12 percent higher for female hip fracture patients age 75 to 84, and 14 percent higher for female hip fracture patients age 85 and over.

These figures noted above overstate the excess mortality attributable to hip fracture because older people who fall repeatedly and are therefore at greater risk for hip fracture generally are in poorer physical condition than older people who do not fall repeatedly (33,43,91,1 13,1 16); thus they are at greater risk of dying. The appropriate comparison group to determine excess mortality for people who fracture their hip and die would be other people with similar physical impairments and coexisting illnesses who do not fracture their hip—a comparison group that, to OTA's knowledge, has not been constructed.

In evaluating the effect of hip fractures on long-term mortality, it is also important to determine the duration of excess mortality that is attributable to the fracture. On the basis of their study of814 people with a hip fracture treated in seven Maryland hospitals from 1984 to 1986, Magaziner et al. (79) concluded that excess mortality persisted for six months for females and subjects age 85 and over; 10 months for subjects age 75 to 84; and more than one year for males and subjects age 65 to 74. Data from the New England study also show that excess mortality following a hip fracture persists longer for subjects age 65 to 74 than for older patients *(27)*. Other researchers and commentators have concluded that excess mortality following a hip fracture persists for four months (31), six months (16,21 ,45), eight months (62,86), one year (23), and 1.6 years for females and 1.8 years for males (48).

For the purpose of OTA's analysis of the costs and effectiveness of screening for osteoporosis which pertains only to females, OTA concluded that excess mortality following a hip fracture should only be projected for one year after the fracture. The individuals who reviewed this document and commented on OTA's decision agreed with it.

POST-HOSPITAL AND OTHER OUTPATIENT SERVICE USE AND EXPENDITURES

Many people with a hip fracture are discharged from the hospital to a nursing home, a rehabilitation facility, or another short-stay hospital. Others who are discharged home receive paid home care services. Virtually all hip fracture patients have post-hospital physician visits, and some are rehospitalized in the year following their fracture for problems related to the fracture or its treatment. In addition, hip fracture patients use emergency room and ambulance services, and some use outpatient physical therapy. This section presents the information OTA used to determine how many people age 50 and over with a hip fracture used each of these post-hospital and other outpatient services and estimate 1990 expenditures for the services. OTA's principal findings based on this information were summarized at the beginning of this document.

Medicare expenditures for nursing home, rehabilitation, and home health care services for hip fracture patients constitute a notable proportion of all Medicare expenditures for these services. From 1984 to 1985, Medicare expenditures for nursing home care for patients in DRGs 209,210, and 236 accounted for more than 20 percent of all Medicare expenditures for nursing home care (89). Medicare expenditures for post-hospital rehabilitation and home health care services for patients in DRGs 209 and 210 accounted for 10 percent and 8 percent respectively of all Medicare expenditures for the two types of services. Not all patients in these DRG categories are hip fracture patients, but many are.[20]

[20] **In 1988, hip fracture patients constituted 32 percent of individuals in DRG 209 and 86 percent of individuals in DRG 210 (based on data from Charlson (12) and Latta and Helbing (66)). A study of post-hospital service use by a 20 percent sample of Medicare beneficiaries discharged from short-stay hospitals in 1984/85 found that among those in DRG 209, hip fracture patients were three times more likely than other patients in the same DRG to use Medicare-covered post-hospital services (90).**

As average hospital length of stay has decreased in recent years, the proportion of hip fracture patients that receives post-hospital services has increased. Expenditures for post-hospital services for these patients have also increased-certain] y as a proportion of all Medicare expenditures for the services (89) and probably also as a proportion of expenditures by other payers.

Since the implementation of PPS, a somewhat larger proportion of hip fracture patients has been discharged from the hospital in a medically unstable condition. The previously cited study of more than 2,500 hip fracture patients treated in 297 hospitals in five states between 1981 and 1986 found that the proportion of patients discharged with one or more medical instabilities increased from 19 percent in the pre-PPS period to 23 percent in the post-PPS period (64).[21] Most of the increase was observed in patients who were discharged home. Before PPS, only 9 percent of hip fracture patients who were discharged home had one or more medical instabilities, compared with 17 percent in the post-PPS period. For hip fracture patients discharged to a nursing home, the proportion with one or more medical instabilities increased only slightly, from 26 percent in the pre-PPS period to 27 percent in the post-PPS period (64).

The University of Minnesota's Post Acute Care Study—a study of post-hospital service use for elderly Medicare beneficiaries discharged from 52 hospitals in three metropolitan areas (Pittsburgh, Minneapolis/St. Paul, and Houston) in 1988 and 1989—found that many hip fracture patients use several different types of services in the year following their discharge from the hospital (139). Movement from one service to another was relatively rapid in the period just after hospital discharge. About 45 percent of the 606 hip fracture patients in the study sample moved one or snore times in the first six weeks following their discharge from the hospital, not counting the initial move when they left the hospital (53, 139). Thus it cannot be assumed that hip fracture patients who are receiving a particular service at the time of hospital discharge will still be receiving the service even six weeks later.

On the other hand, the Post Acute Care Study also found that the movement of hip fracture patients from one service to another slows down by six months post-discharge. Of the 202 hip fracture patients in DRGs 210,211, and 236 who were discharged from the hospital to a nursing home, for example, 31 percent were in a nursing home at six months post-discharge; the same proportion and presumably most of the same individuals were in a nursing home six months later, at one year post-discharge (53).

Finally, post-hospital service use varies in different geographic areas because of differences in referral practices and the availability of particular types of services in different communities. Referral practices, service availability, and service use are all affected by funding. Differences in funding for particular services among Medicare fiscal intermediaries and state Medicaid programs are associated with differences in service use from state to state (90,102). In fact, the availability of funding for different types and amounts of post-hospital services may be more important than other factors, including patient need, in determining what services are used, by which patients, and for how long.

| Use and Expenditures for Nursing Home Care

Tables 17 and 18 present unpublished data from the 1988 and 1991 National Hospital Discharge Surveys on the number and proportion of people age 50 and over with a first-listed diagnosis of hip fracture (ICD-9-CM diagnostic code 820) according to their discharge status and destination .22 The

[21] For most hip fracture patients, these medical instabilities consisted of new incontinence or new confusion (64).

[22] The findings of the two surveys with respect to the proportion of hip fracture patients that died in the hospital (column 1, tables 17 and 18) were shown previously in tables 8 and 9.

