized with a medical condition. The most frequent medical reasons for rehospitalization included CHF, pneumonia, COPD, psychoses, and GI problems. The most frequent surgical reasons for rehospitalization included cardiac stent replacement, major hip/knee surgery, other vascular surgery, major bowel surgery, and other hip or femur surgery.

In 2006, the median annual health care cost for these adults was approximately \$4,000 per person; about 25% had no expenses or expenses under \$1,750; and 25% had expenses over \$9,300 (Machlin 2009). Over 50% of individual out-of-pocket spending, excluding health care coverage, was for prescription medications (NCHS 2010). Viewed from another perspective, in 2002 the elderly accounted for 36% of all health care expenses (Cohen & Yu 2006).

Medicare beneficiaries

The Medicare program provides health insurance coverage to Americans who are age 65 or older, under age 65 with certain disabilities, and individuals of all ages diagnosed with End-Stage Renal Disease (ESRD). Medicare Part A, the Hospital Insurance Program, assists in the coverage of inpatient hospital care, inpatient care in a skilled nursing facility, hospice services, and some home health care services. Beneficiaries are automatically enrolled and do not pay a monthly premium for Part A. Medicare Part B, the Medical Insurance Program, helps pay for physician services, outpatient care, some preventive services, and some services not covered under Part A, such as home health care and physical and occupational therapy. Beneficiaries are automatically enrolled unless they opt out, and they must pay a monthly premium for Part B that is deducted from their monthly Social Security benefits. Medicare Part D is a prescription drug benefit provided by private insurance companies. Part D may help lower prescription drug costs for some beneficiaries, and premiums must be paid for by the beneficiary. Below we present a snapshot of the Medicare fee-for-service (FFS) population, with an emphasis on health care utilization and expenditures.

The Medicare population in 2006 was composed of the elderly (84%), the disabled (16%), and individuals with ESRD (less than 1%; MedPAC 2010b). The typical Medicare

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beneficiary was a Caucasian female (56%) between 65 and 74 years of age (42%), who lived with her spouse (49%), attended some college or was a college graduate (41%), and rated her health as good or fair (51%). Most beneficiaries lived in urban areas (76%), had annual household incomes between \$15,000 and \$25,000 (22%; CMS 2002), and had some form of supplemental insurance coverage (90%). Their chronic illnesses were arthritis (55%) and hypertension (55%), and they had no ADL or IADL limitations (CMS 2002). Medicare spent an average of \$8,865 in 2006 for their health care services (MedPAC 2010b). For more characteristics of the Medicare population see Table 1.2.

Table 1.2 Selected Characteristics of the Medicare Population

Characteristic	Percent of Population
Gender	
Male	44
Female	56
Race	
Caucasian	78
African American	9
Hispanic	8
Other	5
Age Categories	
< 65 years	15
65–74 years	42
75–84 years	31
85+ years	13
Not Married	44
Less than high school	27
Household income below poverty level	15
Medicaid eligible	16
Lives alone	28
Lives in rural area	24
Health rated fair/poor	30
Chronic Illnesses	
Hypertension	55
Arthritis	55
Obesity	31
Heart disease	30
Pulmonary disease	22
Cancer (any)	21
Diabetes	18
Osteoporosis	15
Stroke	11
Alzheimer’s disease	4
Prior healthcare use	
Any ER visit	23
2+ ER visits	9
Any hospital admission	33
2+ hospital admissions	6

Sources: CMS 2002; Federal Interagency Forum on Aging-Related Statistics 2008; NCHS 2010; MedPAC 2010b.

Dual-eligible beneficiaries, those who qualify for both Medicare and Medicaid, accounted for 16% of the total Medicare population in 2006 (MedPAC 2010b). They were eligible for Medicaid because of low household income: 51% lived below the poverty level. They were more likely to be female, African American or Hispanic American; they lacked a high school education, had more ADL and/or IADL limitations, lived in rural areas, and lived either in an institution, alone, or with persons other than a spouse. They were more likely to be under 65 years of age (41%), have higher rates of poor health (20%), diabetes, COPD, stroke, and Alzheimer's disease compared to non-dual-eligibles. They accounted for 27% of total Medicare expenditures and averaged per capita expenses of \$15,384, which is more than twice that for non-dual-eligible beneficiaries.

