

# The Use and Cost of Health Services Prior to Death: A Comparison of the Medicare-only and the Medicare-Medicaid Elderly Populations

HELENA TEMKIN-GREENER,  
MARK R. MEINERS, ELIZABETH A. PETTY,  
and JILL S. SZYDLOWSKI

*Community Coalition for Long Term Care, Rochester, New York*

**T**HE HIGH COST AND ETHICAL DILEMMAS ASSOCIATED with care of elderly decedents have been the subject of increased interest over the last several years (Lubitz and Prihoda 1984; McCall 1984; Callahan 1987, 1990; Riley et al. 1987; Roos, Montgomery, and Roos 1987; Scitovsky 1988; Fries 1989; Riley and Lubitz 1989; Johnson, Mullooly, and Greenlick 1990; McMillan et al. 1990; Binstock and Post 1991; Guralnick et al. 1991).

Several studies have documented dramatic differences in health care use and cost patterns between elderly decedents and survivors. More recently, studies have offered evidence that older, disabled patients do not receive expensive, high-technology care that could be considered wasteful or inappropriate. The studies also indicate that medical care use during the last years of life varies substantially, depending on the degree of chronicity of the illness that causes death. However, most studies conducted to date continue to face an important limitation. With two exceptions (Roos et al. 1987; Scitovsky 1988), most literature on health care use prior to death has focused exclusively on Medicare data, and therefore, by definition, on hospitalization and physician services. The effects of dying on the use of nursing-home or other community-based, long-term-care services are not as well understood. For

example, earlier studies have suggested that persons dying at an older age incur fewer expenses than persons who die younger. These findings admittedly may be biased because Medicare does not capture all ambulatory services used by the elderly, and pays for only a fraction of nursing-home and home care usage.

In a 1987 study, Roos, Montgomery, and Roos shed insight on this issue by examining the utilization of all health care services in the years preceding death for a large sample of older Canadians in the province of Manitoba. Their work contradicts the results of all prior U.S. studies by demonstrating that persons dying at older ages (85+) incur greater death-related costs than individuals who die at a younger age. However, the expenditures cited in the study are estimates based on average daily, or per visit, payments that probably overestimate real cost, particularly for the very old. A more recent study (Scitovsky 1988), using information on all medical expenses for a sample population of patients in a medical center, appears to support the earlier studies of Medicare decedents, in that medical care expenditures decline with an increasing age at death. The study population may not, however, be representative of the larger population of older decedents because of its predominantly white, middle-class composition.

These contradictory results point to a continuing need to examine the entire spectrum of health care usage and cost in both the year of death and the years preceding it. The purpose of our study is to add to this small, but growing, body of knowledge on the cost of care associated with death by drawing on a unique longitudinal, person-specific data base for the elderly who were dually eligible for Medicare and Medicaid, and the Medicare-only elderly in Monroe County, New York. Specifically, we focus on the use and cost, over time, of both Medicare and Medicaid services by elderly decedents and survivors. In undertaking the study, we decided on three major objectives:

1. to examine and compare utilization and expenditure patterns of the Medicare-only and the dually eligible Medicare and Medicaid decedents
2. to analyze patterns of care and cost by duration of illness for these decedents and for comparable groups of survivors and the general population
3. to examine and compare patterns of care among the decedents by cause of hospitalization in the last year of life

## Data and Methods

The time period covered by this study is 1984 through 1988. The data are derived from a communitywide data base, a uniquely rich source of information on the expenditures, utilization, and eligibility patterns of the older (65+ years of age) population of Monroe County, New York. The information in the data base includes person-specific Medicare (parts A and B) and Medicaid paid claims and eligibility for elderly persons who are eligible either only for Medicare or for both Medicare and Medicaid. Longitudinal files contain detailed description of eligibility history, services used, and expenditures by Medicare and/or Medicaid from 1984.