TABLE 17: Discharge Status and Destination for People with a Hip Fracture Treated in Short-Stay Nonfederal Hospitals in 1988

Age	Died in the hospital	Discharged to home	Left against medical advice	Discharged to another short-stay hospital	Discharged to a long-term care institution	Discharged alive: destination not stated	Discharge status not stated
50-59	**46**	**4,975**		**367**	**2,172**	**619**	
n=8, 179	*1%*	*61%*		*4%*	*27%*	*8%*	
60-69	1,184	18,016	479	2,848	8,499	1,736	795
n=33,557	*4%*	*54%*	*1%*	*8%*	*25%*	*5%*	*2%*
70-79	**1,651**	**26,949**	**883**	**2,319**	**22,635**	**7,774**	**796**
n=62, 707	*3%*	*43%*	*1%*	*4%*	*36%*	*12%*	*1%*
80-89	2,001	28,483	760	9,045	49,568	6,655	1,676
n=98, 188	*2%*	*29%*	*1%*	*9%*	*50%*	*7%*	*2%*
90-99	**2,206**	**4,406**	**78**	**2,066**	**23,000**	**1,698**	
n=33,476	*7%*	*13%*	*<1%*	*6%*	*69%*	*5%*	
1 00+	*1,043*	*262*			*45*		
n= 1,350	*77%*	**19%**			**3%**		
Totals	8,131	83,093	1,900	16,665	105,919	18,482	3,267
n=237,457	3%	35%	1%	**7%**	**45%**	**8%**	**1%**
Males							
50-59		**1,539**		**367**	**266**	**57**	
n=2,231		*69%*		*16%*	*12%*	*3%*	
60-69	**920**	**5,767**	**420**	**1,433**	**2,956**	**694**	**795**
n= 12,985	**7%**	**44%**	**3%**	*1 1%*	**23%**	**5%**	**6%**
70-79	**1,427**	**5,991**	**583**	**311**	**5,783**	**875**	
n=14,970	*10%*	*40%*	*4%*	*2%*	*39%*	*6%*	
80-89	**564**	**5,305**	**376**	**709**	**12,346**	**889**	**240**
n=20,429	**3%**	**26%**	*2%*	*3%*	*60%*	*4%*	*1%*
90-99	**945**	**946**		**204**	**3,238**	**554**	
n=5,887	*16%*	*16%*		*3%*	**55%**	*9%*	
100+	*1,043*						
n= **1,043**	*100%*						
Totals	*4,899*	*19,548*	1,379	**3,024**	**24,591**	**3,069**	**1,035**
n=57,545	**9%.**	**34%**	**2%**	**5%**	**43%**	**5%**	**2%**
Females							
50-59	**46**	**3,436**			**1,304**	**562**	
n=5,948	*1%*	*58%*			*32%*	*9%*	
60-69	**264**	**12,249**	**59**	**1,415**	**5,543**	**1,042**	
n=20,572	*1%*	*60%*	*< 1%*	**7%**	**27%**	**5%**	
70-79	**224**	**20,958**				**6,899**	**796**
n=47, 737	*<1%*	*44%*		*4%*	*35%*	*14%*	**2%**
80-89	**1,437**	**23,178**	**384**	**8,336**	**37,222**	**5,766**	**1,436**
n=77, 759	*2%*	*30%*	*< 1%*	*11%*	**48%**	**7%**	**2 %**
90-99	**1,261**	**3,462**	**78**	**1,882**	**59,762**	**1,144**	
n=27,589	*5%*	*13%*	*<1%*	**7%**	*72%*	*4%*	
100+		**262**			**45**		
n=307		**85%**			**15%**		
Totals	**3,232**	**63,545**	**521**	**13,641**	**81,328**	**15,413**	**2,232**
n= 179,912	**2%**	**35%**	**<170**	**8%**	**45%**	**9%**	**1%**

SOURCE U S Department of Health and Human Services, Public Health Service, National Center for Health Statistics, unpublished data from the 1988 National Hospital Discharge Survey, 1992

TABLE 18: Discharge Status and Destination for People with a Hip Fracture Treated in Short-Stay Nonfederal Hospitals in 1991

Age	Died in the hospital	Discharged to home	Left against medical advice	Discharged to another short-stay hospital	Discharged to a long-term care institution	Discharged alive: destination not stated	Discharge status not stated
50-59	**51**	**7,851**	**37**	**1,266**	**440**	**325**	
n=9,970	***1%***	***79%***	***<1%***	***13%***	***4%***	***3%***	
60-69	749	15,029	37	1,693	6,499	1,992	273
n=26,272	*3%*	*57%*	*<1%*	*6%*	*25%*	*8%*	*1%*
70-79	**2,477**	**28,408**	**799**	**11,063**	**25,915**	**9,756**	**855**
n=79,273	***3%***	***36%***	***1%***	***14%***	***33%***	***12%***	***1%***
80-89	5,187	30,456	481	14,797	55,954	12,887	3,059
n=122,821	*4%*	*25%*	*<1%*	*12%*	*46%*	*10%*	*2%*
90-99	**1,757**	**8,717**	**36**	**7,444**	**19,760**	**3,996**	**571**
n=42,281	***4%***	***21%***	***<1%***	***18%***	***47%***	***9%***	***1%***
100+	314	428		15	188	123	
n=1,068	*29%*	*40%*		*1%*	*18%*	*12%*	
Totals	10,535	90,889	1,390	36,278	108,756	29,079	4,758
n=281,685	*4%*	*32%*	*<1%*	*13%*	*39%*	*10%*	*2%*
Males							
50-59		**3,466**		**1,126**	**273**	**141**	
n=5,006		***69%***		***22%***	***5%***	***3%***	
60-69	526	4,499		271	3,994	445	
n=9,735	*5%*	*46%*		*3%*	*41%*	*5%*	
70-79	**1,252**	**5,179**	**188**	**3,546**	**5,716**	**2,024**	
n=17,905	***7%***	***29%***	***1%***	***20%***	***32%***	***11%***	
80-89	2,557	7,851		3,582	11,803	2,425	309
n=28,527	*9%*	*28%*		*13%*	*41%*	*9%*	*1%*
90-99	**653**	**1,893**	**36**	**326**	**2,636**	**1,391**	**219**
n=7,154	***9%***	***26%***	***1%***	***5%***	***37%***	***19%***	***3%***
100+	126			15	45	28	
n=214	*59%*			*7%*	*21%*	*13%*	
Totals	5,114	22,888	224	8,866	24,467	6,454	528
n=68,541	*7%*	*33%*	*<1%*	*13%*	*36%*	*9%*	*<1%*
Females							
50-59	**51**	**4,386**	**37**	**140**	**167**	**184**	
n=4,964	***1%***	***88%***	***1%***	***3%***	***3%***	***4%***	
60-69	223	10,530	37	1,422	2,505	1,547	273
n=16,537	*1%*	*64%*	*<1%*	*9%*	*15%*	*9%*	*2%*
70-79	**1,225**	**23,229**	**611**	**7,517**	**20,199**	**7,732**	**855**
n=61,368	***2%***	***38%***	***1%***	***12%***	***33%***	***13%***	***1%***
80-89	2,630	22,605	481	11,215	44,151	10,462	2,750
n=94,294	*3%*	*24%*	*1%*	*12%*	*47%*	*11%*	*3%*
90-99	**1,104**	**6,824**		**7,118**	**17,124**	**2,605**	**352**
n=35,127	***3%***	***19%***		***20%***	***49%***	***7%***	***1%***
100+	188	428			143	95	
n=854	*22%*	*50%*			*17%*	*11%*	
Totals	5,421	68,001	1,166	27,412	84,289	22,625	4,230
n=213,144	*3%*	*32%*	*1%*	*13%*	*40%*	*11%*	*2%*

SOURCE U.S Department of Health and Human Services, Public Health Service, National Center for Health Statistics, unpublished data from the 1991 National Hospital Discharge Survey, 1992.

data show that 45 percent of people age 50 and over who were hospitalized with a hip fracture in 1988 were discharged to a nursing home (see table 17).[23] In 1991, 39 percent of people age 50 and over who were hospitalized with a hip fracture were discharged to a nursing home (see table 18). The proportion discharged to a nursing home varies by age, from a third or fewer of those under age 80 to half or more of those age 80 and over. The proportions differ greatly between the two surveys for the age group 50 to 59, which has relatively few patients, and the age group 90 to 99, in which 69 percent of patients were discharged to a nursing home in 1988 compared with 47 percent in 1991. On average, male hip fracture patients are slightly less likely than female hip fracture patients to be discharged to a nursing home.