In 2008, health care spending was approximately \$1.95 trillion (MedPAC 2010b), and accounted for 16% of the gross domestic product (Stanton & Rutherford 2006). Medicare is the largest single purchaser of health care in the United States, and accounted for 23% of total spending in 2006 (MedPAC 2010b). The rest of health care spending came from private insurance payers (35%) and from out-of-pocket spending. All public programs, including Medicare, Medicaid, the State Children's Health Insurance Program, and other programs, accounted for 47% of total spending.

Medicare spending presents a more complex picture than beneficiary demographics and their health status. In 2008 Medicare accounted for 29% of all national spending on hospital care, 21% of physician and clinical services, 41% of home care services, 19% of nursing home care, 30% of durable medical equipment, and 22% of prescription drugs (MedPAC 2010b). According to 2009 data, inpatient hospital services accounted for 27% of Medicare expenditures, 13% for physician services, and 12% for prescription drugs under Part D. Total Medicare expenditures in any given calendar year are spent among a very small number of beneficiaries. In 2006, the costliest 5% of beneficiaries accounted for 39% of total Medicare spending. In contrast, 50% of beneficiaries accounted for only 4% of total program expenses. The costliest beneficiaries tended to be the chronically ill, who experienced multiple hospital admissions, were covered by both Medicare and Medicaid (dual-eligibles), and were within in the last year of their lives.

The burden of chronic illness

Over half of Americans suffer from at least one chronic illness. Despite tremendous advances in treatment, chronic illness rates have risen dramatically. Diabetes has become a "new" national epidemic, and escalating rates of obesity and cardiovascular disease threaten to derail previous advances made in reducing these disease rates (DeVol & Bedroussian 2007). It has been estimated that without significant change in chronic illness care and lifestyle, the incidence of cancer, mental disorders, and diabetes will increase by 50% in the next two decades, and heart disease will increase by more than 40% (Partnership to Fight Chronic Disease 2009).

Chronic illnesses are having an enormous impact on human and economic aspects of society. It has been suggested that the health of Americans and the economy depend on our ability to focus efforts on reducing the burden of chronic illness, because if not, the socioeconomic consequences will be staggering and could negatively impact the lifestyles

of all Americans (DeVol & Bedroussian 2007). In this section we present a snapshot of the burdens caused by chronic illnesses.

Chronic illness prevalence

Today, 50% of Americans suffer from at least one chronic illness (Partnership to Fight Chronic Disease 2009), and four out of five older adults, aged 50 and older, suffer from at least one chronic illness (AARP 2009a). This prevalence differs by race: 77% of African Americans have at least one chronic illness, as do 68% of Hispanic Americans; 64% of Caucasians; and 42% of Asian Americans (Collins *et al.* 2002). A quarter of Americans (28%) have multiple chronic illnesses (Anderson 2010).

Additionally, some chronic illnesses are associated with higher risk of co-morbidity than others. For example, people with CHF, kidney disease, or stroke are more likely to have five or more other chronic illnesses than people with arthritis, mental disorders, or cancer (AARP 2009a). Similarly, the relationship of select chronic illness and co-morbidity-risk are associated with age and gender. Using an algorithm developed by Weiss and colleagues (2007), it is possible to estimate major chronic illness co-occurrence in older adults. For example, following their formula, approximately 14% of elderly women with chronic lower respiratory tract illness (emphysema, chronic bronchitis, or asthma) will also have both diabetes and severe arthritis compared to 20% of elderly men. However, few researchers have studied the clustering of chronic illnesses, which has a direct impact on how care is provided to these individuals and ultimately on clinical outcomes (Vogeli *et al.* 2007).

Chronic illnesses' impacts on health service use

Individuals with chronic illnesses, typically adults 55 years of age or older and those with multiple chronic illnesses, are the heaviest users of health care services. They are the highest users in all major health service areas including hospitalizations, physician visits, home health care, and prescription medications (Anderson 2010). They account for a majority of annual health care expenditures. Based on recent 2006 data, individuals with one or more chronic illnesses accounted for: 79% of physician visits, 97% of home health visits, 79% of hospital admissions, and 93% of individuals filling prescription medications (Anderson 2010).