Medicare claims and eligibility data were obtained from the Health Care Finance Administration (HCFA) via the Medicare Automated Data Retrieval System (MADRS). Adjudicated Medicaid claims were accumulated from the New York State Medicaid Management Information System (MMIS) and from the locally paid claims file. Additionally, copies of Medicaid and Medicare eligibility files formed the basis for the creation of all analytical files, including the person-specific longitudinal summary files. For the dually eligible elderly, Medicare and Medicaid person-specific data were linked into a single record per person per year, using Social Security numbers and/or names, when appropriate. The date of death information was made available through the Medicare inactive eligibility file, which registers the deaths of all Medicare recipients and is used to update the active eligibility file.

This study uses data with several important advantages over those on which previous studies have been based. First, the data are population based, representing all Medicare and/or Medicaid elderly, albeit in one large upstate New York county. Second, the data are drawn from two major administrative systems—Medicare and Medicaid—rather than from selected samples or surveys. Third, the data allow for comparisons between the decedents and the general elderly population, which includes all survivors. Finally, for the subset of elderly individuals who are dually eligible for Medicare and Medicaid, all major elements of care (i.e., hospital, ambulatory, nursing home, home care, etc.) are included.

While combining both the Medicare and the Medicaid experience to allow for an unprecedentedly comprehensive examination of decedents, the data base has its own limitations. It contains full utilization infor-

mation only for decedents and survivors who are eligible to receive Medicaid. These dually eligible elderly differ in many respects from the elderly who are eligible for Medicare only; as such, they have been of continuous interest to policy makers for some time (McMillan and Gornick 1984; McMillan et al. 1983). They have been shown to have greater health care needs and costs, relative to other aged persons.

In order to understand fully the differences and similarities between patients who are dually eligible and those who are Medicare only, the study population was divided into three groups of older (65+ years of age) decedents who died in 1988. The first group consists of persons who were Medicare only (MO) during their entire time of eligibility in the study period. This sample provides information on 3,304 decedents, of whom 2,948 were eligible for Medicare only, at least since 1984. The second group consists of decedents who were dually eligible (DE) for Medicare and Medicaid during their entire time of eligibility in the study period. There were 1,045 dually eligible decedents in 1988, of whom 499 were dually eligible since at least 1984. The third group of decedents were those who spent down to Medicaid at some point during the study period and before their death in 1988 ( $n = 115$ ). This spend-down population was isolated and excluded from the analyses because their patterns of use and cost, particularly in the spend-down year, may have biased any comparisons of the Medicare-only versus the dually eligible decedents.

All cost and utilization information is summarized on an individual basis by calendar year, and expressed in terms of units (e.g., dollars or days) per person per month of eligibility, thus always adjusting for exposure/eligibility period. This is necessary because, on average, decedents had only six months of Medicare or Medicare-Medicaid exposure in 1988, their last year of life, whereas the comparison groups averaged nearly 12 months. Data on years prior to the calendar year of death (1988) are also organized by calendar year (not as person-specific months prior to death). For each year preceding the calendar year of death the MO and the DE decedent groups averaged 11.9 months of exposure per year.

Beneficiaries who died before the age of 69 would have less than five years of exposure in the data base, and therefore the years before they attained 65, and/or, in the case of DE decedents, before becoming dually eligible, are excluded from table entries. For example, a Medicare-only decedent dying at age 66 would contribute to the data on Medicare use and cost only in the last two calendar years of life.

Two comparison groups were used to contrast with the patterns of use and cost exhibited by the decedents. The first group is represented by the entire population of either Medicare-only or dually eligible elderly, including the decedents. The second group is composed only of those Medicare-only or dually eligible persons, respectively, who were known to have lived throughout 1988, that is, the survivors. The latter group is used to analyze the usage rates of persons whose utilization was not associated with fatal illness. The former, or general population group, is used to compare the cost of care for the decedents before and during the year of death with the cost experienced by the general population of survivors and decedents. These comparisons draw on the methodology developed by Riley and Lubitz (1989), which calculates how decedents' average reimbursement compares with that of the general elderly population through the application of "reimbursement ratios." All ratios are expressed in terms of expenditures per person per month of eligibility. A reimbursement ratio greater than 1 indicates that decedents' costs were above the average cost experienced by the entire population. Two-tailed *t*-tests were calculated to determine whether reimbursement ratios were statistically different from 1.

