

## Chapter 5

# Osteoporosis and Bone Health

Osteoporosis has been called the “silent disease” because it typically progresses without symptoms until a fracture occurs.<sup>1</sup> Osteoporosis is age-related and characterized by low bone mass due to the loss of bone in the aging process. Bones are easier to break even from falls at low heights, such as standing, or during the course of simple daily activities. In 2002, an estimated 44 million persons over the age of 50 in the United States were at risk for fracture due to osteoporosis or low bone mass. By 2020, if current trends continue and effective treatments are not found and widely implemented, it is estimated that over 61 million persons will be at risk.<sup>1</sup>

The economic burden of inpatient, outpatient and long-term care of incident osteoporotic fractures in the U.S. was estimated at nearly \$17 billion in 2005; cumulative cost over the next 2 decades are estimated to be \$474 billion.<sup>2</sup> In addition to dollar cost, osteoporosis-related fractures bring a burden of pain and disability, resulting in time lost from work or the inability to perform activities of daily living.

### ***Section 5.1: Osteoporosis and Low Bone Mass***

Osteoporosis is a disease characterized by low bone mass and deterioration of bone structure that causes bone fragility and increases the risk of fracture. Gradual loss of bone with aging is normal; however, that loss may be accelerated by factors such as menopause, serious health conditions or their treatment, and lifestyle factors such as inadequate diet, lack of exercise, smoking, or excessive alcohol consumption.

Although often considered a disease primarily of females, within the past decade it has become apparent that osteoporosis is not solely a women’s disease. It affects an estimated 2 million men in the United States, particularly older men. In men, as in women, the low bone mineral density characteristic of osteoporosis is associated with an increased risk of bone fracture. Fracture most commonly affects the hip and lumbar vertebrae, but the radius, tibia, and ribs also may be affected. Rates of fracture-related morbidity and mortality are significant in all older persons, but are substantially higher in men than in women.

The presentation and cause of osteoporosis differ between men and women in several important ways. For example, the condition manifests later in life in men, probably because men initially have a greater bone mass. Moreover, unlike among women, for nearly half of men with osteoporosis an underlying cause can be identified. Among the causes of osteoporosis in men are corticosteroid therapy for arthritis or asthma, hypogonadism in patients being treated for cancer of the prostate with androgen-withdrawal therapy, consumption of large amounts of alcohol, hyperthyroidism, and vitamin D deficiency

Currently, the diagnosis of osteoporosis is defined by the World Health Organization (WHO), and is based on the results of dual energy x-ray absorptiometry (DXA) testing, which evaluates the bone mineral density (BMD) present at several sites. WHO defines osteoporosis as a BMD value more than 2.5 standard deviations (SD) below the average value for a young, healthy

woman (a T-score of  $<-2.5$  SD).<sup>3</sup> Osteopenia, or low bone mass, is defined as  $-1.0$  to  $-2.5$  SD, or 10% to 30%, below the normal bone mass.<sup>4</sup>

### *Section 5.1.1: Osteoporosis Disease Classifications Defined*

For purposes of this chapter, osteoporosis-related conditions will be presented using three broad categories, based on ICD-9-CM diagnosis codes. (Table 5.1) *Primary osteoporosis* includes only persons who have a diagnosis of osteoporosis. It is found primarily among elderly persons, with postmenopausal women affected at the highest rates. The reasons why some persons develop osteoporosis while others do not is unclear; however, estrogen deficiency has been identified by the U.S. Department of Health and Human Services, Office of the Surgeon General, as a primary cause in both men and women.<sup>4</sup>

*Low energy fractures*, formerly referred to as fragility fractures, occur from an event such as a fall from a standing height or less (versus a high energy cause such as a vehicular accident). In general, the lower the BMD, the higher risk of a low energy fracture. However, the reasons why some women and men with low BMD do not experience low energy fractures in circumstances similar to those who do are not well understood.

*Secondary osteoporosis* occurs when another condition or treatment causes erosion of bone health. Causes of secondary osteoporosis include certain diseases, such as hyperthyroidism or celiac disease, and certain medications, especially glucocorticoids. In addition, some lifestyle habits, such as low activity levels, diets with low calcium intake, and smoking are believed to contribute to the development of osteoporosis. In 2004, 6.1 million persons aged 45 and over in the United States were diagnosed with a condition that can contribute to the development of osteoporosis.

In recent years, knowledge about osteoporosis risk factors, diagnostic criteria, and treatment options has advanced rapidly.<sup>1,5</sup> Research into treatments and preventive measures is flourishing. Clinical trials have shown that suppression of bone turnover markers, an indication of a slowing of bone loss, can be achieved in as little as 3 months of using prescription therapies, reducing the risk for low energy fractures.<sup>6</sup> However, it is also known that many patients diagnosed with osteoporosis do not follow the treatment regime, often due to medication side effects, and that not all patients respond to current therapies. Perhaps most important, current data demonstrate that the majority of patients who suffer a low energy fracture and are subsequently among those at highest risk for repeat fracture typically are not evaluated for osteoporosis, much less treated.

### *Section 5.1.2: Prevalence of Osteoporosis*

Estimates of the prevalence of osteoporosis and low bone mass are based on the best available scientific information from leading researchers. There are no definitive sources of information on the numbers of persons with osteoporosis or at risk for low energy fractures, as this is truly a “silent disorder.” Estimates of prevalence among white females are generally believed to be more reliable because this group has been studied the most due to their high fracture rate. The incidence or prevalence among males and racial groups is even more difficult to estimate as there are no definitions of what constitutes osteoporosis and low bone mass in these groups as there are with white women. However, the incidence of osteoporosis and low bone mass among these groups is believed to be higher than previously estimated. The leading national study that provides data upon which to make these estimates is the National Health and Nutrition Examination Study (NHANES), a self-reported

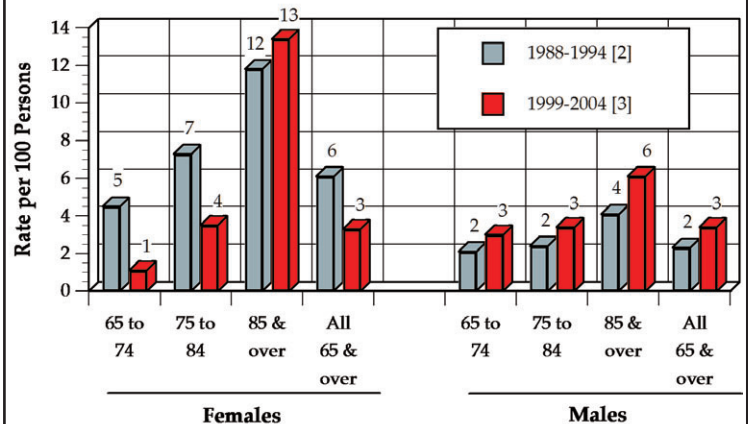
study that includes questions related to diagnosis and treatment of osteoporosis, fractures, and cause of fracture. Data from the NHANES surveys for the years 1999-2000, 2001-2002, and 2003-2004 were merged and analyzed for this report to provide estimated prevalence.

The National Osteoporosis Foundation (NOF) estimated there were 29.5 million women and 11.7 million men in the United States with osteoporosis or low bone mass in 2002. Asian and non-Hispanic white women are affected about equally, and at higher proportions than Hispanic and non-Hispanic black women. The prevalence of osteoporosis and low bone mass among males was substantially lower, but followed the same general racial patterns.<sup>1</sup>

Data in the NHANES study indicate that over the 10-year interval between 1988-1994 and 1999-2004, based on self-reported conditions, the prevalence of osteoporosis in both females and males aged 65 and over more than doubled. (Table 5.2 and Graph 5.1.1) The rapid increase in the prevalence of osteoporosis diagnosis is likely due to the

extensive educational and awareness efforts aimed at both the general public and health care professionals, as well as increased testing of bone mass in older women. During that same time frame, females of this age group reported a slight decline in the rate of hip fractures, while males

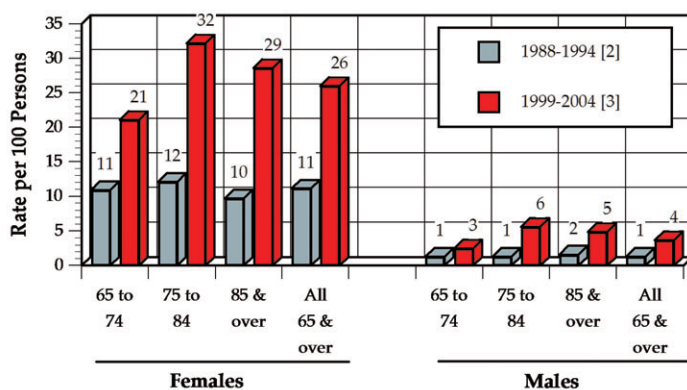
**Graph 5.1.2: Self-Reported Rate of Hip Fracture [1] for Persons Aged 65 and Over, United States 1988-1994 and 1999-2004**



[1] Has a doctor ever told you that you had broken or fractured your hip?  
 [2] Source: Praemer A, Furner S, Rice DP; *Musculoskeletal Conditions in the United States*. Rosemont, IL; American Academy of Orthopaedic Surgeons; 1999; p 42.  
 [3] Source: National Center for Health Statistics. National Health and Nutrition Examination Survey Data, 1999-2004

aged 65 and over reported an increased rate of hip fracture. (Graph 5.1.2) A similar decline in hip fracture rates was found by a team of Dartmouth researchers in examination of Medicare databases.<sup>4</sup> Although reasons for this shift are unknown, greater awareness of osteoporosis and fracture potential, increased testing, and the impact of recent treatments in females may be contributing factors. Awareness of osteoporosis among men is less prevalent. They are less likely to be evaluated early for osteoporosis, even in the face of serious, contributing medical conditions.

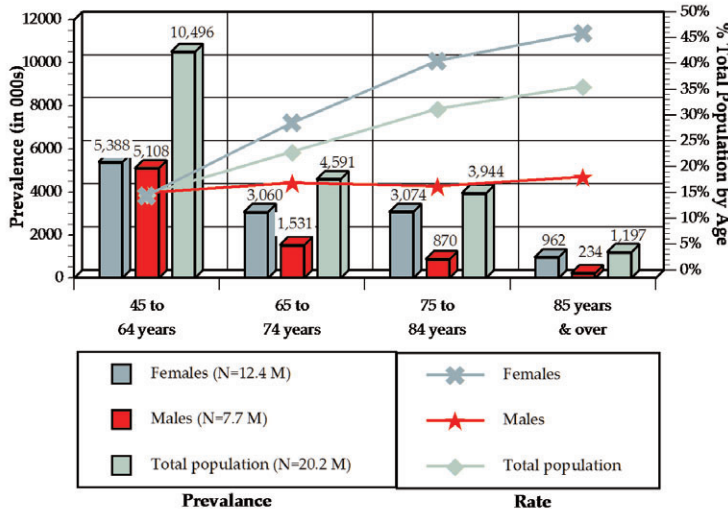
**Graph 5.1.1: Self-Reported Rate of Osteoporosis [1] for Persons Aged 65 and Over, United States 1988-1994 and 1999-2004**



[1] Has a doctor ever told you that you had osteoporosis, sometimes called thin or brittle bones?  
 [2] Source: Praemer A, Furner S, Rice DP. *Musculoskeletal Conditions in the United States*, ed 2. Rosemont, IL: American Academy of Orthopaedic Surgeons; 1999.  
 [3] Source: National Center for Health Statistics, National Health and Nutrition Examination Survey Data, 1999-2004

On average, for each year between 1999 and 2004, 20 million people over the age of 45 reported they were told by their doctor they had osteoporosis or had sustained a fracture of the hip, spine, or wrist, the most common locations of fractures associated with

**Graph 5.1.3: Self-Reported Prevalence of Osteoporosis or Fracture of Hip, Spine or Wrist for Persons Aged 45 and Over, United States 1999-2004**



Source: National Center for Health Statistics. National Health and Nutrition Examination Survey Data, 1999-2004

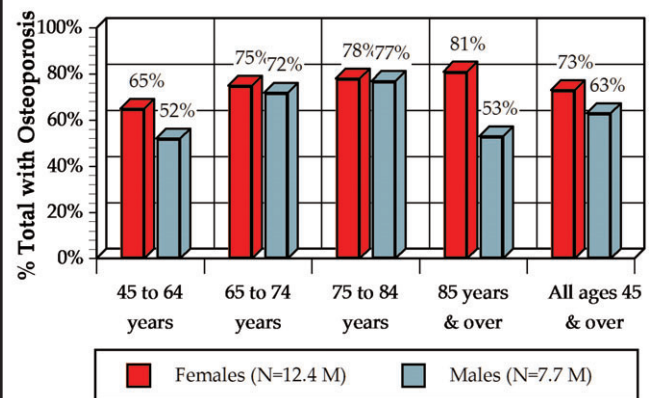
Thirty-six percent (36%) of females, compared to 48% of males, reporting an osteoporosis condition were under the age of 65 years. (Table 5.3) The reason for this variation is not known.