Both home health care and physician visits have increased significantly alongside the number of chronic illnesses (Anderson 2010). Physician visits increased from an annual average of three visits for one chronic illness, to twelve visits for someone with five or more chronic illnesses (or four times as many annual visits). Home health visits showed a similar trajectory; visits for one chronic illness averaged one annual visit versus eleven visits for someone with five or more chronic illnesses. Additionally, the same pattern of chronic illnesses, combined with ADL or IADL limitations, impacted these visits. Physician visits increased from five annual visits for an individual with one chronic illness and any ADL/IADL limitation compared to fourteen visits for someone with five or more chronic illnesses, or three times as many annual visits. Individuals with one chronic illness and any ADL/IADL averaged six annual home health visits compared to seventeen for someone with five or more chronic illnesses.

A different pattern emerged when physician visits for elderly adults were examined, regarding those 65 years of age or older and covered by Medicare. The burden placed on health care providers was magnified radically (Berenson 2007). Medicare beneficiaries with one chronic illness averaged 8 annual visits with 4 different physicians. These numbers increased noticeably based on the number of chronic illnesses. Medicare beneficiaries with two chronic illnesses averaged 11 visits with 5 different physicians; beneficiaries with three chronic illnesses averaged 15 visits with 7 different physicians; beneficiaries with four chronic illnesses averaged 20 visits with 8 different physicians; and beneficiaries with five or more chronic illnesses averaged 37 visits with 14 different physicians.

Individuals with chronic illness were more likely to be hospitalized (Anderson 2010). About 4% of individuals with no chronic illnesses were hospitalized in a 12-month period; however, the incidence increased to 6% with one chronic illness, 10% for two, 14% for three, 19% for four, and 27% for five or more. A similar pattern emerged when comparing any ADL/IADLs limitation with the number of chronic illnesses. Individuals with a chronic illness and any ADL/IADL limitation had a hospitalization rate of 13%, and increased to 17% for two chronic illnesses, 23% for three chronic illnesses, 26% for four chronic illnesses, and 31% for five or more chronic illnesses.

Individuals with chronic illnesses accounted for the majority of prescription medications (Anderson 2010). On average, individuals with one chronic condition filled 7 prescriptions annually, which increased to 16 prescriptions for two chronic illnesses, 27 for three chronic illnesses, 36 for four chronic illnesses and 57 for five or more. This same pattern was visible when comparing the likelihood of filled prescription medications and number of chronic illnesses. Approximately 13% of individuals with one chronic illness and any ADL/IADL limitation filled a prescription in a 12-month period compared to 22% for individuals with two chronic illnesses, 35% for individuals with three chronic illnesses, 42% for individuals with four chronic illnesses, and 65% for individuals with five or more chronic illnesses.

Chronic illness impact on health care costs

In 2006, 50% of individuals diagnosed with one or more chronic illness accounted for 84% of all health care spending (Anderson 2010). These expenditures were disproportional compared to the percentage of individuals with no chronic illnesses and their insurance coverage: 78% of private health-insurance spending was on the 48% of individuals with chronic illnesses; 79% of Medicaid spending was on the 40% of non-institutional individuals with chronic illnesses; and 98% of Medicare spending was on beneficiaries with chronic illnesses. The number of chronic illnesses accelerated health care spending. Compared to individuals with no chronic illnesses, annual expenditures are almost three times greater for someone with one chronic illness, over seven times greater for someone with three chronic illnesses, and almost 15 times greater for someone with five or more chronic illnesses (Anderson 2010). There was also a significant difference in health care spending on chronically ill individuals with ADL or IADL limitations. Individuals with one or more ADL/IADL limitations and five or more chronic illnesses had average annual health expenditures that were more than double compared to individuals with one or

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more ADL/IADL limitations and only one chronic illness (approximately \$17,000 versus \$6,000).