## Results

Of the 91,661 elderly who were Medicare recipients in 1988, 4,349 died during that year. Among these decedents, 3,304 were eligible for Medicare only and 1,045 were dually eligible for Medicare and Medicaid.

### *Expenditures by Age*

To date, research performed on data derived from the U.S. sources has shown that medical care expenditures decline among very old decedents (Lubitz and Prihoda 1984; Scitovsky 1988). This has prompted researchers to suggest a shorter time between onset of final illness and death for older decedents, which would account for the lower costs associated with dying (Lubitz and Prihoda 1984; Guralnick et al. 1991). Our analysis adds new dimensions to previous findings by providing information on all medical care expenses for decedents who are eligible for both Medicare and Medicaid.

Our data reveal that, in the year of death, Medicare's expenses were indeed lower among the very old. This holds true for both the MO and

the DE decedents. The younger DE decedents cost Medicare more, shortly prior to death, than the MO decedents of comparable age. For example, DE decedents who were 65 to 74 years old cost Medicare \$9,689 in 1988, whereas MO decedents of the same age cost Medicare \$6,749 (DE/MO ratio of 1.4). The very old, on the other hand—persons 85 years of age or older at death—appeared to cost Medicare roughly the same amounts before death: \$4,498 for persons who were DE, and \$4,894 for those who were MO (DE/MO ratio of 0.9).

This apparent decline in Medicare's cost of care among the very old decedents, also observed by other researchers, is to some extent an artifact of the services paid for by Medicare, rather than a true reflection of the cost of care among older versus younger decedents. For example, nursing-home care and custodial home care services are not covered by Medicare and are paid for out of pocket or by Medicaid.

When we examine all medical care costs for the dually eligible decedents, a different picture emerges (figure 1). In the year of death (1988) the decedents had on average six months of exposure. The cost of services provided to both MO and DE decedents was lower for persons who

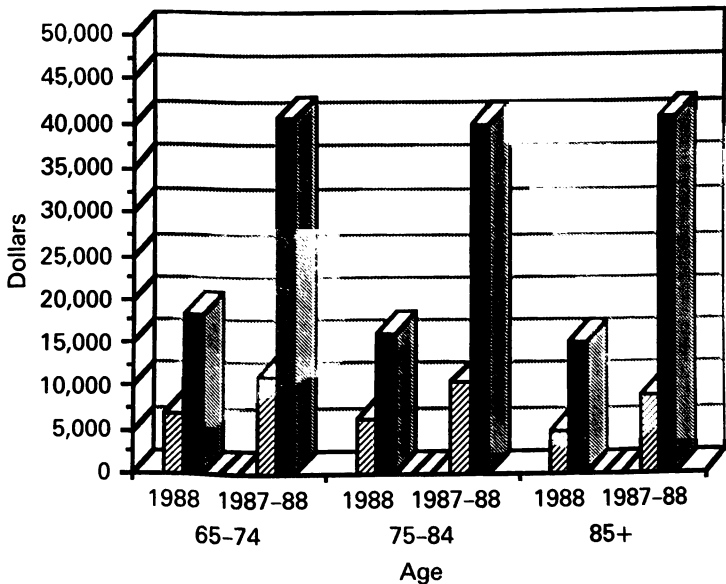


FIG. 1. Mean medical expenses of dually eligible (DE) and Medicare-only (MO) decedents, by age, in the last 6 (1988) and last 18 (1987-88) months of life. ▨, MO; ■, DE.

who died at age 85 or older than for those who were younger at death (65–74 years of age). However, when cost of care in the year prior to the year of death (1987) is also counted, age differential persists only for the MO decedents. The younger (aged 65–74) MO decedents cost Medicare \$11,249 during the 1987–88 time period, whereas the older (85+) MO decedents cost Medicare \$8,682. For the DE decedents, there are no differentials, by age of decedents, in the cost of care during the last months (1987–88) of life when Medicare and Medicaid expenditures are summed. The oldest decedents (85+ years) are neither more nor less expensive (having consumed on the average \$40,582) than those who are between either ages 75 and 84 (\$40,005) or ages 65 and 74 (\$40,471) at death.