Data from the University of Minnesota's Post Acute Care Study show that of the 227 hip fracture patients in DRG 209, 35 percent (80 patients) were discharged from the hospital to a nursing home. Of the 379 hip fracture patients in DRGs 210,211, and 236,53 percent (202 patients) were discharged from the hospital to a nursing home (53, 139).

Other studies of hip fracture patients treated in individual hospitals or hospitals in certain geographic areas have found that anywhere from 24 to 78 percent of patients were discharged to a nursing home (28,29,32,50,57,59,64,79,95). This variation reflects differences in the study samples as well as differences in referral practices and the availability of various types of services in different communities.

Most studies that have compared the proportion of hip fracture patients discharged to a nursing home before and after the implementation of PPS have found that the proportion is higher in the post-PPS period (28,29,32,51,89). Both before and after the implementation of PPS, virtually all persons who were living in a nursing home at the time of their fracture have been readmitted to the nursing home after their discharge from the hospital (26,51). The change post-PPS has been in the proportion of patients that was living at home at the time of their fracture and is discharged from the hospital to a nursing home (51).

In the past, most hip fracture patients who were discharged from the hospital to a nursing home went to a skilled nursing facility (SNF) rather than an intermediate care facility (ICF). A study of 19,000 people with a hip fracture treated in Illinois hospitals from 1980 to 1982 found that almost three-quarters of those discharged to a nursing home went to a SNF (59). The distinction between SNFS and ICFS was eliminated for purposes of Medicaid reimbursement in 1990, but hip fracture patients whose nursing home care is paid for by Medicare still must be in a nursing home that is Medicare-certified as providing a skilled level of care.

Nursing home residents with a hip fracture have a shorter average length of stay than other nursing home residents. The 1985 National Nursing Home Survey found that among residents with a primary admission diagnosis of hip fracture who were discharged from a nursing home in 1985 for any reason, including death, 34 percent had stayed less than one month; 41 percent had stayed from one to six months, and 25 percent had stayed more than six months; their mean length of stay was 299 days, and their median length of stay was 59 days (133). In contrast, among all nursing home residents discharged in 1985, 31 percent had stayed less than one month; 32 percent had stayed one to six months, and 37 percent had stayed more than six months; the mean length of stay for all residents discharged in 1985 was 401 days, and their median length of stay was 82 days.

The Post Acute Care Study found that of the 80 hip fracture patients in DRG 209 who were discharged from the hospital to a nursing home, 37 percent stayed less than six weeks, 20 percent stayed from six weeks to six months, 3 percent stayed from six months to one year, and 40 percent stayed more than one year (53). Of the 202 hip

23 The survey instrument for the National Hospital Discharge Survey uses the term king-term care institution for nursing homes.

fracture patients in DRGs 210,211, and 236 who were discharged from the hospital to a nursing home, 36 percent stayed less than six weeks, 33 percent stayed from six weeks to six months, and 31 percent stayed more than one year (53).

Studies of hip fracture patients treated in individual hospitals indicate that 33 to 82 percent of patients discharged to a nursing home were still in the nursing home six months later (7,28,95) and that 32 to 66 percent of those discharged to a nursing home stayed in the nursing home more than one year (29,32,57). Data on 565 hip fracture patients in two states show that only 17 percent of those who were discharged from the hospital to a nursing home in 1985 and 1986 were still in the nursing home six months later (51).

These wide-ranging and incompatible figures on nursing home length of stay reflect differences in the study samples as well as differences in patterns of service use in different communities. The figures from the 1985 National Nursing Home Survey are based on a discharge sample that includes only residents who are discharged from the nursing home in the time frame of the study; thus the figures underestimate average length of stay for all nursing home residents with a hip fracture. The figures from the Post Acute Care Study and the other studies cited above are based on admission samples that include all residents with a hip fracture admitted to a nursing home in the time frame of the study. These studies include residents with longer lengths of stay but still do not provide information about length of stay for residents with very long stays.

In comparison with both admission and discharge samples, samples of current nursing home residents show a greater proportion of residents with long lengths of stay and a smaller proportion of residents with short lengths of stay (72). In part because hip fracture patients have a shorter average length of nursing home stay than other nursing home residents, they constitute a very small proportion of current residents. According to the 1985 National Nursing Home Survey, only 1.8 percent of all residents had a primary diagnosis of hip fracture at the time of the survey.[24] In contrast, residents with a primary admission diagnosis of hip fracture constituted 5 percent of all residents discharged in 1985 (130).

On the basis of an average of the figures from the 1988 and 1991 National Hospital Discharge Surveys, OTA estimates that 41 percent of all hip fracture patients age 50 and older are discharged from the hospital to a nursing home. The comparable proportions are 39 percent for male hip fracture patients and 42 percent for female hip fracture patients. Averaging the figures from the two years and combining the age categories 90 to 99 and 100+, the age-specific proportions of hip fracture patients discharged to a nursing home are as follows: age 50 to 59, 14 percent; age 60 to 69, 25 percent; age 70 to 79,34 percent; age 80 to 89,48 percent; and age 90 and over, 55 percent.

For length of stay, OTA estimates that 24 percent of hip fracture patients discharged to a nursing home remain for one month, 8 percent remain for two months, 8 percent remain for three months, 8 percent remain for four months, 8 percent remain for five months, 10 percent remain for six months, and 34 percent remain for one year or longer. These figures are based primarily on averaged data from the Post Acute Care Study, which included only people age 65 and over. OTA is not aware of any data that can be used to estimate nursing home length of stay for hip fracture patients age 50 to 64. Thus OTA used the figures just cited for all hip fracture patients discharged to a nursing home, regardless of age. Since patients age 65 and over are likely to remain in a nursing home longer than patients age 50 to 64, these figures probably overestimate length of stay and therefore expenditures for the younger patients.

24 Of these 26,600 residents, 1,600 were under age 65; 1,700 were age 65 to 74; 7,300 were age 75 to 84; and 16,000 were age 85 an over (1 34). Of the 26,600 residents, 21 ,900 were females. Of the female residents, 21,400 were age 65 andover, 6,100 were age 75 to 84, and 14,100 were age 85 and over. Female residents with a primary diagnosis of hip fracture constituted 2 percent of all female nursing home residents.