Ultimately, how much a particular chronic illness contributes to health care spending is a product of the total cost of treatment and the impact the disease has on life expectancy (AARP 2009a). For example, a 65-year-old adult with a serious chronic illness will cost Medicare an additional \$1,000 to \$2,000 per year until death, compared to a similar aged adult without the condition (Joyce *et al.* 2005). Over an adult's remaining life expectancy from age 65, diabetes is estimated to be more costly than cancer (\$15,000 in additional spending versus \$13,500), and hypertension more costly than stroke (\$11,000 versus \$4,000), despite differences in shorter life expectancy associated with the chronic illnesses. Lifetime Medicare spending on elderly individuals who are obese is estimated to be \$25,000 to \$37,000 more compared to beneficiaries of normal weight (Thorpe & Ogden 2010). From age 70 until death, Medicare spends approximately 35% more on obese beneficiaries compared to those of normal weight, primarily because of higher co-morbidity among very old obese beneficiaries (Yang & Hall 2008).

Although inpatient care is the largest category of Medicare expenditures, in recent years the prevalence and changing mix of treatment locations for chronic illnesses have had noticeable effects on the rise in Medicare spending (Thorpe *et al.* 2010; Decker *et al.* 2009). Increases in the rates of diabetes, kidney disease, hypertension, hyperlipidemia, mental disorders, and arthritis among Medicare beneficiaries have reduced spending growth for inpatient hospital services. At the same time, because these illnesses are primarily treated in the outpatient setting and at home by prescription drugs, the growth of Medicare spending has largely been attributable to increases in physician visits, prescription medications, and home health care services.

Chronic illness impact on patient care and caregivers

An older America, coupled with advances in medical technology and treatment, has resulted in a substantial reported increase in chronic illnesses. We have seen that this phenomenon has resulted in significantly higher health care utilization and spending, but how have these trends impacted chronically ill adults, their families, and caregivers? Two surveys have highlighted that unfortunately, these individuals and their caregivers have often experienced shortcomings in chronic illness care that they have received (Harris Interactive 2001; AARP 2009b). These surveys found that chronically ill adults experienced numerous quality of care problems, including issues with timely access to care when sick, a lack of care coordination and adequate information, major medical errors, unnecessary medical tests, potentially unnecessary hospital readmissions, and inadequate follow-up care after hospital discharge.

Ongoing challenges for chronically ill adults in receiving care included not being able to see a physician when they felt it was necessary, concerns that their insurance did not cover all types of care needed, and that the costs of care were a financial burden (Harris Interactive 2001; AARP 2009b). Chronically ill adults with three or more chronic illnesses experienced consistently high out-of-pocket expenses compared to those with no chronic illnesses, especially the near elderly (Cunningham 2009; Paez *et al.* 2009). Chronically ill adults also experienced different diagnoses for the same symptoms from

Table 1.3 A Synopsis of Chronic Illness

<p>Chronically Ill Adults</p> <ul style="list-style-type: none">• The number of individuals with chronic illness is increasing substantially and rapidly.• The type and number of chronic illnesses varies by race and socioeconomic status.• Hypertension is the most common chronic illness in adults, followed by lipid disorders, arthritis, heart disease, and eye disorders.• Approximately 50% of individuals with a chronic illness have multiple chronic illnesses.• Elderly adults, 65 years of age and older, have a higher likelihood of having multiple chronic illnesses.• Elderly women are more likely to have chronic illnesses than men.• Approximately 25% of individuals with chronic illnesses have some type of physical or social activity limitation. <p>Chronic Illness and Health Care Utilization</p> <ul style="list-style-type: none">• Individuals with chronic illnesses are the largest consumers of health care services.• Individuals with multiple chronic illnesses have the highest likelihood of hospitalization.• Outpatient health care utilization, especially physician visits and home health care visits, increase substantially with the number of chronic illnesses an individual has.• Over 60% of annual health care spending is for individuals with multiple chronic illnesses.• 98% of annual Medicare expenditures are for individuals with chronic illnesses and over 66% of expenditures are for those with five or more chronic illnesses. <p>Chronic Illness' Impact on Individuals and Their Caregivers</p> <ul style="list-style-type: none">• Quality of care for individuals with chronic illnesses varies by race.• Over 50% of individuals with chronic illnesses have more than three different physicians.• Individuals with chronic illnesses report not receiving adequate information from clinicians and health care providers.• Out-of-pocket expenses increase substantially with the number of chronic illnesses an individual has.• Caregiving children and spouses are more likely to suffer from depression.• Family caregivers provide a majority of all long-term care services to the chronically ill.

different physicians, and some were warned by a pharmacist about a potentially harmful interaction between medications prescribed for them by one or more of their physicians.