Table 1 presents these findings in a different way by examining the percentage of expenditures according to type of service and age of decedents. For the MO decedents, the data show that, whereas the oldest decedents represent 32 percent of all deaths, they account for 26 percent of all costs; the corresponding figures for persons aged 65 to 74 are 30 and 35 percent, and for those aged 75 to 84, 38 and 39 percent. However, the distribution of expenditures within each age group varies considerably depending on type of service. Although hospital costs represent the primary source of expense for all decedents, they account for 74 percent of all expenditures for the oldest decedents (85+ years), and 66 percent for the youngest (65–74 years). The youngest decedents, on the other hand, used considerably more ambulatory care than the two older decedent groups, accounting for over 30 percent of that group's total expenditures.

The distribution of cost by service type is quite different for the DE decedents. Fifty-five percent of the expenditures made by Medicare and Medicaid on behalf of the youngest (65–74 years) of the DE decedents was for hospital care, compared with 40 percent for those aged 75 to 84, and 26 percent for those 85 or older. Conversely, 62 percent of the expense among the oldest decedents can be attributed to nursing-home care, compared with 24 percent among those aged 65 to 74, and 41 percent for those aged 75 to 84.

When all costs are examined for the DE decedents during the year of death and one preceding calendar year (1988–87), it appears that their age at death may have had little or no impact on the cost of care. Overall expenses associated with death do not decline, in this group, as age at death increases, although Medicare-reimbursed expenses do decline

TABLE 1  
 Percentage Distribution of Decedents and Expenditures,  
 by Type of Service and Age, Last 18 Months of Life (1987-88)

Type of service	Age (%)			
	All (N = 3,304)	65-74 (n = 990)	75-84 (n = 1,272)	85+ (n = 1,042)
<b>Medicare-only</b>				
Decedents	100	30	38	32
Total expenditures	100	35	39	26
Expenditures		100	100	100
Hospital		66	71	74
Ambulatory		31	26	22
Nursing home		1	1	2
Home care		2	2	2
	(N = 1,045)	(n = 169)	(n = 280)	(n = 596)
<b>Medicare-Medicaid</b>				
Decedents	100	16	27	57
Total expenditures	100	17	29	54
Expenditures		100	100	100
Hospital		55	40	26
Ambulatory		10	9	6
Nursing home		24	41	62
Home care		8	8	5
All other		3	2	1

with age at death. Given the impact of socioeconomic status on cost of care in the last months of life (House et al. 1990), it cannot be concluded that a similar pattern would hold for the MO decedents, had all of their out-of-pocket expenses been known. However, the analysis does suggest this as a possibility, particularly because Medicare reimbursements were similar for these otherwise dissimilar groups.

For the dually eligible decedents, the major difference between individuals dying at different ages may be their reliance on acute versus chronic care services, rather than the cost of services per se. The older DE decedents receive the largely supportive care provided by nursing-home and home care services, whereas the younger decedents rely to a greater extent on the generally more intensive care provided in hospitals.



*Expenditures and Duration of Illness*

Following the methodology developed by Riley and Lubitz (1989), we constructed reimbursement ratios (adjusted for exposure and eligibility) to assess the magnitude of decedents' per capita cost, compared with the general older population, across different age groups and over time.

In the calendar year of death, both the MO and the DE decedents had expenses well above the population average. The youngest MO decedents had expenses that were 12.41 times higher than those of the general population in the same age group (figure 2). For the older decedents, the reimbursement ratios were lower: 7.31 for those who died between the ages of 75 and 84, and 4.61 for those whose age at death was 85 or more. A similar pattern can be observed for the DE decedents, although the reimbursement ratios for this group are not as high as those for the MO (figure 3). In the year of death the expenses of the youngest DE decedents were 3.85 times greater than for a comparable age group of the general population. The reimbursement ratios for persons dying between the age of 75 and 84, and those dying at 85 or above, are 2.00 and 1.35 in the year of death, respectively.