Rates of treatment for osteoporosis reported between 1999 and 2004 were slightly higher for females than for males; however, the differences narrowed in individuals between the ages of 65 and 84. (Table 5.3 and Graph 5.1.4) The data suggest that if patients recognize they have osteoporosis, the likelihood they will receive treatment rises, an indication that education about screening or testing for osteoporosis is an important factor in ensuring better long term outcomes.

osteoporosis. (Table 5.3 and Graph 5.1.3) These self-reports were primarily among women in all age groups; the sole exception was persons aged 45 to 64, among whom the self-reports were nearly evenly divided between the females and males (51% to 49%, respectively.) Among those 85 years of age or older, 80% self-reporting a diagnosis of osteoporosis or fracture were female, most likely reflecting the longevity of females and their preponderance in this age group.

The higher proportions of women in older age groups reporting a diagnosis of osteoporosis and/or low energy fractures may also be due to the fact that, as the population ages, the incidence of both of these conditions rises steadily among women, while that of males remains relatively steady. Between the ages of 45 and 64, approximately 16% of both females and males report they have been told by a doctor they have osteoporosis or have had a fracture of the hip, spine, or wrist. By the age of 85 or older, 48% of females report osteoporosis and/or a fracture, while only 20% of males in this age group do so.

**Graph 5.1.4: Self-Reported Treatment for Osteoporosis [1] by Gender for Persons Aged 45 and Over, United States 1999-2004**



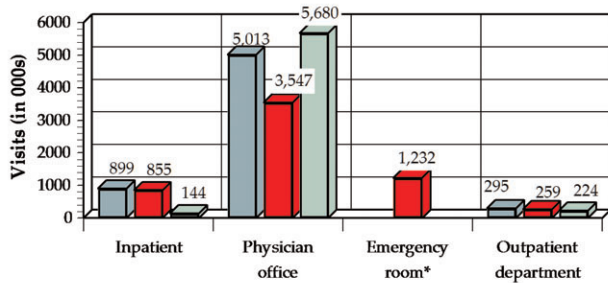
[1] Replied "Yes" when asked if ever been told by a doctor that you had osteoporosis and had been treated for osteoporosis.  
Source: National Center for Health Statistics. National Health and Nutrition Examination Survey Data, 1999-2004

## Section 5.2: Health Care Resource Utilization for Osteoporosis and Low Energy Fractures

### Section 5.2.1: Patient Visits, 2004

In 2004, 6.2 million persons aged 45 and over with a diagnosis of primary osteoporosis utilized

**Graph 5.2.1: Health Care Visits for Osteoporosis [1] and Low Energy Fractures [2] for Persons Aged 45 and Over by Site, United States 1999-2004**



\* Estimates for primary and secondary osteoporosis do not meet standards for reliability for emergency room visits.  
 [1] Osteoporosis and related condition ICD-9-CM codes shown in Section 5.5  
 [2] Treatment for fractures, excluding those with high energy causes (i.e., vehicular [auto, air, water] accidents, war injuries)  
 [3] Diagnosis of another medical condition that may lead to or contribute to the development of osteoporosis  
 Sources: National Center for Health Statistics, National Inpatient Survey, National Ambulatory Medical Care Survey, and National Hospital Ambulatory Medical Care Survey, 2004

health care resources; an additional 5.7 million persons of this age with low energy fractures also utilized health care resources. (Table 5.1) An additional 6.1 million persons aged 45 and over were diagnosed with a condition that can contribute to the development of osteoporosis, and were therefore at risk for secondary osteoporosis. An additional 1.4 million persons of this age sustained a vertebral fracture with a spinal cord injury; however, all 1.4 million of these patients received their spinal cord injury as a result of a high energy impact (i.e., motor vehicle accident). (Table 5.4)

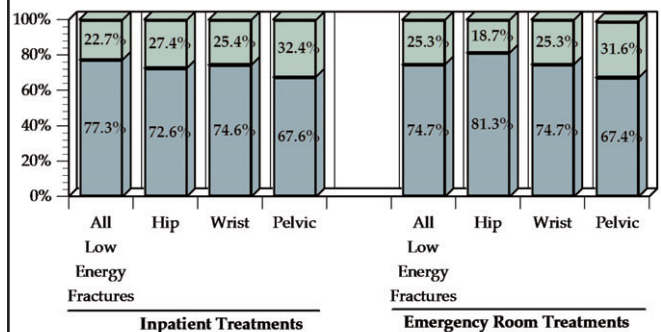
Health care utilization by persons aged 45 and over with a diagnosis of primary osteoporosis and low energy fractures involves primarily physician office visits. In 2004, 80% of patients aged 45 and over with primary osteoporosis were diagnosed in a physician’s office, while 62% of patients over the age of 45 with a low energy fracture were treated in a physician’s office. (Graph 5.2.1)

Persons aged 45 and over hospitalized with a diagnosis of primary osteoporosis or a low energy fracture accounted for 5% of all inpatient admissions in 2004, representing 704,300 incidents. In addition, 1.23 million low energy fractures of persons aged 45 and over were treated in emergency rooms, 21% of all cases treated. (Table 5.4)

Ninety percent (90%) of individuals aged 45 and over diagnosed with primary osteoporosis in an inpatient setting in 2004 were females. (Table 5.5) Among individuals age 45 and over, low energy fractures occurred in females at a fairly constant 3:1 ratio to males. (Tables 5.5 and 5.6 and Graph 5.2.2) The sole exception is vertebral/pelvic fractures, for which the female:male ratio was 2:1.

With the exception of inpatient hospitalization for primary osteoporosis or a low energy fracture, males aged 45 or over did not use health care resources in sufficient numbers to reach statistical reliability in the overall prevalence in the databases. However, the age of males treated as inpatients or in the emergency room for a low energy fracture is shown for comparative purposes. (Tables 5.5 and 5.6)

**Graph 5.2.2: Low Energy Fracture [1] Treatment for Persons Aged 45 and Over by Sex and Site, United States 2004**

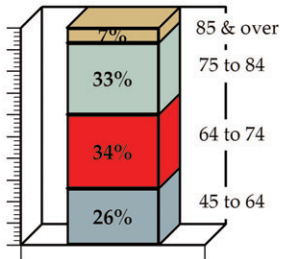


[1] Treatment for fractures, excluding those with high energy causes (i.e., vehicular [auto, air, water] accidents, war injuries)  
 Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004

*Section 5.2.2: Age at Time of Osteoporosis Diagnosis or Low Energy Fracture Incident, 2004*

Although osteoporosis may occur in younger patients, it is primarily a condition of older adults. Among patients 45 years of age or older, the mean age at time of diagnosis of osteoporosis in a physician's office in 2004 was 71.4 years. One-fourth of these diagnoses (26%) were for females between the ages of 45 and 64. (Graph 5.2.3) Due

**Graph 5.2.3: Age Distribution for Osteoporosis Diagnosis in Physician's Office for Persons Aged 45 and Over, United States 2004**



Source: National Center for Health Statistics, National Ambulatory Medical Care Survey, 2004

to the very small number of males, this age is primarily representative of females.

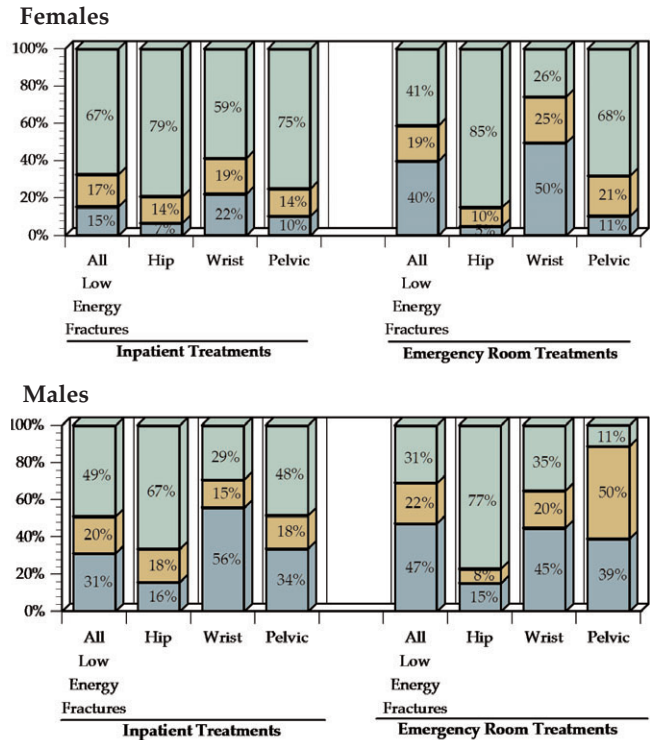
The mean age of females aged 45 or over receiving a diagnosis of primary osteoporosis in an inpatient setting was 77.6 years, with 66% of the diagnosed patients aged 75 or over. However, 13% of the diagnoses occurred in females

between the ages of 45 and 64, with the remaining 21% aged 65 to 74. Males aged 45 or over received a diagnosis of primary osteoporosis at a slightly younger mean age of 75.3 years. A higher proportion of males (19%) than females (13%) between the ages of 45 and 64 had a diagnosis of osteoporosis. (Table 5.5)

Low energy fractures also occur more frequently in the elderly, particularly among females. Among patients 45 years of age and older and treated for a hip fracture, 79% treated in an inpatient setting and 85% treated in an emergency department were females aged 75 years or older. However, wrist fractures treated in emergency departments were more commonly seen in younger women between the ages of 45 and 64 (50%). Among females aged 45 to 64, only 15% of all low energy fractures treated in an

inpatient setting were females, while 40% seen in an emergency department were females of this age. (Graph 5.2.4)

**Graph 5.2.4: Low Energy Fracture [1] Treatment for Persons Aged 45 and Over by Age, Gender, and Site, United States 2004**



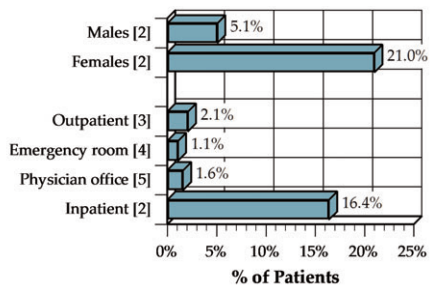
[1] Treatment for fractures, excluding those with high energy causes (i.e., vehicular [auto, air, water] accidents, war injuries)