Poor communication patterns were prominent among providers and chronically ill adults and their caregivers (AARP 2009b). Common problems included that the provider did not have all the needed information when the patient arrived for the visit, the patient and/or caregiver did not understand what they had been told by the provider, and they were not told the purpose of or how to take a newly prescribed medication.

Chronically ill adults were reluctant to ask for help, and few of them ever asked for assistance from outside the immediate family (Harris Interactive 2001). On average, family caregivers had provided care for a loved one for about four and a half years. When these caregivers needed help, they more often sought assistance from local religious and/or community organizations they were familiar with. Like the chronically ill adult they cared for, caregivers were not likely to ask for assistance, even from other relatives or close friends.

Family caregivers are a critical support structure for individuals with chronic illnesses. In any given year, over 50 million Americans find themselves in a caregiving role (Partnership to Fight Chronic Disease 2008). Almost one in five (17%) family caregivers provide 40 hours of care a week or more, and provide a majority (80%) of all long-term care

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services for those with a chronic illness or disability. Family caregivers who experience extreme stress while caring for their loved one with chronic illness or disability have been shown to be more prone to chronic diseases themselves and they age prematurely. Children of aging parents are twice as likely as non-caregivers to suffer from depression, and spouses are six times as likely to suffer from depression (Partnership to Fight Chronic Disease 2008). Caregiving families tend to have incomes that are \$15,000 less than non-caregiving families, yet they spend 2.5 times more on out-of-pocket expenses.

Summary

As Americans have become increasingly older, so have the number living with chronic illnesses. Our current health care system was not designed to provide coordinated care for these individuals who are primarily insured by the Medicare and Medicaid programs. As a result, these individuals are not receiving optimum quality of care for many of their chronic illnesses. As the “baby boom generation” gets ready to become Medicare beneficiaries, more providers with specialized training, resources, and new approaches to delivering care for chronic illnesses will be needed to meet their health care needs.

Improving care for the chronically ill is one of the most important challenges facing our health care system. Research has consistently demonstrated that maintaining and sustaining improvements in care management and coordination for chronically ill adults is extremely difficult. Additionally, dysfunctional incentives have contributed to a fragmented system that has failed to address the fundamental causes of chronic illness, and too many care decisions have been removed from the control of clinicians and patients.

The prevalence of chronic illness is steadily increasing, and by 2030 it is estimated that the number of adults with at least one chronic illness will be in excess of 171 million. Besides longevity, lack of physical activity, tobacco use, and poor nutrition habits are directly responsible for increased rates of chronic illnesses, including cancer, COPD, diabetes, and heart disease. The chronically ill have significantly higher rates of disability, mortality, health care utilization, and medical expenses compared to people without chronic illnesses.

Rates of chronic illness are correlated with socioeconomic status and ethnicity. Adults who live near or below the poverty level and are racial minorities experience significantly higher levels of chronic illnesses and disability. Projections indicate that these incidences will only get worse in the future.

The data indicate that the current care provided to chronically ill adults and their caregivers often leads to poor outcomes. In clinical practice, chronic illness management typically falls short of effective communication and coordination across different care settings and providers. As a result, patients and their families/caregivers experience the brunt of the chronic illness burden.

It has been acknowledged and acclaimed by medical experts and policy makers that our health care system is dysfunctional and for all purposes, broken. Almost all agree that changes are necessary, especially when it comes to financing and delivering medical care for individuals with chronic illnesses. In the preceding chapters we present information that addresses the current state of chronic illness care, and we offer evidence-based suggestions that have the potential to positively impact care management and address the issues of fragmentation and care coordination for the chronically ill.

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