The pattern of reimbursement ratios over time also shows a similarity

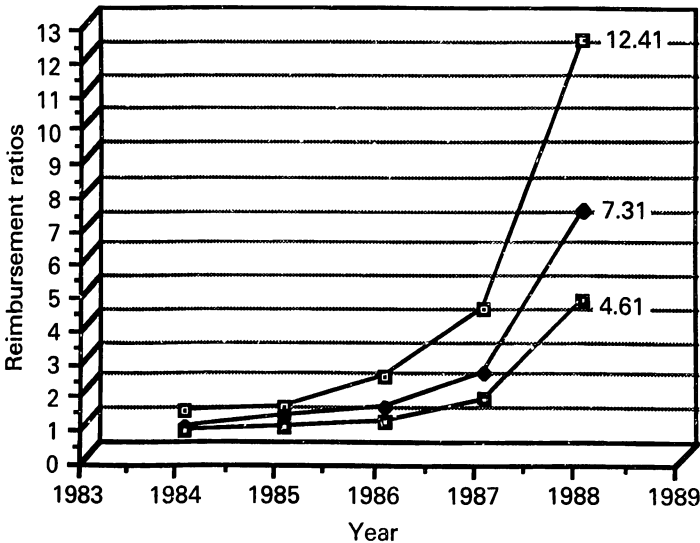


FIG. 2. Reimbursement ratios for older Medicare-only 1988 decedents: Medicare expenditures by age and proximity to year of death, —□—, 65-74; —●—, 75-84; —■—, 85+.

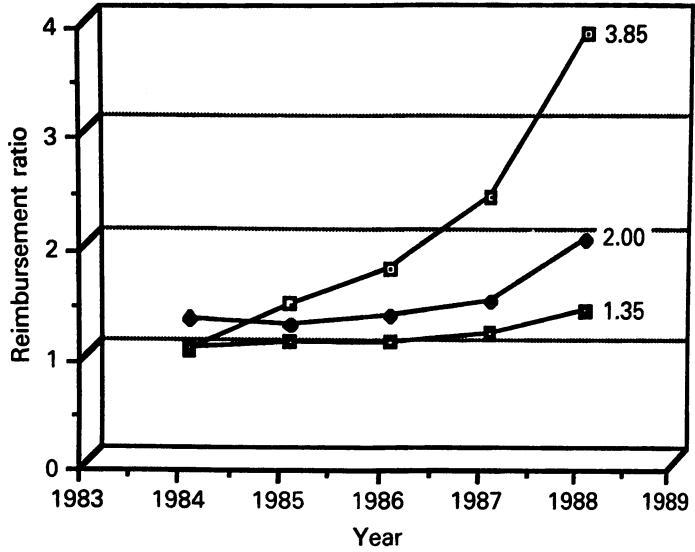


FIG. 3. Reimbursement ratios for older dually eligible 1988 decedents: Medicare and Medicaid expenditures by age and proximity to year of death. —□—, 65-74; —●—, 75-84; —■—, 85+.

between the MO and the DE decedents (table 2). For the MO decedents, the reimbursement ratios show that cost of care was significantly different from the cost of the general population throughout the four calendar years prior to death. The ratios remain greater than 1 throughout only for those aged 65 to 74 at death.

Among the DE elderly, the reimbursement ratios also demonstrate that higher use of services, expressed by ratios greater than 1, extends well before the calendar year of death, particularly in the case of the youngest (aged 65 to 74) decedents, who exhibited higher than average expenses in the three calendar years preceding the year of death. Among the oldest decedents, aged 85 or more, reimbursement ratios were significantly different from the average only in the year of death and one prior calendar year. These results suggest that persons who die at a younger age show a pattern of higher-cost use over a longer period of time, indicating either a prolonged spell of illness or a more intensive pattern of use of acute services, compared with persons who die at older ages.