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004

With the exception of hip fractures, males aged 45 and over are more likely to have a low energy fracture at a younger age than are women. This could be due to exposure to more physical activity or settings in which low energy impacts more frequently occur. Overall, 31% of low energy fractures treated in an inpatient setting and 47% treated in emergency departments were males aged 45 to 64 in 2004. (Graph 5.2.4)

In 2004, the proportion of low energy fractures in persons aged 45 and over who also are diagnosed with osteoporosis as a potential contributing

**Graph 5.2.5: Proportion of Low Energy Fracture [1] Patients Aged 45 and Over with a Diagnosis of Osteoporosis by Site and Gender, United States 2004**



[1] Treatment for fractures, excluding those with high energy causes (i.e., vehicular [auto, air, water] accidents, war injuries)  
 [2] Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004  
 [3] Source: National Center for Health Statistics, National Hospital Ambulatory Medical Care Survey, Outpatient Centers, 2004  
 [4] Source: National Center for Health Statistics, National Hospital Ambulatory Medical Care Survey, Hospital Emergency, 2004  
 [5] Source: National Center for Health Statistics, National Ambulatory Medical Care Survey, 2004

cause was very low. Among all patients aged 45 and older with a low energy fracture seen in a physician's office, an emergency room, or an outpatient setting in 2004, fewer than 2% were also diagnosed with osteoporosis. Even in an

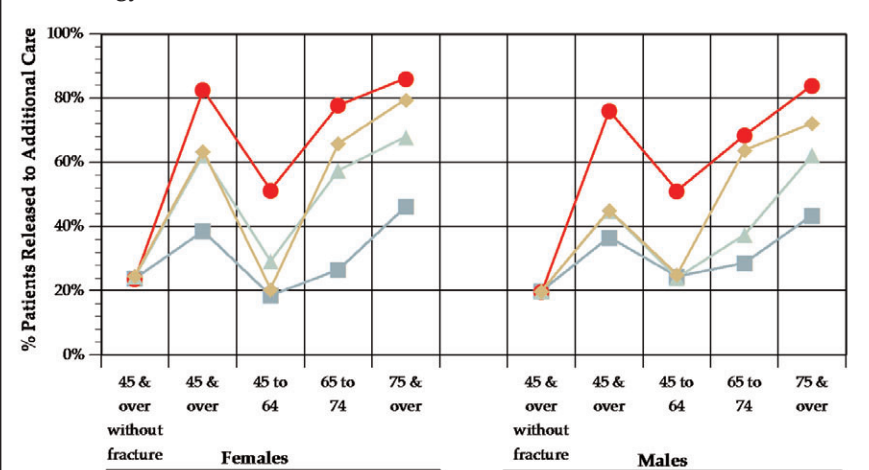
nursing care setting upon their release from inpatient care than are persons without a fracture. The older the patient, the greater the likelihood that such a transfer will be necessary. Among non-fracture female patients, approximately 24% are released to additional care settings, while approximately 38% of non-fracture patients aged 75 and over are released to another care setting. By contrast, among all female hip fracture patients, the proportions are 83% and 86% for all patients and those aged 75 and over, respectively. Even female patients with a wrist fracture are more likely to be released to additional care, with 45% of all patients with this type of fracture going to another care setting, and 60% of those aged 75 and over doing so. The rates for males released to an additional care setting are slightly lower, but still substantially higher than for patients with no fracture. (Table 5.7 and Graph 5.2.6) The cost of additional care for patients with low energy fractures has not been quantified due to lack of available data.

inpatient setting, only 16% of low energy fracture patients also had an osteoporosis diagnosis, an indication that osteoporosis is under-diagnosed even when patients are admitted to a hospital. Females with a low energy fracture were four times as likely as males with a fracture to be diagnosed with osteoporosis. The failure to recognize osteoporosis as a possible contributing cause of the fracture increases the possibility of future fractures in this already at risk population. (Tables 5.4 and 5.5 and Graph 5.2.5)

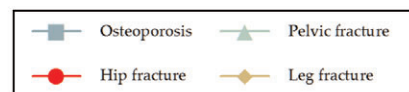
*Section 5.2.3: Short/Long-Term Care for Low Energy Fracture Patients*

Regardless of the age at which a low energy fracture occurs, both females and males are more likely to be transferred to a short, intermediate, or long-term skilled

**Graph 5.2.6: Hospital Discharge to Short/Intermediate/Skilled Nursing Care for Persons Aged 45 and Over by Age and Sex for Persons with Osteoporosis, Low Energy Fractures [1] and without a Fracture, United States 2004**



[1] Treatment for fractures, excluding those with high energy causes (i.e., vehicular [auto, air, water] accidents, war injuries)  
 Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004



#### *Section 5.2.4: Nursing Home Population and Risks of the Fragile Elderly*

After an elderly person has sustained a fall resulting in fracture, his or her ability to live independently is reduced due to pain and limitations in activity. These patients are also at risk of additional falls and consequent fractures. These patients require additional care and resources. Among persons in the nursing home population in 2004, 7,640 (<1% of total admissions) were diagnosed with osteoporosis at the time of their admission; the majority were aged 75 and older. (Table 5.8) A substantially larger number, more than 118,000 (8% of admissions), had sustained a low energy fracture at the time of admission, most likely due to osteoporosis and fragile bones. Females accounted for more than 82% of the nursing home admittances due to fracture; 92% of the nursing home admittances were aged 75 years of age or older at the time of the fracture. Hip fractures are the most common type of fracture that places older persons in a nursing home, accounting for 44% of admittances due to fracture. However, pelvic, upper and lower limb, ankle or foot, and stress fractures are also a common cause of placement in a nursing home for persons aged 75 and older.

At the time of interview in 2004, nearly 40,200 nursing home residents aged 65 and older had sustained a new fracture since being admitted. The majority of these were females (74%); more than one-half (58%) were 85 years of age or older. Nearly 522,000 nursing home residents aged 65 and older, or two in five, reported reported a fall within the past 6 months. Of those falling, 2%, or 27,600, sustained a hip fracture within the past 6 months, and 33,900 (3%) another type of fracture.

As the number of U.S. persons over the age of 75 increases in the next few decades, the burden placed on nursing home care due to fragile bones

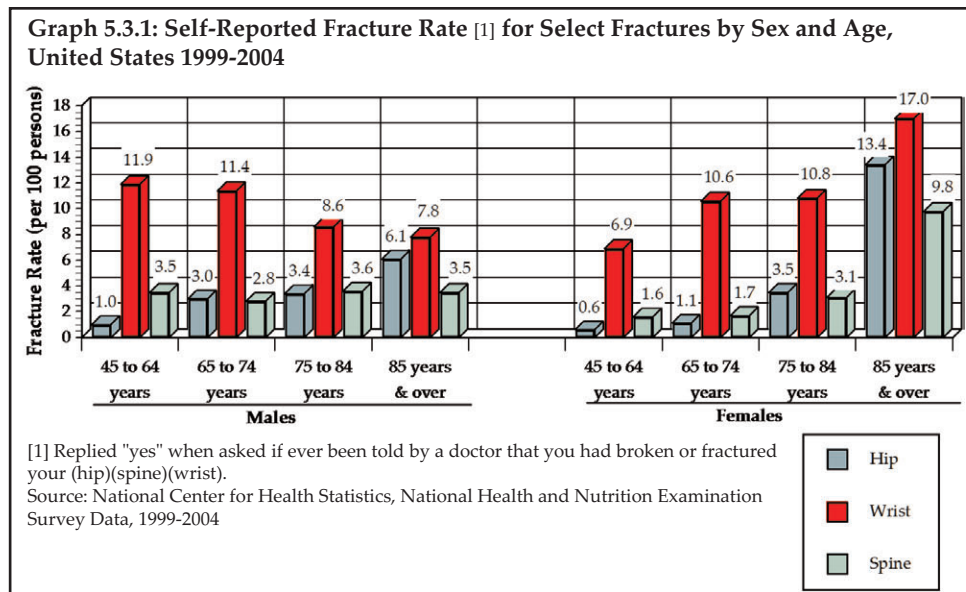
will increase. Reducing the incidence and severity of osteoporosis will be critical to maintaining the health of the aging population, as well as reducing health care costs.

#### *Section 5.3: Falls and Low Energy Fractures*

Falls are the leading cause of injury, including mortality and non-fatal injuries, for persons aged 65 and older in the United States and a leading cause of hospitalization among persons of all ages. In 2000, falls accounted for 46% of all hospitalizations from injuries; 309 out of every 100,000 persons suffering a fall were hospitalized.<sup>7</sup> In 2002, 12% of unintentional injury deaths resulted from falls and 1.6 million nonfatal injuries from falls were treated at hospital emergency departments throughout the United States.<sup>8</sup>

Fractures are the primary cause of hospitalization or death following a fall, particularly among individuals aged 65 and over. Osteoporosis is a leading underlying cause of low energy fractures after a fall, especially among the elderly. One in two women and one in four men over aged 50 will have an osteoporosis-related fracture in her or his remaining lifetime.<sup>9</sup>

Self-reported fracture rates for hip, wrist, and spine, from 1999 to 2004, indicate an increasing rate of fracture among females as the population ages, particularly among individuals aged 85 and older. Among males, relatively stable rates of spine fracture occurred between the ages of 45 and older, while wrist fracture rates decreased with age and hip fracture rates increased. (Table 5.9 and Graph 5.3.1) Overall, 12% of fractures reported for persons aged 45 and over were hip fractures; 19% were spine fractures; and 69% were wrist fractures.



obtain prevalence than incidence. Often they are diagnosed when the patient complains of chronic back pain as the result of compression or stress on the weakened spine.<sup>4</sup> Even without acute symptoms, vertebral compression fractures can impact significantly on quality of life, affecting the ability to walk, balance, and sometimes cause upper back, neck or abdominal pain. The

Hip fractures significantly impact quality of life, and are invariably associated with chronic pain, reduced mobility, disability, and an increasing degree of dependence.<sup>10</sup> The mortality rate in the first 12 months after hip fracture is 20%, and is higher in males than females.<sup>9</sup> Some studies suggest that mortality may be higher, with a 30% rate following hip fracture surgery noted.<sup>11</sup> Current estimates are that one in four hip fractures occur in males, and recent research indicates that men will have a different course of recovery than women, with higher rates of disability as well as mortality.<sup>12,13</sup> Fifty percent of persons experiencing a hip fracture will be unable to walk without assistance, and 25% will require long term care.<sup>14</sup>

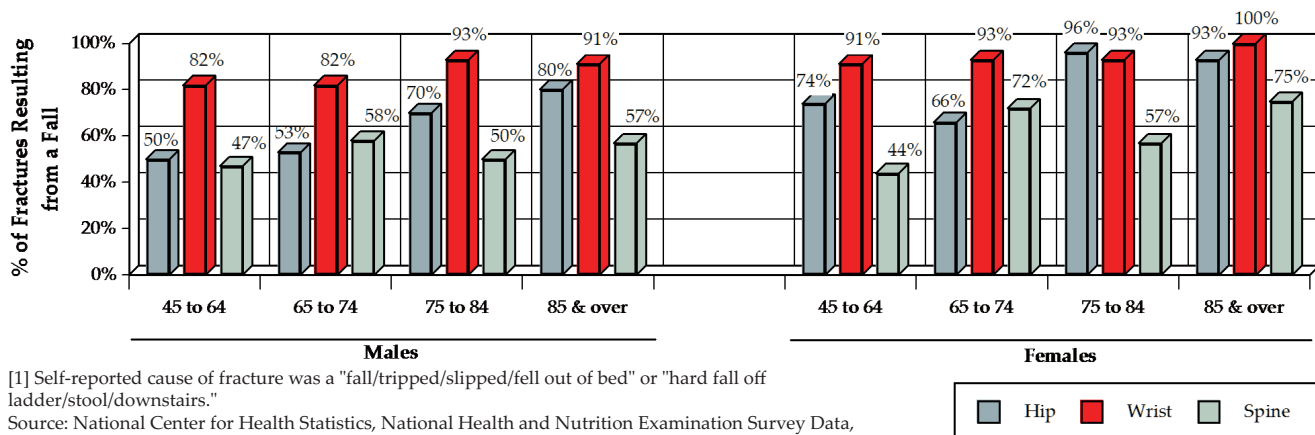
There is no generally accepted definition of a spine fracture, also referred to as compression fractures, resulting in a wide variation of overall prevalence estimates.<sup>15</sup> Only about one in four spinal fractures are diagnosed as a result of falls. The most widely accepted definition of suspected spine fractures in use today is a 20% loss of height from early adulthood, hence compressing the vertebral column. Since many of these fractures occur without acute symptoms and patients are rarely admitted to the hospital, it is easier to

presence of existing vertebral fractures are generally considered a predictor for future fracture risk of the spine, wrist and hip.