No data are available to determine the average length of stay for the 34 percent of hip fracture patients who remain in the nursing home for one year or longer. On the basis of data from the 1985 National Nursing Home Survey, Spence and Wiener (1 14) estimated that 36 percent of all nursing home residents admitted in 1985 would remain in the nursing home more than one year, including 17 percent who would remain for one to three years, 9 percent who would remain for three to five years, and 10 percent who would remain for more than five years. One could use these figures, which are not hip fracture-specific, to estimate average length of stay for long-stay hip fracture patients, subtracting 2 percent from one of the length of stay categories to total to 34 percent. Alternatively, one could assume that nursing home stays longer than one year generally are not attributable to hip fracture.

In considering these two alternatives, it is important to keep in mind the relatively high background level of nursing home use among very old people. In 1985,22 percent of individuals age 85 and over were in a nursing home at any one time, compared with only 1 percent of individuals age 65 to 74 and 6 percent of individuals age 75 to 84 (133). Older females are more likely than older males to be in a nursing home, and in 1985,25 percent of females age 85 and over were in a nursing home at any one time.[25]

Several studies have shown that hip fracture patients who remain in a nursing home for longer than six months or a year tend to be over age 80, female, lacking in family involvement, disoriented, and unable to transfer from bed to chair, bathe, or ambulate without assistance (7,57,81). These characteristics predict nursing home placement irrespective of hip fracture.

In addition, as noted earlier, some individuals fracture their hip while they are living in a nursing home. These individuals are almost always readmitted to the nursing home when they are discharged from the hospital (26,5 1,79), and they are likely to remain in the nursing home for the rest of their lives. According to the 1985 National Nursing Home Survey, more than 18,000 individuals were discharged from a nursing home to a short-stay hospital with a primary *discharge* diagnosis of hip fracture (130); virtually all these individuals had an additional discharge code (E code) indicating that the hip fracture was the result of an accidental fall (39). One cannot be sure that all these individuals experienced a new hip fracture in the nursing home, but it is likely that most did.

Some nursing homes do not formally discharge residents when the residents are hospitalized; thus the number of individuals who fracture their hip while they are living in a nursing home may be greater than 18,000. Unpublished data from the 1987 National Medical Expenditure Survey indicate that 34,000 nursing home residents were hospitalized with a primary hospital diagnosis of hip fracture in 1987 (126). If all of these 34,000 individuals survived and returned to the nursing home from the hospital, they would constitute about one-third of all hip fracture patients discharged from a short-stay hospital to a nursing home in that year.

Given that the majority of hip fracture patients are age 80 or over, that hip fracture patients who remain in a nursing home for a prolonged period generally have characteristics that predict nursing home placement irrespective of hip fracture, and that a large number of nursing home residents fracture their hip in the nursing home and return to the nursing home after discharge from the hospital, it is not surprising that some hip fracture patients who are discharged from the hospital to a nursing home are still in a nursing home one year after their fracture. Nor is it likely that their pro-

25 On the basis Of data from the National Mortality Follow back Survey, Kemper and Murtaugh (60) concluded that among females who died in 1986, the proportion that had spent some time in a nursing home before their death was 9 percent for those who died at age *45* to 64,2 I percent for those who died at age 65 to 74,42 percent for those who died at age 75 to 84,65 percent for those who died at age 85 to 94, and 77 percent for those who died over age 95. About half of all persons who entered a nursing home spent at least one year there.

longed nursing home stays are primarily attributable to their hip fracture.

For these reasons, OTA concluded that the maximum nursing home length of stay that should be attributed to hip fracture is one year and that including longer stays would allocate expenditures to hip fracture that are actually attributable to frailty and dementia in very old people, lack of alternative care settings, and other factors. Undoubtedly, there are some cases in which a prolonged nursing home stay is attributable to hip fracture. If there are many such cases, OTA's decision to use a one-year maximum length of stay for this analysis will result in an underestimation of expenditures for nursing home care for hip fracture patients. On the other hand, OTA's estimate of expenditures for nursing home care may be too high since no reduction was made to account for the large number of cases in which individuals fracture their hip while they are in a nursing home and return to the nursing home after their hospital discharge; many of these individuals probably would have stayed in the nursing home for a prolonged period even if they had not fractured their hip. The potential overestimation of expenditures for nursing home care from the latter cases probably outweighs any underestimation of expenditures due to cases in which a nursing home stay longer than one year is legitimately attributable to hip fracture.

In addition to hip fracture patients who are initially discharged from the hospital to a nursing home, some hip fracture patients are initially discharged home or to a rehabilitation facility and later admitted to a nursing home. As noted earlier, the Post Acute Care Study found that 80 of the 227 hip fracture patients in DRG 209 were initially discharged from the hospital to a nursing home (1 39). Among the other 147 hip fracture patients in this DRG, 8 percent of those who were initially discharged home and 22 percent of those who were initially discharged to a rehabilitation facility were in a nursing home by one year post-discharge. Of the 379 hip fracture patients in DRGs 210, 211, and 236, 202 were initially discharged from the hospital to a nursing home. Among the other 177 hip fracture patients in these DRGs, 8 percent of those initially discharged home and 17 percent of those initially discharged to a rehabilitation facility were in a nursing home by one year post-discharge. These individuals who were initially discharged home or to a rehabilitation facility but were in a nursing home by one year post-discharge constitute 6 percent of all hip fracture patients in the study sample. OTA does not have information about the reason these individuals were admitted to a nursing home. Lacking this information, OTA assumed that their nursing home admission was attributable to their hip fracture. OTA also does not have information about average length of nursing home stay for these individuals. Since they were initially discharged to home or a rehabilitation facility, OTA assumed that, on average, they were in a nursing home for 10 of the 12 months in the first year post-discharge. This assumption may result in an overestimation of the use of and expenditures for nursing home care by hip fracture patients.

Most hip fracture patients receive skilled level nursing home care, at least for their first few months in the nursing home, and many receive Medicare reimbursement for the first weeks of care, thus reimbursement for their care is likely to be above the average reimbursement for all residents. In 1985, the average monthly charge for nursing home care was $1,456. This overall average includes an average monthly charge of $2,141 for individuals for whom Medicare was the primary **payer, $1,998** for individuals for whom Medicaid was the primary payer and the resident was receiving skilled level care, $1,292 for individuals for whom Medicaid was the primary payer and the resident was receiving intermediate level care, and $1,450 for residents who were paying for their own care (1 33). The average monthly charge for residents with a primary diagnosis of hip fracture was $1,608 in 1985 (134), compared with the average monthly charge of $1,456 for all residents, noted above. On the basis of figures from the 1985 National Nursing Home Survey and HCFA's Skilled Nursing Home Facility Input Price Index, Kemper et al. (61) estimated that the average annual nursing home charge for 1990 was $25,000

or $2,083 per month.[26] Thus, OTA estimated the 1990 nursing home expenditure for hip fracture patients as $2,293 per month ($2,083 multiplied by the ratio of $1,608 to $1 ,456).