We pursued this issue further by examining hospital and nursing-home use among decedents, and comparing it with use during 1988 by

TABLE 2  
Reimbursement Ratios for Older 1988 Decedents,  
by Age, Payer, and Calendar Year Prior to Death

Elderly age group	Year prior to death				
	1984	1985	1986	1987	1988
Medicare-only					
65-74	1.30*	1.37**	2.27**	4.31**	12.41**
75-84	0.79**	1.07	1.37**	2.41**	7.31**
85+	0.69**	0.79**	0.91**	1.58**	4.61**
Medicare-Medicaid					
65-74	0.99	1.40**	1.72**	2.37**	3.85**
75-84	1.27*	1.22*	1.32**	1.45**	2.00**
85+	1.01	1.06	1.08	1.15*	1.35**

\*  $P < .05$ .

\*\*  $P < .001$ .

the general older population (including survivors and decedents), and by the survivors-only population. These two comparison groups provide a standard against which to view the changing utilization patterns of decedents in the years leading to the year of death.

For the Medicare-only population, table 3 indicates that hospital usage increases with age among the comparison groups: the general population and the survivors-only group. Whereas all MO decedents use substantially more hospital care in the year of death, hospital use among younger decedents (aged 65 to 74) appears to be influenced by impending death throughout the four preceding years. Even in the fourth year before death hospital use by these decedents was more than twice that of comparable survivors or the general population. For the older decedent groups, impending death seems to have had a progressively smaller influence on hospital use. For MO persons who died between the ages of 75 and 84, hospital use was significantly different from that exhibited by the comparison groups, beginning with the third calendar year before death. For the oldest (85+ years) MO decedents, hospital use was different from that of a comparable group of survivors or the general population only in the year of death and one preceding calendar year. A somewhat similar, but less clear, pattern can be observed for the DE de-

TABLE 3  
Hospital Days per Person per Year According to Proximity to Death,  
by Age and Payer Source

Payer source/ age group	Comparison group		Decedents—year prior to death				Year of death	All years
	General population <sup>a</sup>	Survivors <sup>b</sup>	4th	3rd	2nd	1st		
<b>Medicare only</b>								
65–74	1.2	1.0	2.6	2.5	4.0	5.7	22.5	37.3
75–84	2.3	1.7	2.6	4.1	3.8	6.0	24.7	41.2
85+	3.8	2.6	2.8	3.0	3.4	5.6	22.1	36.9
All	1.8	1.4	2.7	3.3	3.8	5.8	23.2	38.8
<b>Medicare–Medicaid</b>								
65–74	7.4	5.7	3.7	9.0	15.9	26.1	51.6	106.3
75–84	9.7	6.7	13.5	11.2	10.6	15.0	56.4	106.7
85+	11.7	9.9	6.0	6.0	8.4	8.7	24.4	53.5
All	9.6	7.3	8.0	8.2	10.4	13.4	37.7	77.7

<sup>a</sup> Everyone eligible to receive services, including survivors and decedents.

<sup>b</sup> All those who lived through 1988.

cedents and comparisons, with the notable exception of a lower use of hospital care both preceding and during the year of death among the oldest compared with the younger decedents. These patterns suggest a shorter period of increased acute health care usage prior to death among the oldest decedents.

Although the major increase in hospital usage among the MO and the DE decedents, particularly those who die at age 85 or older, occurs shortly before the year of death, utilization of chronic (Medicaid-reimbursed) nursing-home care is quite different (table 4). Although table 4 does report the Medicare-reimbursed nursing-home days for the MO decedents, we need to emphasize that our purpose here is not to compare the MO and the DE decedents' overall use of nursing-home days. Because Medicare does not cover any chronic care, data in the table reflect coverage rather than usage. Medicaid covers chronic care, and therefore data for the DE decedents reflect their overall use of nursing-home services.