Among all females aged 45 and over, falls were responsible for nearly all wrist fractures, as well as for the majority of hip fractures, treated between 1999 and 2004. Males follow a similar pattern, although falls account for a slightly lower proportion of fractures among men. Roughly half of spine fractures are caused by falls, with other causes, including automobile accidents, accounting for the remainder. The older the patient, the more likely that a fall is the cause of a fracture. (Table 5.9 and Graph 5.3.2)

The mean age at time of first fracture of the wrist caused by a fall for all females aged 45 and over reporting a wrist fracture was 62.9 years. The mean age at first fracture of the spine was 70.6 years; for first hip fracture it was 74.8 years. Wrist and spine fractures are more common among younger females, while hip fracture rates increase significantly among females aged 85 and older. Among males, the mean age of first wrist fracture is 60.2 years, reflecting the higher rate of fracture in younger males than in older males. The mean

**Graph 5.3.2: Proportion of Fractures Resulting from a Fall [1] for Select Fractures by Sex and Age, United States 1999-2004**



[1] Self-reported cause of fracture was a "fall/tripped/slipped/fell out of bed" or "hard fall off ladder/stool/downstairs."

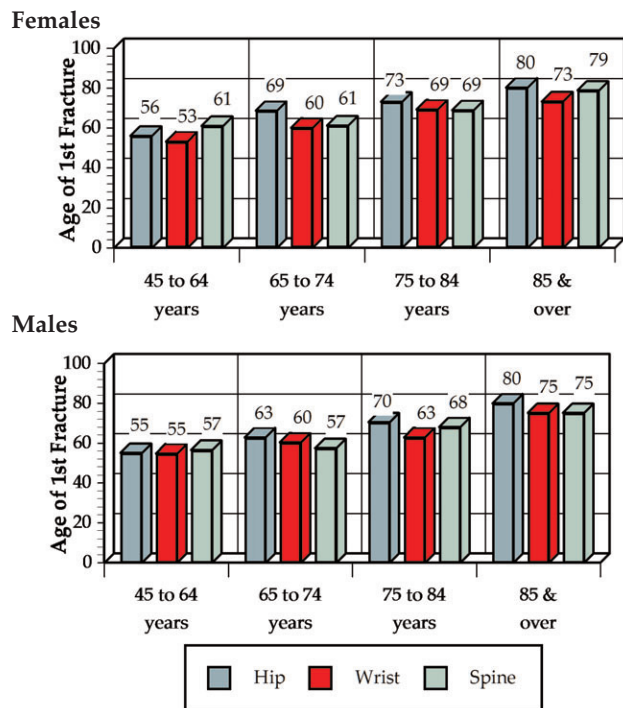
Source: National Center for Health Statistics, National Health and Nutrition Examination Survey Data, 1999-2004

age of first hip fracture among males, at 69.2 years, is nearly 5 years younger than among females. Spine fractures due to a fall also occur at a younger age, 60.2 years, among males. As the population ages, the age at which they report

their first fracture also rises. (Table 5.9 and Graph 5.3.3)

The mean number of lifetime fractures of all sites reported by all persons in the NHANES for the years 1999 to 2004 was slightly over one; however, some persons reported multiple fractures. For example, in the 2003-2004 NHANES, the most recent year of data available, some respondents reported 2 lifetime hip fractures, up to 6 lifetime wrist fractures, and up to 10 lifetime spine fractures.<sup>16</sup>

**Graph 5.3.3: Mean Age of 1st Fracture When Cause is a Fall [1] for Select Fractures by Gender and Age, United States 1999-2004**



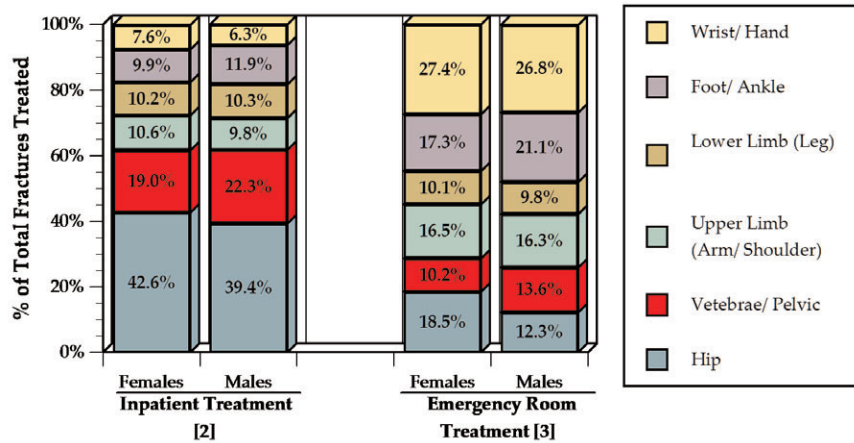
[1] Self-reported age at time of first fracture and reported cause of fracture was a "fall/tripped/slipped/fell out of bed" or "hard fall off ladder/stool/downstairs."

Source: National Center for Health Statistics, National Health and Nutrition Examination Survey Data, 1999-2004

*Section 5.3.1: Inpatient Treatment for Low Energy Fractures, 2004*

In 2004, slightly more than 704,000 persons over age 45 were discharged from the hospital after sustaining a low energy fracture. More than one-third of the inpatient fractures were hip fractures (43% for females and 39% for males). Vertebrae/pelvic fractures comprised about one-fifth (19% and 22% for females and males, respectively). The remaining fracture sites accounted for 10% or less of all fractures treated in inpatient facilities. In the same year, more than 1.2 million fractures to persons aged 45 and older were treated in emergency rooms. Fractures of the wrist or hand accounted for the largest proportion of these low energy fractures in both females and males,

**Graph 5.3.4: Proportion of Fracture Treatment [1] for Persons Aged 45 and Over by Anatomic Site and Treatment Location, United States 2004**



[1] Osteoporosis and related condition ICD-9-CM codes shown in Section 5.5.  
 [2] Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004  
 [3] Source: National Center for Health Statistics, National Hospital Ambulatory Medical Care Survey, Hospital Emergency Room, 2004

The mean length of inpatient stay for persons aged 45 and older with a low energy fracture in 2004 was 6.1 days, or 13% longer than the mean stay of 5.4 days for patients without a fracture injury. The mean cost per inpatient stay for persons aged 45 and older with a low energy fracture in 2004 was \$28,077, a cost that was 8% greater than that of patients with similar demographics but without a fracture. The estimated cost in 2004 of treating low energy fractures in patients aged 45 and older who were

accounting for 27% of total fractures incurred by both genders. This was followed by fractures of the foot and ankle and upper limb (arm/shoulder) fractures. (Table 5.10 and Graph 5.3.4)

### Section 5.4: Cost and Burden of Osteoporosis and Low Energy Fractures, 2004

The mean length of inpatient stay for persons aged 45 and older with a diagnosis of osteoporosis (but not a fracture) in 2004 was 5.3 days, or 2% shorter than the mean stay of 5.4 days for patients without an osteoporosis diagnosis. The mean cost per inpatient stay for persons aged 45 and older with an osteoporosis diagnosis in 2004 was \$21,209, which was 19% less than that of patients with similar demographics but without an osteoporosis diagnosis. The estimated cost in 2004 of treating patients aged 45 and older who were hospitalized and had a diagnosis of osteoporosis was \$19.1 billion. (Table 5.11) It is unlikely the osteoporosis diagnosis was the primary diagnosis for which the patients were hospitalized.

hospitalized as a result of the fracture was \$24.2 billion. (Table 5.11)

The burden of osteoporosis is already high, and it is growing. The costs associated with this disease are also increasing in both men and women and in all ethnic groups. These data provide strong support for the initiation of societywide prevention measures, including early and regular screening for bone health, as well as for greater emphasis on the diagnosis of individuals at risk for osteoporosis and identification of new strategies to improve treatment and treatment adherence in high risk groups.

1. National Osteoporosis Foundation (NOF): *America's Bone Health: The State of Osteoporosis and Low Bone Mass in Our Nation*. Washington DC: National Osteoporosis Foundation, 2002.
2. Burge RT, Dawson-Hughes B, Solomon DH, et al: Incidence and economic burden of osteoporosis-related fractures in the United States, 2005-2025. *J Bone Miner Res* 2007;22:465-475.
3. World Health Organization (WHO): *WHO Scientific Group on the Assessment of Osteoporosis at Primary Health Care Level*. Brussels, Belgium: WHO Press, Geneva, Switzerland, 2004.

4. US Department of Health and Human Services (USDHHS): *Bone Health and Osteoporosis: A Report of the Surgeon General*. Rockville, MD: U.S. Government Printing Office, Office of the Surgeon General, 2004, p 107.
5. Baim S, Biegel R, Binkley NC: Medicare and private reimbursement of osteoporosis diagnosis and treatment, in *Osteoporosis Clinical Updates*. Washington DC: National Osteoporosis Foundation, 2006, vol 7, pp 1-8.
6. Bonnick SL, Shulman L: Monitoring osteoporosis therapy: bone mineral density, bone turnover markers, or both? *Am J Med* 2006;119:25S-31S.
7. Finkelstein EA, Corso PS, Miller TR: *The Incidence and Economic Burden of Injuries in the United States*. New York, NY: Oxford University Press, Inc., 2006, p 187.
8. National Safety Council (NSC): *Injury Facts, 2005-2006 Edition*. Itasca, IL: National Safety Council, 2006.
9. National Osteoporosis Foundation (NOF): National Osteoporosis Foundation Fast Facts. Available at: <http://www.nof.org/osteoporosis/diseasefacts.htm>. Accessed September 19, 2007.
10. International Osteoporosis Foundation (IOF): Facts and statistics about osteoporosis and its impact, in, 2007. Available at: <http://www.iofbonehealth.org/facts-and-statistics.html>. Accessed September 19, 2007.
11. Moran CG, Wenn RT, Sikand M, Taylor AM: Early mortality after hip fracture: is delay before surgery important? *J Bone Joint Surg Am* 2005;87:483-489.
12. Orwig DL, Chan J, Magaziner J: Hip fracture and its consequences: differences between men and women. *Orthop Clin North Am* 2006;37:611-622.
13. Hawkes WG, Wehren L, Orwig D, et al: Gender differences in functioning after hip fracture. *J Gerontol A Biol Sci Med Sci* 2006;61:495-499.
14. Riggs BL, Melton LJ: The worldwide problem of osteoporosis: insights afforded by epidemiology. *Bone* 1995;17:505S-511S.
15. Genant HK, Jergas M: Assessment of prevalent and incident vertebral fractures in osteoporosis research. *Osteoporos Int* 2003;14:S43-S55.
16. National Center for Health Statistics (NCHS): *National Health and Nutrition Examination Survey 2003-2004: Documentation, Codebook, and Frequencies*. Hyattsville, MD: Centers for Disease Control, 2006, p 34.