For the 66 percent of hip fracture patients discharged to a nursing home who remain in the nursing home less than a year, the weighted average expenditure for nursing home care based on the length of stay figures given above and a payment of $2,293 per month is $6,810 per patient for 1990. For the 34 percent of patients discharged to a nursing home who remain in the nursing home at one year post-discharge, the average per patient expenditure for nursing home care, based on the same figures and assuming a maximum attributable length of stay of one year, is $27,516 per patient for 1990. Combining these two amounts, the weighted average per patient expenditure for nursing home care for hip fracture patients who are discharged from the hospital to a nursing home is $13,849 for 1990. For hip fracture patients who are initially discharged home or to a rehabilitation facility but later admitted to a nursing home, the average per patient expenditure for nursing home care is $22,930 for 1990. Assuming that 41 percent of all hip fracture patients are discharged from the hospital to a nursing home and that 6 percent are initially discharged home or to a rehabilitation facility but later admitted to a nursing home, the average per patient expenditure for nursing home care for all hip fracture patients is $7,054 for 1990.

If it were assumed that nursing home stays beyond one year are attributable to hip fracture and Spence and Wiener's figures for average length of stay beyond one year for all nursing home residents were used (subtracting 2 percent from the one- to three-year length of stay category to total to 34 percent), the average per patient expenditure for the 34 percent of hip fracture patients discharged from the hospital to a nursing home who remain in the nursing home at one year post-discharge would be $93,878 for 1990. Combining this amount with the $6,810 estimate for patients who remain in the nursing home less than one year yields a weighted average per patient expenditure of $36,412 for 1990. Assuming that 41 percent of all hip fractures patients are discharged to a nursing home, the average per patient expenditure for all hip fracture patients would be $14,929 for 1990. If it were additionally assumed that the 6 percent of hip fracture patients who are initially discharged home or to a rehabilitation facility but later admitted to a nursing home also remain in the nursing home beyond one year, using Spence and Wiener's figures for length of stay, the average per patient expenditure for all hip fracture patients would be $20,286 for 1990. As noted earlier, however, OTA believes that, in general, expenditures for nursing home stays beyond one year are not legitimately attributable to hip fracture.

Use and Expenditures for Care in a Rehabilitation Facility or Another Short-Stay Hospital

Some hip fracture patients are discharged from the hospital to a free-standing rehabilitation hospital, a rehabilitation unit in a short-stay hospital, or another type of unit in a short-stay hospital. In addition, some patients are readmitted to a short-stay hospital in the year following their fracture. The National Hospital Discharge Survey does not collect information about discharges to rehabilitation facilities, but discharges to rehabilitation facilities are probably included in the survey response category, *discharges to another short-stay hospital.* Data from the 1988 survey show that an average of 7 percent of hip fracture patients age 50 and over were discharged to a short-stay

26 This number might be too low. According to a 1988 survey of state Medicaid programs, the average per diem for Medicaid SNF care was $60.65 ($1 ,820 per month) in 1988 and the average per diem for Medicaid ICF care was $46.03 ($ I ,382 per month) in 1988. These rates varied greatly from state to state (8). The state Medicaid programs estimated that private pay rates were $11.98 per day higher for SNF care and $10.19 per day higher for ICF care in 1987. Neu and Harrison (89) report that in 1984/85, Medicare allowed charges for one day of skilled care were $110.63 for patients in DRG 209, $118.49 for patients in DRG 210, and $111 .80 for patients in DRG 236.

hospital (see table 17). The proportion varies for different age groups but shows no obvious trend to increase or decrease with increasing patient age. The 1991 National Hospital Discharge Survey found that an average of 13 percent of hip fracture patients age 50 and over were discharged to a short-stay hospital, again with no obvious trend to increase or decrease with increasing patient age (see table 18).

A review of 1988 Medicare data conducted for PROPAC found that 8 percent of hip fracture patients age 65 and over were discharged to a rehabilitation facility (102). Hip fracture patients age 85 and over were less likely than those under age 85 to be discharged to a rehabilitation facility, and black patients were less likely than white patients to be discharged to a rehabilitation facility.

The University of Minnesota's Post Acute Care Study, which included Medicare beneficiaries discharged from 52 hospitals in three metropolitan areas in 1988 and 1989, found that of the 227 hip fracture patients in DRG 209, 16 percent (36 patients) were discharged from the hospital to a rehabilitation facility (53, 139). Of the 379 patients in DRGs 210,211, and 235, 14 percent (53 patients) were discharged to a rehabilitation facility. Six weeks later, most of these patients had left the rehabilitation facility to go home or to a nursing home.

The proportion of hip fracture patients discharged to a rehabilitation facility varies in different geographic areas and among hospitals. The study of hip fracture patients treated in seven Maryland hospitals between 1984 and 1986 found that less than 5 percent of patients were discharged to a rehabilitation facility (79). In contrast, a study of hip fracture patients discharged from one hospital in Boston in 1983 and 1984 found that 40 percent were discharged to a rehabilitation facility (50). The high proportion of patients discharged to a rehabilitation facility in the latter study is not replicated in any other study OTA is aware of and probably reflects the availability of this type of service in Boston at the time of the study and referral practices at the discharging hospital.

The proportion of hip fracture patients discharged to a rehabilitation facility maybe increasing (78). From 1984 to 1985, only 3 percent of hip fracture patients in DRGs 209 and 210 received Medicare payment for post-hospital care in a rehabilitation facility (90) compared with 8 percent in 1988 (102). Since rehabilitation facilities are exempt from PPS, there is probably a financial incentive for greater use of these facilities for Medicare beneficiaries.

Average length of stay for hip fracture patients in rehabilitation facilities is short. In 1984 and 1985, the average length of stay in a rehabilitation facility was 8.8 days for Medicare beneficiaries in DRG 209 and 10.1 days for Medicare beneficiaries in DRG 210 (90).

Many hip fracture patients are readmitted to a short-stay hospital in the year following their fracture, sometimes for complications resulting from the fracture or treatment they received for the fracture. Among 536 hip fracture patients who were treated in seven Maryland hospitals from 1984 to 1986 and survived for at least one year, 35 percent were rehospitalized in the year following their fracture (80). Among 1,045 hip fracture patients treated in 57 hospitals in five states in 1985 and 1986, 42 percent of those discharged alive were rehospitalized in the year following their fracture, and the average length of stay for these rehospitalization was eight days (51).