The younger DE decedents (ages 65 to 84) experienced increases in the number of days spent in a nursing home in each of the four years preceding the year of death. Although the older decedents spent consid-

TABLE 4  
Nursing-home Days per Person per Year According to Proximity to Death,  
by Age and Payer Source

Payer source/ age group	Comparison group		Decedents—year prior to death				Year of death	All years
	General population <sup>a</sup>	Survivors <sup>b</sup>	4th	3rd	2nd	1st		
Medicare only								
65-74	0.1	0.1	0.0	0.0	0.1	0.3	1.6	2.0
75-84	0.4	0.3	0.0	0.1	0.5	0.9	3.1	4.6
85+	1.2	1.0	0.2	0.5	1.1	1.3	4.9	8.0
All	0.3	0.2	0.1	0.2	0.5	0.8	3.2	4.8
Medicare-Medicaid								
65-74	42.1	40.4	44.6	58.6	75.8	96.3	85.0	275.3
75-84	126.5	125.5	158.6	177.3	169.3	180.3	141.8	685.5
85+	242.5	240.7	241.4	280.1	263.7	275.8	254.8	1,061.0
All	135.4	130.6	169.3	204.0	203.2	218.3	195.7	990.5

<sup>a</sup> Everyone eligible to receive services, including survivors and 1988 decedents.  
<sup>b</sup> All persons who lived through 1988.

erably more days in a nursing home, the number of days decreased as they moved closer to death while hospital use briefly increased, suggesting that hospitals and nursing homes acted as service substitutes.

Table 5 summarizes total health care use, expressed in expenditures per member per month (pmm), by proximity to the year of death among the MO and the DE decedents. The Medicare-only system expenditures are lower for the older than for the younger decedents, although the differences in expenditures by age extend only through the second year prior to the year of death. During the fourth and the third years before death, Medicare expenditures differed only slightly between persons dying at younger and older ages.

When Medicare expenses on behalf of the Medicare-only decedents are compared with Medicare expenses for the dually eligible decedents, interesting comparisons appear. Although in the general elderly population the DE elderly cost Medicare more than the MO elderly, Medicare's expenses in the year of death were very similar for the MO (\$982 for those aged 75 to 84 and \$777 pmm for those older than 85) and for the DE decedents (\$1,101 for those aged 75 to 84 and \$714 pmm for per-

TABLE 5  
Per Member per Month Cost of Services According to Proximity  
to Year of Death, by Age and Payer Source

Age group	Cost (\$)				
	4th year	3rd year	2nd year	1st year	Year of death
<b>Medicare-only eligibles</b>					
Medicare					
65-74	116	126	198	375	1,071
75-84	105	151	195	347	982
85+	117	141	171	316	777
All 65+	112	139	190	347	947
<b>Medicare-Medicaid eligibles</b>					
Medicare					
65-74	247	311	437	736	1,538
75-84	347	297	389	534	1,101
85+	216	233	266	409	714
All 65+	267	268	333	500	962
Medicaid					
65-74	385	628	866	1,125	1,342
75-84	986	1,216	1,292	1,473	1,425
85+	1,201	1,488	1,581	1,716	1,681
All 65+	945	1,231	1,371	1,547	1,555

sons 85 and older). The ratios of Medicare expenditures for the MO to the DE decedents were 1.1 and 0.9 for the two older groups of decedents (figure 4). Only the youngest (aged 65-74) DE decedents cost Medicare more than individuals who were MO, at a ratio of 1.44. Four years prior to the year of death, the differences in Medicare's cost between the dual eligibility and the Medicare-only decedents were dramatic in all age groups, with the reimbursement ratio for the oldest and the youngest decedents being 1.9 and 2.1, respectively, and the ratio for decedents aged 75 to 84 being 3.3. At death, the Medicare cost differential between Medicare-only and dually eligible persons disappears.

When Medicaid expenditures are taken into account for the dually eligible, the pattern changes again. Whereas Medicare's costs are lower for the older decedents, Medicaid's costs are lower for younger decedents. Because Medicaid expenditures on behalf of decedents are principally