## Section 5.5: Osteoporosis and Bone Health Data Tables

For purposes of this study, osteoporosis has been categorized into the three classifications. *Primary osteoporosis* is a diagnosis of osteoporosis. *Low energy fracture* is one caused by an event such as a fall from a standing height. (A high energy fracture, by contrast, is caused by involvement in a motor vehicle accident.) *Secondary osteoporosis* is the presence of another condition or treatment that may cause eroding of bone health and osteoporosis. Codes included in these three osteoporosis categories are as shown in Table 5.1.

**Table 5.1: Osteoporosis and Bone Health: Analysis Codes**

CODE	ICD-9-CM CODE DESCRIPTION	CODE	ICD-9-CM CODE DESCRIPTION
<b>OSTEOPOROSIS</b>			
73300	Osteoporosis NOS	73303	Disuse Osteoporosis
73301	Senile Osteoporosis	73309	Osteoporosis NEC
73302	Idiopathic Osteoporosis		
<b>LOW ENERGY FRACTURES</b>			
<b><u>Vertebral and Pelvic Fractures</u></b>			
80500	Vertebral Fracture (Closed)	81300	Wrist Fracture (Closed)-Radius and Ulna Upper End
80501	Vertebral Fracture (Closed)	81301	Wrist Fracture (Closed)-Radius and Ulna Upper End
80502	Vertebral Fracture (Closed)	81302	Wrist Fracture (Closed)-Radius and Ulna Upper End
80503	Vertebral Fracture (Closed)	81303	Wrist Fracture (Closed)-Radius and Ulna Upper End
80504	Vertebral Fracture (Closed)	81304	Wrist Fracture (Closed)-Radius and Ulna Upper End
80505	Vertebral Fracture (Closed)	81305	Wrist Fracture (Closed)-Radius and Ulna Upper End
80506	Vertebral Fracture (Closed)	81306	Wrist Fracture (Closed)-Radius and Ulna Upper End
80507	Vertebral Fracture (Closed)	81307	Wrist Fracture (Closed)-Radius and Ulna Upper End
80508	Vertebral Fracture (Closed)	81308	Wrist Fracture (Closed)-Radius and Ulna Upper End
80520	Vertebral Fracture (Closed)-Thoracic	81320	Wrist/forearm Fracture (Closed)-Radius and Ulna Shaft
80540	Vertebral Fracture (Closed)-Lumbar	81321	Wrist/forearm Fracture (Closed)-Radius and Ulna Shaft
80560	Pelvic Fracture (Closed)-Sacrum and Coccyx	81322	Wrist/forearm Fracture (Closed)-Radius and Ulna Shaft
80580	Vertebral Fracture (Closed)-Unspecified	81323	Wrist/forearm Fracture (Closed)-Radius and Ulna Shaft
80800	Pelvic Fracture (Closed)-Acetabulum	81340	Wrist/forearm Fracture (Closed)-Radius and Ulna Lower End
80820	Pelvic Fracture (Closed)-Pubis	81341	Wrist/forearm Fracture (Closed)-Radius and Ulna Lower End
80841	Pelvic Fracture (Closed)-Ilium	81342	Wrist/forearm Fracture (Closed)-Radius and Ulna Lower End
80842	Pelvic Fracture (Closed)-Ischium	81343	Wrist/forearm Fracture (Closed)-Radius and Ulna Lower End
80843	Pelvic Fracture (Closed)-Multiple	81344	Wrist/forearm Fracture (Closed)-Radius and Ulna Lower End
80849	Pelvic Fracture (Closed)-Other	81345	Wrist/forearm Fracture (Closed)-Radius and Ulna Lower End
80880	Pelvic Fracture (Closed)-Unspecified	81380	Wrist/forearm Fracture (Closed)-Radius and Ulna Unspecified
		81381	Wrist/forearm Fracture (Closed)-Radius and Ulna Unspecified
		81382	Wrist/forearm Fracture (Closed)-Radius and Ulna Unspecified
		81383	Wrist/forearm Fracture (Closed)-Radius and Ulna Unspecified
		81400	Wrist Fracture (Closed)-Carpal Bones
		81401	Wrist Fracture (Closed)-Carpal Bones
		81402	Wrist Fracture (Closed)-Carpal Bones
		81403	Wrist Fracture (Closed)-Carpal Bones
		81404	Wrist Fracture (Closed)-Carpal Bones
		81405	Wrist Fracture (Closed)-Carpal Bones
		81406	Wrist Fracture (Closed)-Carpal Bones
		81407	Wrist Fracture (Closed)-Carpal Bones
		81408	Wrist Fracture (Closed)-Carpal Bones
		81409	Wrist Fracture (Closed)-Carpal Bones
		81500	Hand Fracture (Closed)-Metacarpal Bones
		81501	Hand Fracture (Closed)-Metacarpal Bones
		81502	Hand Fracture (Closed)-Metacarpal Bones
		81503	Hand Fracture (Closed)-Metacarpal Bones
		81504	Hand Fracture (Closed)-Metacarpal Bones
		81509	Hand Fracture (Closed)-Metacarpal Bones
<b><u>Upper Limb Fracture (Shoulder and Arm)</u></b>			
81000	Upper limb Fracture (Closed)-Clavicle (Shoulder)		
81001	Upper limb Fracture (Closed)-Clavicle (Shoulder)		
81002	Upper limb Fracture (Closed)-Clavicle (Shoulder)		
81003	Upper limb Fracture (Closed)-Clavicle (Shoulder)		
81100	Upper limb Fracture (Closed)-Scapula (Shoulder)		
81101	Upper limb Fracture (Closed)-Scapula (Shoulder)		
81102	Upper limb Fracture (Closed)-Scapula (Shoulder)		
81103	Upper limb Fracture (Closed)-Scapula (Shoulder)		
81109	Upper limb Fracture (Closed)-Scapula (Shoulder)		
81200	Upper limb Fracture (Closed)-Humerus Upper End		
81201	Upper limb Fracture (Closed)-Humerus Upper End		
81202	Upper limb Fracture (Closed)-Humerus Upper End		
81203	Upper limb Fracture (Closed)-Humerus Upper End		
81209	Upper limb Fracture (Closed)-Humerus Upper End		
81220	Upper limb Fracture (Closed)-Humerus Upper End		
81221	Upper limb Fracture (Closed)-Humerus Upper End		
81240	Upper limb Fracture (Closed)-Humerus Upper End		
81241	Upper limb Fracture (Closed)-Humerus Upper End		
81242	Upper limb Fracture (Closed)-Humerus Upper End		
81243	Upper limb Fracture (Closed)-Humerus Upper End		
81244	Upper limb Fracture (Closed)-Humerus Upper End		
81249	Upper limb Fracture (Closed)-Humerus Upper End		

Table 5.1 continued next page.

**Table 5.1: Osteoporosis and Bone Health: Analysis Codes** (continued)

<u>CODE</u>	<u>ICD-9-CM CODE DESCRIPTION</u>	<u>CODE</u>	<u>ICD-9-CM CODE DESCRIPTION</u>
<b><u>Ankle and Foot Fracture</u></b>		<b><u>Hip Fracture</u></b>	
82400	Ankle Fracture (Closed)-Medial Malleolus	82000	Hip Fracture (Closed)-Neck of Femur
82420	Ankle Fracture (Closed)-Lateral Malleolus	82001	Hip Fracture (Closed)-Neck of Femur
82440	Ankle Fracture (Closed)-Bimalleolar	82002	Hip Fracture (Closed)-Neck of Femur
82460	Ankle Fracture (Closed)-Trimalleolar	82003	Hip Fracture (Closed)-Neck of Femur
82480	Ankle Fracture (Closed)-Unspecified	82009	Hip Fracture (Closed)-Neck of Femur
82500	Foot Fracture (Closed)- Calcaneus	82020	Hip Fracture (Closed)-Neck of Femur
82520	Foot Fracture (Closed)-Unspecified (Instep)	82021	Hip Fracture (Closed)-Neck of Femur
82521	Foot Fracture (Closed)-Astragalus	82022	Hip Fracture (Closed)-Neck of Femur
82522	Foot Fracture (Closed)-Navicular (Scaphoid)	82080	Hip Fracture (Closed)-Neck of Femur
82523	Foot Fracture (Closed)-Cuboid		
82524	Foot Fracture (Closed)-Cuneiform		
82525	Foot Fracture (Closed)-Metatarsal Bone(s)		
82529	Foot Fracture (Closed)-Other (Tarsal with Metatarsal)		
<b><u>Stress and Pathological Fractures</u></b>		<b><u>Lower Limb, Excluding Foot and Ankle</u></b>	
73310	Unspecified Pathological Fracture	82100	Lower Limb Fracture (Closed Only)-Thigh/Upper Leg
73311	Pathological Fracture-Humerus	82101	Lower Limb Fracture (Closed Only)-Thigh/Upper Leg
73312	Pathological Fracture-Wrist	82120	Lower Limb Fracture (Closed)-Lower End Femur Unspecified
73313	Pathological Fracture-Vertebrae	82121	Lower Limb Fracture (Closed)-Lower End Femur Condyle
73314	Pathological Fracture-Femur Neck	82122	Lower Limb Fracture (Closed)-Lower End Femur Eepiphysis
73315	Pathological Fracture-Other Femur	82123	Lower Limb Fracture (Closed)-Lower End Femur Supracondylar
73316	Pathological Fracture-Tibia/Fibula	82129	Lower Limb Fracture (Closed)-Lower End Femur Multiple Fractures
73319	Other Specified Pathological Fracture	82200	Lower Limb Fracture (Closed Only)-Patella
73393	Stress Fracture of Tibia or Fibula	82300	Lower Limb Fracture (Closed Only)-Tibia and Fibula
73394	Stress Fracture of the Metatarsals	82301	Lower Limb Fracture (Closed Only)-Tibia and Fibula
73395	Stress Fracture of Other Bone	82302	Lower Limb Fracture (Closed Only)-Tibia and Fibula
		82320	Lower Limb Fracture (Closed Only)-Tibia and Fibula Shaft
		82321	Lower Limb Fracture (Closed Only)-Tibia and Fibula Shaft
		82322	Lower Limb Fracture (Closed Only)-Tibia and Fibula Shaft
		82380	Lower Limb Fracture (Closed Only)-Tibia and Fibula Unspecified
		82381	Lower Limb Fracture (Closed Only)-Tibia and Fibula Unspecified
		82382	Lower Limb Fracture (Closed Only)-Tibia and Fibula Unspecified
<b><u>Exclude all cases with E-code of:</u></b>			
E800-E807	Railway		
E810-E819	Motor Vehicle Traffic		
E820-E825	Motor Vehicle Nontraffic		
E826-E829	Other Road Vehicles		
E830-E838	Water		
E840-E845	Air and Space		
E846-E848	Other Vehicle Accidents Not Elsewhere Classified		
E990-E999	Operations of War		

Table 5.1 continued next page.