Many hip fracture patients who are rehospitalized in the year following their fracture are hospitalized for conditions unrelated to the fracture. To determine the proportion of patients rehospitalized for fracture-related conditions, HCFA convened a panel of orthopedic surgeons to develop lists of potential adverse events for patients who receive one of two treatments for hip fracture: partial hip replacement or reduction and internal fixation (122). Based on the lists of adverse events and associated time frames developed by the panel, HCFA concluded that in 1986, 5 to 10 percent of the patients were rehospitalized in the year following their original hospital discharge for a condition related to their hip fracture. A larger

proportion of the patients was rehospitalized for any cause.[27]

On the basis of the preceding discussion, OTA estimates that 12 percent of all hip fracture patients are discharged from the original hospital to a rehabilitation facility or another short-stay hospital. This figure is the average of the figures on discharges to short-stay hospitals from the 1988 and 1991 National Hospital Discharge Surveys and discharges to rehabilitation facilities from the Post Acute Care Study and the study conducted for PROPAC. Using this figure assumes that most discharges to short-stay hospitals in the National Hospital Discharge Survey are actually discharges to rehabilitation facilities.

On the basis of the findings of Neu and Harrison (89), OTA estimates that the average length of stay for hip fracture patients who are discharged to a rehabilitation facility or other short-stay hospital is nine days.

To determine the average per patient expenditure for post-hospital care in a rehabilitation facility or another short-stay hospital, OTA used the average charge for a hospital day, $687 in 1990 (3).[28] Using this figure, the average expenditure for hip fracture patients discharged to a rehabilitation facility or short-stay hospital is $6,183 (nine days multiplied by $687 per day) for 1990. Assuming that 12 percent of hip fracture patients were discharged to a rehabilitation facility or another short-stay hospital, the weighted average per patient expenditure for all hip fracture patients is $742 for 1990. These amounts may overestimate the true amounts because they are based on hospital charges.

OTA further assumed that 8 percent of hip fracture patients (the midpoint of HCFA's 5 to 10 percent figures cited above) were readmitted to a short-stay hospital for a fracture-related condition at some time in the year following their fracture and that these patients had an average length of stay in the short-stay hospital of eight days, based on the study of hip fracture patients treated in 57 hospitals in five states (51). Using these figures, the average per patient expenditure for hip fracture patients rehospitalized in a short-stay hospital is $5,496 for 1990. The weighted average per patient expenditure for all hip fracture patients is $440.

Use and Expenditures for Home Care Services

Some hip fracture patients receive paid home care services either immediately after their discharge from the hospital or later in the first year post-fracture. In addition, many patients receive unpaid home care services provided by family members and others. The discussion below pertains only to paid home care services. Unpaid services provided by family members and others are discussed later in this document.

Medicare pays for some types of home care, including skilled nursing, physical therapy, and home health aide services. In 1984 and 1985,26 percent of hip fracture patients in DRG 209, 25 percent of hip fracture patients in DRG 210, and 25 percent of all patients in DRG 236 received Medicare-covered home health care services sometime in the first six months post-discharge (89,90). Most of these services were provided in the first two months post-discharge. Patients in DRGs 209 and 236 received an average of 16 Medicare-covered home health care visits in the first 60 days post-discharge and an additional four Medicare-covered visits by 190 days post-discharge (89). Patients in DRG 210 received an average of 18 Medicare-covered home health care visits in the first two months post-discharge and an additional six Medicare-covered visits by 190 days post-discharge. The use of Medicare-covered home health services by all patients in DRG 209 increased with age from 28 percent of those

27 From 1976 to 1988, there were 334 or more hospital discharges per year per 1,000 persons age 65 and over in the United States(1). Thus, at least one-third of elderly people are hospitalized per year for all causes.

28 AHA does not provide information about average payment for a hospital day.

under age 70, to 34 percent of those age 70 to 74, 39 percent of those age 75 to 79, and 41 percent of those age 85 to 89, and then decreased to 32 percent of those age 89 and over (90). The use of Medicare-covered home health services by all patients in DRG 210 varied with patient age but showed no obvious trend to increase or decrease with increasing patient age.

A review of 1988 Medicare data conducted for PROPAC found that an average of 31 percent of hip fracture patients age 65 and over received Medicare-covered home health services (102). Hip fracture patients age 85 and over were less likely than those under age 85 to receive home health services, and white patients were less likely than black patients to receive home health services.

The University of Minnesota's Post Acute Care Study found that of the 227 hip fracture patients in DRG 209, 27 percent (62 patients) were discharged from the hospital to home with paid home care services (53, 139). At six weeks post-discharge, 93 percent of these patients were still at home, and 7 percent were in an institution. Of the 379 hip fracture patients in DRGs 210, 211, and 236, 14 percent (53 patients) were discharged from the hospital to home with paid home care services (53, 139). At six weeks post-discharge, 92 percent of these patients were still at home, and 8 percent were in an institution.

The previously cited study of 657 hip fracture patients treated in seven Maryland hospitals from 1984 to 1986 found higher use of paid home care services in the early post-discharge period and a drop off in service use by six months post-fracture (55). The study collected information about 10 types of paid home care services, including both home health and other nonmedical home care services. The 10 types of home care services were personal care, domestic care, meals on wheels, medical supervision, nursing care, physical therapy, indoor mobility assistance, outdoor mobility assistance, emotional support, and assistance with arranging services. At two months post-fracture, 27 percent of the hip fracture patients were receiving one or more of these types of services for an average of 24 hours per week with an average expenditure from all sources of $182 per week. By six months post-fracture, only 17 percent of the patients were receiving any of the home care services, and those receiving the services were receiving fewer hours, an average of 17 hours per week, with an average expenditure from all sources of $87 per week. Patients who received home care services were in poorer physical condition on average than patients who did not receive the services.

In evaluating the impact of hip fracture on the use of home care services, it is important to consider the background levels of use of these services by all elderly people and by elderly people with physical impairments. With respect to service use by all elderly people, the Supplement **on** Aging of the 1985 National Health Interview Survey found that 1 percent of persons age 65 and over reported receiving homemaker services in the previous year; 3 percent reported receiving visiting nurse services; and 2 percent reported receiving home health aide services (128). Individuals over age 75 were more likely than individuals age 65 to 74 to use these services, and females were more 1ikely than males to use each of the services; nevertheless, only 6 percent of females over age 75 reported using any of the services in the previous year. Thus, the use of home care services by hip fracture patients is considerably higher than the use of these services by elderly people in general.

With respect to service use by elderly people with physical impairments, the 1982 National Long Term Care Survey found that 26 percent of elderly individuals with chronic disabilities who were unable to care for themselves independently were receiving paid home care services (73). This number includes 5 percent who were receiving only paid services and 21 percent who were receiving both paid and unpaid home care services. Thus the use of home care services by hip fracture patients is similar to the use of home care services by all elderly people with physical impairments, at least in the early post-discharge period.

In this context, it is interesting to note that 17 percent of the 657 hip fracture patients in the Maryland study cited above were receiving paid

home care services at an average cost of $94 per week *before* their hip fracture (55). The proportion receiving paid home care services and the average expenditures for the services were considerably higher at two months post-fracture. By six months post-fracture, however, the proportion of patients receiving paid home care services was again 17 percent, and the average weekly expenditure for home care services was lower than in the pre-fracture period. Some individuals who were receiving paid home care services before their hip fracture probably were no longer receiving the services at six months post-fracture because they had died or were in a nursing home. Nevertheless, it is likely that a considerable proportion of the individuals who used paid home care services after their hip fracture would have used these services even without the fracture.