**Table 5.1: Osteoporosis and Bone Health: Analysis Codes** (continued)

<u>CODE</u>	<u>ICD-9-CM CODE DESCRIPTION</u>	<u>CODE</u>	<u>ICD-9-CM CODE DESCRIPTION</u>
<b><u>SECONDARY OSTEOPOROSIS</u></b>			
<b><u>Diagnosis That May Lead to Osteoporosis</u></b>			
24290	Thyrotoxic NOS-No Crisis	25720	Testicular Hypofunction NEC
24291	Thyrotoxic NOS-with Crisis	25930	Ectopic Hormone Secondary NEC
25200	Hyperparathyroidism NOS	25990	Endocrine Disorder NOS
25201	Primary Hyperparathyroid	26820	Osteomalacia NOS
25202	Secondary Hyperparathyroid-Nonrenal	26890	Vitamin D Deficiency NOS
25208	Hyperparathyroidism NEC	58800	Renal Osteodystrophy
25500	Cushing's Syndrome	58881	Secondary Hyperparathyroid-Renal
25530	Corticoadren Overact NEC	62720	Female Climacteric State
25620	Postablative Ovarian Failure	62740	Artificial Menopause States
25631	Premature Menopause	62780	Menopausal Disorder NEC
25639	Other Ovarian Failure	62790	Menopausal Disorder NOS
25710	Postblat Testic Hypofun		
<b><u>Vertebral Fractures with Spinal Cord Injury</u></b>			
80600	C1-C4 Fracture-Closed/Cord Injury NOS	80626	T7-T12 Fracture-Closed/Complete Lesion of Cord
80601	C1-C4 Fracture-Closed/Complete Lesion of Cord	80627	T7-T12 Fracture-Closed/Anterior Cord Syndrome
80602	C1-C4 Fracture-Closed/Anterior Cord Syndrome	80628	T7-T12 Fracture-Closed/Central Cord Syndrome
80603	C1-C4 Fracture-Closed/Central Cord Syndrome	80629	T7-T12 Fracture-Closed/Cord Injury NEC
80604	C1-C4 Fracture-Closed/Cord Injury NEC	80630	T1-T6 Fracture-Open/Cord Injury NOS
80605	C5-C7 Fracture-Closed/Cord Injury NOS	80631	T1-T6 Fracture-Open/Complete Lesion of Cord
80606	C5-C7 Fracture-Closed/Complete Lesion of Cord	80632	T1-T6 Fracture-Open/Anterior Cord Syndrome
80607	C5-C7 Fracture-Closed/Anterior Cord Syndrome	80633	T1-T6 Fracture-Open/Central Cord Syndrome
80608	C5-C7 Fracture-Closed/Central Cord Syndrome	80634	T1-T6 Fracture-Open/Cord Injury NEC
80609	C5-C7 Fracture-Closed/Cord Injury NEC	80635	T7-T12 Fracture-Open/Cord Injury NOS
80610	C1-C4 Fracture-Open/Cord Injury NOS	80636	T7-T12 Fracture-Open/Complete Lesion of Cord
80611	C1-C4 Fracture-Open/Complete Lesion of Cord	80637	T7-T12 Fracture-Open/Anterior Cord Syndrome
80612	C1-C4 Fracture-Open/Anterior Cord Syndrome	80638	T7-T12 Fracture-Open/Central Cord Syndrome
80613	C1-C4 Fracture-Open/Central Cord Syndrome	80639	T7-T12 Fracture-Open/Cord Injury NEC
80614	C1-C4 Fracture-Open/Cord Injury NEC	80640	Closed Lumbar Fracture with Cord Injury
80615	C5-C7 Fracture-Open/Cord Injury NOS	80650	Open Lumbar Fracture with Cord Injury
80616	C5-C7 Fracture-Open/Complete Lesion of Cord	80660	Fracture Sacrum-Closed/Cord Injury NOS
80617	C5-C7 Fracture-Open/Anterior Cord Syndrome	80661	Fracture Sacrum-Closed/Cauda Equina Lesion
80618	C5-C7 Fracture-Open/Central Cord Syndrome	80662	Fracture Sacrum-Closed/Cauda Injury NEC
80619	C5-C7 Fracture-Open/Cord Injury NEC	80669	Fracture Sacrum-Closed/Cord Injury NEC
80620	T1-T6 Fracture-Closed/Cord Injury NOS	80670	Fracture Sacrum-Closed/Cord Injury NOS
80621	T1-T6 Fracture-Closed/Complete Lesion of Cord	80671	Fracture Sacrum-Closed/Cauda Equina Lesion
80622	T1-T6 Fracture-Closed/Anterior Cord Syndrome	80672	Fracture Sacrum-Closed/Cauda Injury NEC
80623	T1-T6 Fracture-Closed/Central Cord Syndrome	80679	Fracture Sacrum-Open/Cord Injury NEC
80624	T1-T6 Fracture-Closed/Cord Injury NEC	80680	Vertebrae Fracture NOS-Closed with Cord Injury
80625	T7-T12 Fracture-Closed/Cord Injury NOS	80690	Vertebrae Fracture NOS-Open with Cord Injury

**Table 5.2: Self-Reported Rate of Osteoporosis and Hip Fracture for Persons Aged 65 and Over, United States 1988-1994 and 1999-2004**

	<b>Prevalence</b> (Rate per 100 Persons)					
	<b>Osteoporosis</b> [1]		<b>Hip Fracture</b> [2]		<b>Either Condition</b>	
	<b>1988-1994</b> [3]	<b>1999-2004</b> [4]	<b>1988-1994</b> [3]	<b>1999-2004</b> [4]	<b>1988-1994</b> [3]	<b>1999-2004</b> [4]
<b>Females</b>						
65 to 74 Years	10.9	21.1	4.5	1.1	14.2	21.8
75 to 84 Years	12.1	32.2	7.3	3.5	17.7	34.0
<u>85 Years &amp; Over</u>	<u>9.7</u>	<u>28.6</u>	<u>11.8</u>	<u>13.4</u>	<u>19.1</u>	<u>32.7</u>
All Females 65 Years & Over	11.1	26.0	6.1	3.3	15.8	27.5
<b>Males</b>						
65 to 74 Years	1.3	2.5	2.1	3.0	3.3	5.5
75 to 84 Years	1.3	5.6	2.4	3.4	3.0	8.8
<u>85 Years &amp; Over</u>	<u>1.6</u>	<u>4.9</u>	<u>4.1</u>	<u>6.1</u>	<u>5.4</u>	<u>9.4</u>
All Males 65 Years & Over	1.3	3.7	2.3	3.4	3.5	6.9
<b>Total</b>						
65 to 74 Years	6.7	12.6	3.4	2.0	10.0	14.3
75 to 84 Years	8.0	21.8	5.4	3.5	13.4	24.1
<u>85 Years &amp; Over</u>	<u>7.0</u>	<u>19.8</u>	<u>9.4</u>	<u>10.7</u>	<u>16.4</u>	<u>24.1</u>
All Persons 65 Years & Over	7.0	16.5	4.5	3.3	10.7	18.7

[1] Has a doctor ever told you that you had osteoporosis, sometimes called thin or brittle bones?

[2] Has a doctor ever told you that you had broken or fractured your hip?

[3] Source: Praemer A, Furner S, Rice DP. Musculoskeletal Conditions in the United States. Rosemont, IL. 1999, American Academy of Orthopaedic Surgeons.

[4] Source: National Center for Health Statistics. National Health and Nutrition Examination Survey Data, 1999-2004

**Table 5.3: Self-Reported Prevalence of Osteoporosis, Osteoporosis Treatment or Related Fracture [1] for Persons Aged 45 and Over, United State 1999-2004**

Age Group	Prevalence (in 000s)			Occurrence by Sex		Distribution by Age		Prevalence Rate (% of population in age group)		
	Females	Males	Total Population	Females	Males	Females	Males	Females	Males	Total Population
<b>Ever been told had osteoporosis?</b>										
45-64	2,822	487	3,309	85.3%	14.7%	35.7%	47.7%	8.4%	1.6%	5.1%
65-74	2,145	214	2,359	90.9%	9.1%	27.2%	20.9%	21.2%	2.5%	12.6%
75-84	2,353	262	2,615	90.0%	10.0%	29.8%	25.6%	32.2%	5.6%	21.8%
<u>85 &amp; Over</u>	<u>578</u>	<u>59</u>	<u>637</u>	<u>90.7%</u>	<u>9.3%</u>	<u>7.3%</u>	<u>5.8%</u>	<u>28.6%</u>	<u>4.9%</u>	<u>19.8%</u>
Total Aged 45 & Over	7,898	1,022	8,919	88.6%	11.5%	100.0%	100.0%	14.8%	2.2%	9.0%
<b>eEver been treated for osteoporosis? (if responded "Yes" to osteoporosis)</b>										
45-64	1,847	254	2,101	87.9%	12.1%	32.1%	39.5%	65.5%	52.2%	63.5%
65-74	1,603	155	1,759	91.1%	8.8%	27.8%	24.1%	74.8%	772.6%	74.6%
75-84	1,839	203	2,042	90.1%	9.9%	31.9%	31.6%	78.2%	77.5%	78.1%
<u>85 &amp; Over</u>	<u>467</u>	<u>31</u>	<u>497</u>	<u>94.0%</u>	<u>6.2%</u>	<u>8.1%</u>	<u>4.8%</u>	<u>80.7%</u>	<u>52.4%</u>	<u>78.1%</u>
Total Aged 45 & Over	5,756	643	6,399	90.0%	10.0%	100.0%	100.0%	72.9%	63.0%	71.7%
<b>Ever been told had broken or fractured your hip?</b>										
45-64	197	321	519	38.0%	61.8%	23.3%	39.4%	0.6%	1.0%	0.8%
65-74	116	267	372	31.2%	71.8%	13.7%	32.8%	1.1%	3.0%	2.0%
75-84	259	162	421	61.5%	38.5%	30.7%	19.9%	3.5%	3.4%	3.5%
<u>85 &amp; Over</u>	<u>272</u>	<u>73</u>	<u>346</u>	<u>78.6%</u>	<u>21.1%</u>	<u>32.2%</u>	<u>9.0%</u>	<u>13.4%</u>	<u>6.1%</u>	<u>10.7%</u>
Total Aged 45 & Over	844	814	1,658	50.9%	49.1%	100.0%	101.1%	1.6%	1.8%	1.7%
<b>Ever been told had broken or fractured your spine?</b>										
45-64	531	1,083	1,614	32.9%	67.1%	46.9%	70.3%	1.6%	3.5%	2.5%
65-74	174	245	418	41.6%	58.6%	15.4%	15.9%	1.7%	2.8%	2.2%
75-84	229	172	401	57.1%	42.9%	20.2%	11.2%	3.1%	3.6%	3.3%
<u>85 &amp; Over</u>	<u>198</u>	<u>42</u>	<u>240</u>	<u>82.5%</u>	<u>17.5%</u>	<u>17.5%</u>	<u>2.7%</u>	<u>9.8%</u>	<u>3.5%</u>	<u>7.4%</u>
Total Aged 45 & Over	1,132	1,541	2,673	42.3%	57.7%	100.0%	100.1%	2.1%	3.4%	2.7%
<b>Ever been told had broken or fractured your wrist?</b>										
45-64	2,333	3,707	6,340	36.8%	58.5%	51.3%	71.4%	6.9%	11.9%	9.3%
65-74	1,080	983	2,063	52.4%	47.6%	23.7%	18.9%	10.6%	11.4%	11.0%
75-84	792	407	1,198	66.1%	34.0%	17.4%	7.8%	10.8%	8.6%	10.0%
<u>85 &amp; Over</u>	<u>345</u>	<u>93</u>	<u>438</u>	<u>78.8%</u>	<u>21.2%</u>	<u>7.6%</u>	<u>1.8%</u>	<u>17.0%</u>	<u>7.8%</u>	<u>13.6%</u>
Total Aged 45 & Over	4,549	5,190	9,739	46.7%	53.3%	100.0%	100.0%	8.5%	11.4%	9.9%
<b>Ever been told had osteoporosis, been treated for osteoporosis, or had broken or fractured hip, spine or wrist?</b>										
45-64	5,388	5,108	10,496	51.3%	48.7%	43.2%	66.0%	16.0%	16.5%	16.2%
65-74	3,060	1,531	4,591	66.7%	33.3%	24.5%	19.8%	30.1%	17.8%	24.5%
75-84	3,074	870	3,944	77.9%	22.1%	24.6%	11.2%	42.1%	18.4%	32.8%
<u>85 &amp; Over</u>	<u>962</u>	<u>234</u>	<u>1,197</u>	<u>80.4%</u>	<u>19.5%</u>	<u>7.7%</u>	<u>3.0%</u>	<u>47.5%</u>	<u>19.6%</u>	<u>37.1%</u>
Total Aged 45 & Over	12,484	7,743	20,228	61.7%	38.3%	100.0%	100.0%	23.4%	17.0%	20.5%

[1] Replied "Yes" when asked if ever been told by a doctor that you had osteoporosis, been treated for osteoporosis, or had broken or fractured your (hip)(spine)(wrist).