In 1984 and 1985, the average Medicare allowed charge for home health care visits for persons in DRGs 209, 210, and 236 was $53 per visit (89). The average Medicare allowed charge for home health care visits for all types of patients was $51 in 1985,$55 in 1986(106),$62 in 1988(1 10), and $69 in 1990 (123).

On the basis of the preceding discussion, OTA estimates that 30 percent of hip fracture patients received an average of 22 Medicare-covered home health care visits in the first six months post-discharge for an average per patient expenditure of $1,518 ($69 multiplied by 22 visits). Using this amount, the weighted average per patient expenditure for all hip fracture patients is $453 for 1990.

There may be an additional expenditure for homemaker and other nonmedical home care services for these or other hip fracture patients, but little information is available to calculate the amount. The expenditure of $1,518 for home health care services includes payment for 17 home health visits in the first two months post-discharge: a total of 17 visits in two months amounts to about two visits per week, which would entail a weekly expenditure of $110 at 1986 **rates.** Kashner and Magaziner (55) found that expenditures for home care services averaged $182 per week at two months post-fracture, thus leaving $72 per week ($182 minus $11 O) for homemaker and other nonmedical home care services. This amount is close to the $94 per week spent on home care by patients in the pre-fracture period and the $87 per week spent on home care by patients at six months post-fracture. Thus one could assume that there is no additional expenditure for nonmedical home care services associated with hip fracture. Anecdotal evidence suggests that this assumption is false. Instead, OTA assumed a weekly expenditure of $50 (a little over half of the three amounts **above,** $72, $94, and $87) for nonmedical home care services for nine months, or $1,935. Adding this amount for 17 percent of all hip fracture patients (the proportion that was receiving any home care services at six months post-fracture in the Maryland study), the weighted average per patient expenditure for all hip fracture patients is $329 for 1990. This figure may overestimate expenditures for nonmedical home care services in excess of the services that would be used by individuals with similar physical impairments who have not had a hip fracture.

Combining the two figures gives an average expenditure of $782 per patient for home health and other nonmedical home care services for all hip fracture patients.

| Use and Expenditures for Physician Visits

As noted in the earlier section on in-hospital services, in 1986, Medicare paid for an average of 11 post-operative physician visits for individuals who received open reduction and internal fixation of a hip fracture and eight post-operative v i sits for individuals who received a total hip replacement (63). Most of these visits were provided by physicians in specialties different from the physician who performed the surgery. It is not clear what proportion of the visits occurred in the hospital versus after the patient discharge from the hospital. Since OTA did not include expenditures for these visits in the estimated expenditures for in-hospital services discussed earlier, the expenditures are included in this section. OTA does not have any specific information about the number of physician visits for hip fracture patients who re-

ceive a partial hip replacement or for those who are treated nonsurgically.

The study of 657 hip fracture patients treated in seven Maryland hospitals from 1984 to 1986 found that 82 percent of the patients had at least one visit to a physician's office in the first two months after hospital discharge and that these patients averaged 2.6 physician office visits in that period (55). In the period from two to six months post-fracture, 81 percent of the patients had at least one visit to a physician's office, and these patients averaged 4.1 physician office visits in that time.

The National Ambulatory Medical Care Survey provides information about physician office visits based on a nationally representative sample of people of all ages. The survey data for 1991 show that there were 912,000 physician office visits for people age 50 and over in any of the following diagnostic categories: osteoporosis (ICD-9-CM diagnostic code 733.0), fracture of the vertebral column without mention of spinal cord injury (ICD-9-CM diagnostic code 805), fracture of the radius and ulna (ICD-9-CM diagnostic code 813), and fracture of the neck of the femur (ICD-9-CM diagnostic code 820) (108). Further differentiation of the 912,000 physician office visits by the four diagnostic categories, by patient age, or by patient gender results in statistically unreliable data. By combining data on physician office visits for 1989 and 1990 from the National Ambulatory Medical Care Survey, however, it is possible to obtain statistically reliable data for the number of physician office visits for people age 50 and over in these diagnostic categories. The two-year data show 996,000 office visits for people age 50 and over with a hip fracture, including 891,000 office visits for those age 65 and over with a hip fracture (107).29

According the 1988 National Hospital Discharge Survey, about 20,000 people age 50 to 64 were discharged alive from the hospital with a first-listed diagnosis of hip fracture. Assuming that physician office visits reported in the 1989 and 1990 National Ambulatory Medical Care Surveys were evenly distributed between the two years (1989 and 1990), one could conclude that the 20,000 hip fracture patients received 52,500 office visits (996,000 minus 891,000, divided by two years) or about three visits per patient. In 1988, there were about 209,000 people age 65 and over who were discharged alive from the hospital with a first-listed diagnosis of hip fracture. Again, assuming that the physician office visits reported in the 1989 and 1990 National Ambulatory Medical Care Surveys were distributed even] y between the 2 years, one could conclude that the 209,000 hip fracture patients received 445,500 physician office visits (891 ,000 divided by two years) or about two visits per patient. It is unclear why the average number of physician office visits based on data from the National Ambulatory Medical Care Survey is lower than the average number of physician office visits from the Maryland study.

Using the figures on Medicare payments for post-operative physician visits and the Maryland figures on physician office visits, OTA estimates that hip fracture patients age 50 and over receive an average of eight physician visits per patient. Table 19 shows the Medicare submitted and allowed charges for 1990 for all types of physician office visits listed in the 1990 CPT codebook. For individuals age 65 and over, OTA used an average of the Medicare allowed charges for established patients—$67—multiplied by eight visits, yielding $536 for 1990. For individuals age 50 to 64, OTA used an average of the Medicare submitted charges for established patients—$89—multiplied by eight visits, yielding $712 for 1990. According to the 1988 National Hospital Discharge Survey, 9 percent of hip fracture patients age 50 and over were age 50 to 64; the comparable figure for 1991 was 8 percent. Assuming that an average of 8 percent of hip fracture patients age 50 and

29 Hip fracture could have been the primary diagnosis or one of the secondary diagnoses listed by the physician who reported these visits (107).

TABLE 19: Average Medicare Submitted and Allowed Charges for Physician Office Visits, 1990

CPT/HCPCS code	Type of physician office visit	Average Medicare submitted charges	Average Medicare allowed charges
90000	New patient: Office and other outpatient medical service, new patient; brief service	$40	$29
90010	..limited service	46	36
90015	. . intermediate service	58	44
90017	extended service	68	49
90020	..comprehensive service	107	77
90030	Established patient: Office and other outpatient medical service, established patient; minimal	37	26
90040	.. brief service	61	45
90050	..limited service	110	82
90060	.intermediate service	135	104
90070	extended service	102	77
90080	..comprehensive service	87	65

CPT/HCPCS = codes for procedures and services performed by physicians as listed in the Current *Procedural Terminology* (CPT) codebook and the HCFA common procedures coding system (HCPCS).

SOURCE U.S Department of Health and Human Services, Health Care Financing Administration, Off Ice of Research and Demonstrations, unpublished data, 1993

over are age 50 to 64 and the remaining 92 percent are age 65 and over, the weighted average expenditure for physician visits for all hip fracture patients age 50 and over is $550 per patient for 1990.

Use and Expenditures for Outpatient Physical Therapy

Some hip fracture patients receive physical therapy after their discharge from the hospital. Medicare covers in-home physical therapy as part of the home health care benefit, and in-home physical therapy was included in the Medicare-covered home health care services discussed earlier. OTA is not aware of any data on the use of office-based physical therapy for hip fracture patients, although anecdotal evidence suggests that some hip fracture patients receive office-based physical therapy (34). The literature on hip fracture that OTA has reviewed does not mention the use of office-based physical therapy, and other analyses of the cost of hip fractures generally do not include payments for office-based physical therapy.

Some nursing home residents with a hip fracture receive physical therapy that is billed to Medicare as a Part B service in addition to payments from Medicare or other sources for their nursing home care. OTA does not have any data on the use of or expenditures for this service.

Given the lack of information about expenditures for nursing home or office-based physical therapy and the inclusion of expenditures for in-home physical therapy earlier in this document, OTA decided not to include an additional payment for outpatient physical therapy.

Use and Expenditures for Emergency Room and Ambulance Services

Many hip fracture patients are first evaluated in a hospital emergency room before being admitted to the hospital. For Medicare payment purposes,

TABLE 20: Average Medicare Submitted and Allowed Charges for Physician Emergency Room Services, 1990

CPT/HCPCS	Type of emergency room service	Average Medicare submitted charges	Average Medicare allowed charges
90500	Emergency department service, new patient minimal service	$39	$21
90505	..brief service	46	25
90510	..limited service	63	36
90515	..intermediate service	92	52
90517	..extended service	141	83
90520	..comprehensive service	187	114
90530	Emergency department service, established patient, minimal service	38	17
90540	..brief service	49	26
90550	..limited service	60	31
90560	. intermediate service	77	39
90570	..extended service	102	51
90580	..comprehensive service	144	65

CPT/HCPCS = codes for procedures and services performed by physicians as listed in the *Current Procedural Terminology* (CPT) codebook and the HCFA common procedures coding system (HCPCS).

SOURCE: U S. Department of Health and Human Services, Health Care Financing Administration, Off Ice of Research and Demonstrations, unpublished data, 1993.

hospital emergency room services, including radiology services for emergency room patients, are considered part of the inpatient care for individuals who are admitted to the same hospital before midnight of the next day. Thus there is generally no additional expenditure for hospital emergency room services for hip fracture patients whose hospital care is paid for by Medicare (i.e., 94 percent of those age 65 and over and 15 percent of those age 50 to 64). There maybe an additional expenditure, however, for the physician who sees the patient in the emergency room. To determine the amount of this expenditure, OTA obtained 1990 data on the average Medicare submitted and allowed charges for the physician emergency room services listed in the 1990 CPT codebook (see table 20). Using an average of the Medicare allowed charges for physician emergency room services for new patients, OTA estimates that the per patient expenditure for physician emergency room services for hip fracture patients whose hospital care is paid for by Medicare is $55 for 1990.

For hip fracture patients whose hospital care is paid for by a source other than Medicare (i.e., 6 percent of those age 65 and over and 85 percent of those age 50 to 64), there maybe an additional expenditure for emergency room services, including radiology, as well as for physician emergency room services. OTA is not aware of any data on expenditures for emergency room services for hip fracture patients whose care is paid for by a source other than Medicare. Moreover, Medicare information that might be useful in estimating these expenditures is not available because Medicare payments for emergency room and other hospital outpatient services are determined retrospectively, on a hospital-specific basis, using a mix of costs and charges from various cost centers, and national data that differentiate payments by type of service are not compiled (143). Lacking this in-

formation, OTA assumed a per patient expenditure of $200 for emergency room services for hip fracture patients whose care is paid for by a source other than Medicare. In addition, using an average of the Medicare submitted charges for physician emergency room services for new patients (see table 20), OTA estimated that the per patient expenditure for physician emergency room services for these patients is $95. Combining these figures yields an average per patient expenditure of $295 for all emergency room services, including radiology and physician services, for hip fracture patients whose hospital care is paid for by a source other than Medicare.

It is likely that almost all hip fracture patients are taken to the hospital by ambulance. Expenditures for ambulance services vary greatly in different parts of the country. Lacking national data on the average expenditure for ambulance services, OTA assumed a $200 expenditure per patient.

Combining the figures discussed above, the average per patient expenditure for emergency room and ambulance services for hip fracture patients whose care is paid for by Medicare is $255. For hip fracture patients whose care is paid for by a source other than Medicare, the comparable figure is $495. Assuming that 94 percent of hip fracture patients age 65 and over receive care paid for by Medicare and 6 percent receive care paid for by a source other than Medicare, the combined average per patient expenditure for emergency room and ambulance services for hip fracture patients age 65 and over is $269 for 1990. Assuming that 15 percent of hip fracture patients age 50 to 64 receive care paid for by Medicare and 85 percent receive care paid for by a source other than Medicare, the combined average per patient expenditure for emergency room and ambulance services for hip fracture patients age 50 to 64 is $459 for 1990. Assuming further that an average of 8 percent of hip fracture patients age 50 and over are age 50 to 64 and the remaining 92 percent are age 65 and over, the weighted average expenditure for emergency room and ambulance services for all hip fracture patients age 50 and over is $284 for 1990.

I Use and Indirect Costs of Informal Care

Many hip fracture patients receive informal (unpaid) assistance from their family and friends. OTA is aware of only one completed study that has attempted to quantify the informal care received by hip fracture patients (55). The study of 657 hip fracture patients age 65 and over who were treated in seven Maryland hospitals between 1984 and 1986 found that most of these individuals were receiving a substantial amount of care from family and friends before their fracture. In the week before their fracture, 82 percent of the patients received an average of 41 hours of informal care from their families or friends. At **two** months post-fracture, 88 percent of the patients were receiving an average of 44 hours per week of informal care-an increase that **was not** statistically significant. By six months post-fracture, the proportion of patients receiving care and the average hours of care per week had decreased; at that point, 84 percent of patients were receiving an average of 39 hours of unpaid care per week.

Although the Maryland study found very little change in the proportion of patients receiving informal care and the amount of care they received, the type of informal care provided for these patients changed considerably. Before the patient's fracture, unpaid caregivers were more likely to be assisting with shopping, transportation, and arrangements for medical services, whereas after the fracture, they were more likely to be assisting with housework and helping the patient **to** transfer from bed to chair, walk indoors, and get to the toilet.

Researchers at the University of Minnesota are currently analyzing the findings of a study of informal care provided for Medicare beneficiaries with a hip fracture or stroke. The subjects for this study are a subsample of subjects from the Post Acute Care Study. The researchers interviewed family caregivers of 157 hip fracture patients at two weeks, six weeks, six months, and one year after the patient discharge from the hospital (52). Preliminary data from the study show that 70 percent of the family caregivers reported providing