Source: National Center for Health Statistics. National Health and Nutrition Examination Survey Data, 1999-2004

**Table 5.4: Health Care Visits for Osteoporosis and Related Conditions [1] for Persons Aged 45 and Older by Site, United States 2004**

	<u>Visits (in 000s)</u>				<u>Total All Health Care Resources</u>
	<u>Inpatient Hospitalization</u> [4]	<u>Physician Visits</u> [5]	<u>Emergency Room Encounters</u> [6]	<u>Outpatient Visits</u> [7]	
<b><u>Primary Osteoporosis or Low Bone Density</u></b>	899.2	5,013.2	*	294.9	6,248.5
% of Total Visits	14.4%	80.2%	0.7%	4.7%	
<b><u>Low Energy Fracture</u> [2]</b>					
Hip	313.5	*	211.9	*	929.5
Wrist/Hand	54.4	*	342.5	82.9	1,318.7
Vertebrae/Pelvic	150.2	*	139.3	*	652.2
Upper Limb (Arm/Shoulder)	78.2	*	206.8	*	683.2
Lower Limb (Leg)	77.1	*	125.8	*	931.0
<u>Foot/Ankle</u>	<u>78.7</u>	<u>926.5</u>	<u>230.2</u>	<u>69.3</u>	<u>1,304.7</u>
<b>All Low Energy Fractures</b>	704.3	3,546.5	1,231.5	258.6	5,740.9
% of Total Visits	12.3%	61.8%	21.5%	4.5%	
% of Low Energy Fracture Patients with Osteoporosis Diagnosis	16.4%	1.6%	1.1%	2.1%	
<b><u>Secondary Osteoporosis Diagnosis</u> [3]</b>					
Contributing Condition	143.7	5,679.7	*	224.1	6,053.8
Vertebral Fracture w/Spinal Cord Injury	0.0	*	*	0.0	1,430.6

\* Estimate does not meet standards for reliability.

[1] Osteoporosis and related condition ICD-9-CM codes shown in the Table 5.1.

[2] Treatment for fractures, excluding those with high energy causes (i.e., vehicular [auto, air, water] accidents, war injuries)

[3] Diagnosis of another medical condition that may lead to or contribute to the development of osteoporosis

[4] Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004

[5] Source: National Center for Health Statistics, National Ambulatory Medical Care Survey, 2004

[6] Source: National Center for Health Statistics, National Hospital Ambulatory Medical Care Survey, Hospital Emergency, 2004

[7] Source: National Center for Health Statistics, National Hospital Ambulatory Medical Care Survey, Outpatient Centers, 2004

**Table 5.5: Inpatient Resource Utilization for Osteoporosis and Related Conditions [1] for Persons Age 45 and Older by Age and Sex, United States 2004**

FEMALES	<u>% by Age Group</u>			<u>Total Aged 45 &amp; Older</u> (in 000s)	<u>Mean Age</u> (in years)	Distribution by Gender		<u>Total Inpatient Hospitalizations</u> (in 000s)
	<u>45-64</u>	<u>65-74</u>	<u>75 &amp; Older</u>			<u>Females</u>	<u>Males</u>	
<b>Primary Osteoporosis</b>	12.6%	21.1%	66.3%	809.7	77.6	90.1%	9.9%	899.2
<b>Low Energy Fracture [2]</b>								
Hip	6.7%	14.1%	79.2%	227.6	81.2	72.6%	27.4%	313.5
Wrist/Hand	22.1%	19.1%	58.8%	40.6	74.8	74.6%	25.4%	54.4
Vertebrae/Pelvic	10.4%	14.5%	75.1%	101.6	79.4	67.6%	32.4%	150.2
Upper Limb (Arm/Shoulder)	16.6%	20.9%	62.5%	56.8	76.6	72.7%	27.3%	78.2
Lower Limb (Leg)	29.5%	21.9%	48.6%	54.7	72.5	70.9%	29.1%	77.1
<u>Foot/Ankle</u>	<u>44.4%</u>	<u>20.2%</u>	<u>35.4%</u>	<u>52.8</u>	<u>67.6</u>	<u>67.0%</u>	<u>33.0%</u>	<u>78.7</u>
All Low Energy Fractures	15.6%	16.7%	67.7%	499.2	77.7	77.3%	22.7%	704.3
<b>Low Energy Fracture with Osteoporosis Diagnosis</b>				105.0		105.0	10.5	115.5
% Low Energy Fracture Patients with Osteoporosis Diagnosis	8.8%	19.4%	24.0%	21.0%		21.0%	5.1%	16.4%
<b>Secondary Osteoporosis Diagnosis [3]</b>								
Contributing Condition	43.2%	21.4%	35.5%	104.7	67.8	72.9%	27.1%	143.7
Vertebral Fracture w/Spinal Cord Injury	0.0%	0.0%	0.0%	0.0	na	0.0%	0.0%	0.0
<b>MALES</b>								
<b>Primary Osteoporosis</b>	18.8%	22.1%	59.1%	89.5	75.3			
<b>Low Energy Fracture [2]</b>								
Hip	15.7%	17.8%	66.5%	85.9	77.2			
Wrist/Hand	55.7%	15.0%	29.2%	13.8	64.5			
Vertebrae/Pelvic	33.6%	18.1%	48.2%	48.7	70.9			
Upper Limb (Arm/Shoulder)	41.4%	20.0%	38.6%	21.4	68.5			
Lower Limb (Leg)	54.2%	20.5%	25.3%	22.4	64.4			
<u>Foot/Ankle</u>	<u>59.4%</u>	<u>22.1%</u>	<u>18.5%</u>	<u>25.9</u>	<u>61.8</u>			
All Low Energy Fractures	32.8%	18.7%	48.5%	204.3	71.4			
<b>Low Energy Fracture with Osteoporosis Diagnosis</b>				10.5				
% Low Energy Fracture Patients with Osteoporosis Diagnosis	2.7%	3.2%	7.6%	5.1%				
<b>Secondary Osteoporosis Diagnosis [3]</b>								
Contributing Condition	45.8%	26.1%	28.0%	39.0	66.2			
Vertebral Fracture w/Spinal Cord Injury	0.0%	0.0%	0.0%	0.0	na			

[1] Osteoporosis and related condition ICD-9-CM codes shown in the Table 5.1.

[2] Treatment for fractures, excluding those with high energy causes (i.e., vehicular [auto, air, water] accidents, war injuries).

[3] Diagnosis of another medical condition that may lead to or contribute to the development of osteoporosis.

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004

**Table 5.6: Hospital Emergency Room Resource Utilization for Low Energy Fractures<sup>[1]</sup> for Persons Aged 45 and Older by Age and Sex, United States 2004**

	<u>% by Age Group</u>			<u>Total 45 &amp; Older</u> (in 000s)	<u>Mean Age</u> (in years)	<u>Distribution by Gender</u>		<u>Total Emergency Room Treatments</u> (in 000s)
	<u>45-64</u>	<u>65- 74</u>	<u>75 &amp; Older</u>			<u>Females</u>	<u>Males</u>	
<b>FEMALES</b>								
<b>Low Energy Fracture [2]</b>								
Hip	4.9%	10.0%	85.1%	172.3	83.0	81.3%	18.7%	211.9
Wrist/Hand	49.5%	24.8%	25.7%	255.7	65.6	74.7%	25.3%	342.5
Vertebrae/Pelvic	10.5%	21.4%	68.1%	95.3	78.0	68.4%	31.6%	139.3
Upper Limb (Arm/ Shoulder)	31.0%	29.6%	39.3%	154.0	71.0	74.5%	25.5%	206.8
Lower Limb (Leg)	49.4%	14.1%	36.5%	94.1	67.1	74.8%	25.2%	125.8
<u>Foot/Ankle</u>	<u>79.3%</u>	<u>11.1%</u>	<u>9.6%</u>	<u>161.9</u>	<u>57.4</u>	<u>70.3%</u>	<u>29.7%</u>	<u>230.2</u>
<b>All Low Energy Fractures</b>	40.0%	19.2%	40.9%	920.4	69.5	74.7%	25.3%	1,231.5
<b>MALES</b>								
<b>Low Energy Fracture [2]</b>								
Hip	15.2%	7.8%	77.0%	39.6	77.0			
Wrist/Hand	44.8%	20.0%	35.2%	86.7	68.4			
Vertebrae/Pelvic	39.0%	49.7%	11.4%	44.0	64.0			
Upper Limb (Arm/ Shoulder)	16.9%	33.9%	49.2%	52.8	73.3			
Lower Limb (Leg)	80.1%	5.0%	14.9%	31.7	57.9			
<u>Foot/Ankle</u>	<u>81.8%</u>	<u>11.5%</u>	<u>6.6%</u>	<u>68.3</u>	<u>54.9</u>			
<b>All Low Energy Fractures</b>	48.1%	22.4%	29.5%	311.1	65.3			

\* Estimate does not meet standards for reliability.

[1] Osteoporosis and related condition ICD-9-CM codes shown in the Table 5.1.

[2] Treatment for fractures, excluding those with high energy causes (i.e., vehicular [auto, air, water] accidents, war injuries).

Source: National Center for Health Statistics, National Hospital Ambulatory Medical Care Survey, Hospital Emergency Room, 2004

**Table 5.7: Hospital Discharge to Short/Intermediate/Skilled Nursing Care for Persons with Osteoporosis and Related Conditions [1] Aged 45 and Older by Age and Sex, United States 2004**

	<u>% of Total WITH Condition</u>				<u>% of Total WITHOUT Condition</u>			
	<u>45-64</u>	<u>65-74</u>	<u>75 &amp; Older</u>	<u>All 45 &amp; Over</u>	<u>45-64</u>	<u>65-74</u>	<u>75 &amp; Older</u>	<u>All 45 &amp; Over</u>
<b>FEMALES</b>								
<b>Primary Osteoporosis</b>	18.6%	26.6%	46.3%	38.7%	10.8%	21.8%	37.9%	24.0%
<b>Low Energy Fracture [2]</b>								
Hip	51.4%	77.8%	86.1%	82.6%	10.8%	21.4%	37.0%	23.9%
Wrist/Hand	16.4%	31.8%	60.1%	45.0%	10.9%	22.1%	38.7%	24.9%
Vertebrae/Pelvic	29.3%	57.6%	68.0%	62.4%	10.9%	21.9%	38.4%	24.6%
Upper Limb (Arm/Shoulder)	20.6%	42.9%	67.2%	54.4%	10.9%	22.0%	38.6%	24.8%
Lower Limb (Leg)	35.2%	66.0%	79.6%	63.5%	10.8%	21.9%	38.6%	24.8%
Foot/Ankle	<u>20.3%</u>	<u>48.3%</u>	<u>68.0%</u>	<u>42.8%</u>	<u>10.9%</u>	<u>22.0%</u>	<u>38.7%</u>	<u>24.9%</u>
<b>All Low Energy Fractures</b>	<b>28.0%</b>	<b>60.0%</b>	<b>77.0%</b>	<b>66.5%</b>	<b>10.6%</b>	<b>20.8%</b>	<b>36.0%</b>	<b>23.1%</b>
<b>MALES</b>								
<b>Primary Osteoporosis</b>	24.5%	28.7%	43.6%	36.7%	12.5%	19.0%	30.8%	20.0%
<b>Low Energy Fracture [2]</b>								
Hip	51.2%	68.5%	84.0%	76.1%	12.4%	18.7%	30.0%	19.7%
Wrist/Hand	14.0%	37.4%	52.5%	28.8%	12.6%	19.0%	31.0%	20.2%
Vertebrae/Pelvic	24.1%	37.5%	62.3%	45.0%	12.5%	19.0%	30.8%	20.0%
Upper Limb (Arm/Shoulder)	19.8%	39.5%	60.0%	39.3%	12.6%	19.0%	30.9%	20.1%
Lower Limb (Leg)	25.1%	63.9%	72.3%	45.1%	12.5%	19.0%	30.9%	20.1%
Foot/Ankle	<u>15.3%</u>	<u>32.1%</u>	<u>58.2%</u>	<u>26.9%</u>	<u>12.6%</u>	<u>19.0%</u>	<u>31.0%</u>	<u>20.2%</u>
<b>All Low Energy Fractures</b>	<b>24.8%</b>	<b>50.8%</b>	<b>74.1%</b>	<b>53.6%</b>	<b>12.3%</b>	<b>18.5%</b>	<b>29.6%</b>	<b>19.4%</b>

[1] Osteoporosis and related condition ICD-9-CM codes shown in the Table 5.1.

[2] Treatment for fractures, excluding those with high energy causes (i.e., vehicular [auto, air, water] accidents, war injuries).

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004

**Table 5.8: Osteoporosis and Related Conditions [1] in Nursing Home Population Aged 65 and Over, United States 2004**

	<u>Prevalence</u> (in 00s)					<u>Total Population</u>
	<u>65-74</u>	<u>75-84</u>	<u>85 &amp; Over</u>	<u>Male</u>	<u>Female</u>	
<b><u>Diagnosis at Time of Admittance</u></b> (based on age at time of admission)						
Primary Osteoporosis	*	21.6	49.9	*	71.0	76.4
Low Energy Fracture (All)	90.8	387.8	650.5	207.5	973.1	1,180.6
Hip	35.0	171.6	302.6	103.4	411.7	515.1
Vertebrae/Pelvic	*	49.3	106.3	*	148.5	173.1
Upper Limb (Arm, Shoulder)	*	35.1	32.9	*	66.3	77.8
Lower Limb (Leg)	25.2	98.9	135.1	47.0	235.9	282.9
Ankle/Foot	*	*	*	*	42.9	51.7
Secondary Osteoporosis Condition Present				*	*	*
<b><u>Current Primary Diagnosis</u></b> (based on age at time of interview)						
Primary Osteoporosis	*	33.8	104.4	*	149.8	152.5
Low Energy Fracture (All)	22.3	113.2	234.6	104.6	297.0	401.6
Hip	*	47.4	102.5	36.8	122.8	159.5
Vertebrae/Pelvic	*	*	46.7	*	52.9	73.6
Upper Limb (Arm, Shoulder)	*	*	*	*	*	*
Lower Limb (Leg)	*	29.6	47.3	*	73.0	98.8
Ankle/Foot	*	*	*	*	*	*
Secondary Osteoporosis Condition Present	*	*	*	*	*	29.0
<b><u>Current Secondary Diagnosis</u></b> (based on age at time of interview)						
Primary Osteoporosis	155.9	666.7	1,272.0	170.6	2,018.3	2,188.8
Secondary Osteoporosis Condition Present	42.5	164.4	297.8	68.3	479.8	548.1
<b><u>Falls and Fractures</u></b> (based on age at time of interview)						
Reported Fall Within Past 6 Months	*	1,849.0	2,560.0	1,498.0	3,719.0	5,217.0
Sustained Hip Fracture Within Past 180 Days	*	95.0	141.0	69.0	206.0	276.0
Sustained Other Fracture Within Past 180 Days	*	107.0	159.0	78.0	260.0	339.0
<b>Total Nursing Home Population Aged 65 &amp; Older, 2004</b>	1,741.2	4,688.7	6,742.1	3,368.2	9,803.9	13,172.1

\* Estimate does not meet standards for reliability.

[1] Osteoporosis and related condition ICD-9-CM codes shown in the Table 5.1.

Source: National Center for Health Statistics, National Nursing Home Survey, 2004

**Table 5.9: Self-Reported Fracture (Ever) for Persons Aged 45 and Over by Age and Sex, United States 1999-2004**

**FEMALES**

	<u>Rate per 100 Persons</u>				
	<u>45-64</u>	<u>65-74</u>	<u>75-84</u>	<u>85 &amp; Older</u>	<u>45 &amp; Over</u>
Broken or Fractured Hip	0.6	1.1	3.5	13.4	1.6
Broken or Fractured Wrist	6.9	10.6	10.8	17.0	8.5
Broken or Fractured Spine	1.6	1.7	3.1	9.8	2.1
	<u>% of First Fractures Caused by a Fall [1]</u>				
Broken or Fractured Hip	74%	66%	96%	93%	90%
Broken or Fractured Wrist	91%	93%	93%	100%	94%
Broken or Fractured Spine	44%	72%	57%	75%	69%
	<u>Mean Age of First Fracture Caused by a Fall (in years)</u>				
Broken or Fractured Hip	56.0	68.5	73.1	80.2	74.8
Broken or Fractured Wrist	53.2	60.0	69.2	73.3	62.9
Broken or Fractured Spine	60.9	61.2	68.9	78.8	70.6

**MALES**

	<u>Rate per 100 Persons</u>				
	<u>45-64</u>	<u>65-74</u>	<u>75-84</u>	<u>85 &amp; Older</u>	<u>45 &amp; Over</u>
Broken or Fractured Hip	1.0	3.0	3.4	6.1	1.8
Broken or Fractured Wrist	11.9	11.4	8.6	7.8	11.4
Broken or Fractured Spine	3.5	2.8	3.6	3.5	3.4
	<u>% of First Fractures Caused by a Fall [1]</u>				
Broken or Fractured Hip	50%	53%	70%	80%	69%
Broken or Fractured Wrist	82%	82%	93%	91%	86%
Broken or Fractured Spine	47%	58%	50%	57%	64%
	<u>Mean Age of First Fracture Caused by a Fall (in years)</u>				
Broken or Fractured Hip	55.0	62.8	70.4	80.0	69.2
Broken or Fractured Wrist	54.7	60.4	62.8	75.0	60.2
Broken or Fractured Spine	56.5	57.4	68.0	75.1	60.9

[1] Self-reported cause as a "fall/tripped/slipped/fell out of bed" or "hard fall off ladder/stool /downstairs."

Source: National Center for Health Statistics. National Health and Nutrition Examination Survey Data, 1999-2004.

**Table 5.10: Low Energy Fractures [1] Treated as Inpatient or Emergency Room Visits for Persons Aged 45 and Over by Anatomic Site by Sex, United States 2004**

	<u>Inpatient Treatment</u> [2]			
	<u>Females</u>		<u>Males</u>	
	<u>Prevalence</u>	<u>% of Total</u>	<u>Prevalence</u>	<u>% of Total</u>
	(in 000s) [4]	<u>Fracture Sites</u>	(in 000s) [4]	<u>Fracture Sites</u>
Hip	227.6	42.6%	85.9	39.4%
Vertebrae/Pelvic	101.6	19.0%	48.7	22.3%
Upper Limb (Arm/Shoulder)	56.8	10.6%	21.4	9.8%
Lower Limb (Leg)	54.7	10.2%	22.4	10.3%
Foot/Ankle	52.8	9.9%	25.9	11.9%
<u>Wrist/Hand</u>	<u>40.6</u>	<u>7.6%</u>	<u>13.8</u>	<u>6.3%</u>
All Low Energy Fractures	499.2	100.0%	204.3	100.0%

	<u>Emergency Room Treatment</u> [3]			
	<u>Females</u>		<u>Males</u>	
	<u>Prevalence</u>	<u>% of Total</u>	<u>Prevalence</u>	<u>% of Total</u>
	(in 000s) [4]	<u>Fracture Sites</u>	(in 000s) [4]	<u>Fracture Sites</u>
Hip	172.3	18.5%	39.6	12.3%
Vertebrae/Pelvic	95.3	10.2%	44.0	13.6%
Upper Limb (Arm/Shoulder)	154.0	16.5%	52.8	16.3%
Lower Limb (Leg)	94.1	10.1%	31.7	9.8%
Foot/Ankle	161.9	17.3%	68.3	21.1%
<u>Wrist/Hand</u>	<u>255.7</u>	<u>27.4%</u>	<u>86.7</u>	<u>26.8%</u>
All Low Energy Fractures	920.4	100.0%	311.1	100.0%

[1] Treatment for fractures, excluding those with high energy causes (i.e., vehicular [auto, air, water] accidents, war injuries)

[2] Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004

[3] Source: National Center for Health Statistics, National Hospital Ambulatory Medical Care Survey, Hospital Emergency Room, 2004

[4] Multiple fractures sites per patient possible.

Source: National Center for Health Statistics. National Hospital Discharge Survey, 2004.

**Table 5.11: Inpatient Cost Associated with Osteoporosis [1] and Low Energy Fractures [2] for Persons Aged 45 and Older, United States 2004**

	<u>Prevalence</u> (in 000s)	<u>Mean Length of Stay</u> (in days)	<u>Mean Cost per Patient Stay</u>	<u>Estimated Total Cost</u> (in billions)
<b>Osteoporosis Diagnosis Patients</b>				
Osteoporosis Without Fracture	783.7	5.3	\$ 20,704	\$ 16.23
<u>Osteoporosis With Fracture</u>	<u>115.5</u>	<u>5.7</u>	<u>\$ 24,634</u>	<u>\$ 2.85</u>
<b>All Osteoporosis Diagnosis</b>	<b>899.2</b>	<b>5.3</b>	<b>\$ 21,209</b>	<b>\$ 19.07</b>
Non-Osteoporosis Patients	20,758.9	5.4	\$ 26,264	\$ 545.21
<b>Low Energy Fracture Patients</b>				
Hip	313.5	6.7	\$ 32,310	\$ 10.13
Vertebrae/Pelvic	150.2	6.6	\$ 27,610	\$ 4.15
Upper Limb (Arm/Shoulder)	78.2	5.2	\$ 24,347	\$ 1.90
Lower Limb (Leg)	77.1	6.2	\$ 29,190	\$ 2.25
Foot/Ankle	78.7	4.5	\$ 21,618	\$ 1.70
<u>Wrist/Hand</u>	<u>54.4</u>	<u>4.9</u>	<u>\$ 23,893</u>	<u>\$ 1.30</u>
<b>All Low Energy Fractures</b>	<b>704.3</b>	<b>6.1</b>	<b>\$ 27,919</b>	<b>\$ 19.66</b>
Non-Fracture Patients	20,723.3	5.4	\$ 25,883	\$ 536.38

[1] Osteoporosis and related condition ICD-9-CM codes shown in the Table 5.1.

[2] Treatment for fractures, excluding those with high energy causes (i.e., vehicular [auto, air, water] accidents, war injuries).

Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, 2004

Source: National Center for Health Statistics. National Hospital Discharge Survey, 2004.