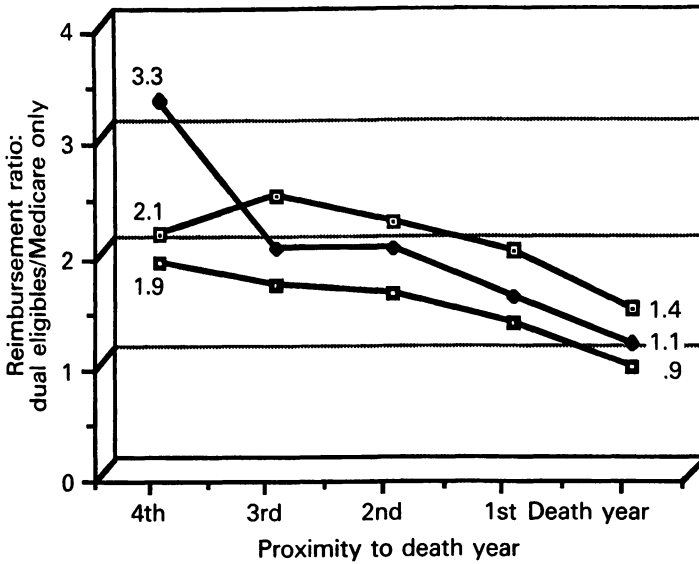


FIG. 4. Medicare reimbursement ratio: dually eligible to Medicare-only decedents by proximity to death. —□—, 65-74; —●—, 75-84; —■—, 85+.

for chronic care, the compression of costs as they relate to age at death, which is so clear for Medicare's expenses, is less markedly visible when the full array of services reimbursed by Medicaid is also considered.

Although in the general population the dually eligible elderly are more costly to Medicare than are those who are Medicare-only (McMillan and Gornick 1984; McMillan et al. 1987), the age-specific pattern of Medicare expenditures is similar for the two groups of decedents. To further explore the differences and similarities between the Medicare-only and the dually eligible decedents, we examined patterns of use and cost by last cause of hospitalization in the year of death.

### *Expenditures by Cause of Illness*

Information about the cause of death was not available for the study population. As a proxy, we examined the cause of the last hospitalization occurring in the year of death. Table 6 summarizes the distribution of reasons for hospitalization among the MO and the DE decedents. It is interesting to note that 46.8 percent of the Medicare-only decedents were not hospitalized at all in that year. Among the dually eligible el-

TABLE 6  
Distribution of Aged Medicare-only and Medicare-Medicaid 1988 Decedents  
by Cause of Hospitalization in the Year of Death

Cause of hospitalization <sup>a</sup>	Medicare-only decedents		Dually eligible decedents	
	Number	Percent	Number	Percent
Infectious and parasitic disorders	46	2.6	19	6.1
Neoplasms	336	19.1	33	10.7
Metabolic and nutritional disorders	76	4.3	20	6.4
Disorders of blood	9	0.5	2	0.6
Mental disorders	22	1.2	10	3.2
Nervous system	25	1.4	4	1.3
Cardiovascular system	614	34.9	80	25.9
Respiratory system	235	13.3	57	18.5
Digestive system	152	8.6	25	8.1
Genitourinary system	76	4.3	26	8.4
Skin	18	1.0	5	1.6
Musculoskeletal	18	1.0	3	0.9
Congenital	1	0.0	6	1.9
Ill defined	34	1.9	17	5.5
Accidents	86	4.8	1	0.3
Other	8	0.4		
All hospitalized decedents	1,757	100.0	308	100.0
Nonhospitalized decedents				
Number	1,547		737	
Percent		46.8		70.5

<sup>a</sup> ICD-9-CM codes.

derly, 70.5 percent of decedents did not have a hospital stay in the year of death, leading us to suggest the following: First, because the DE decedents were considerably older—57 percent were 85 or older, as opposed to 32 percent of the Medicare-only decedents—perhaps they were less likely than the younger decedents to need and/or to receive the relatively intensive type of care provided by hospitals immediately prior to death. Instead they received largely supportive care provided in nursing homes and at home. Second, the high proportion of decedents, in both groups, who did not receive hospital care in the last year of life suggests that there is a substantial group of individuals among the decedents



whose death may have a relatively insignificant impact on the acute health care system.

Disease of the cardiovascular system was the most common reason for hospitalization among the Medicare-only decedents (35 percent), as well as among the dually eligible (26 percent). This was followed by cancer among the Medicare-only decedents (19 percent), and by respiratory-system illness (18 percent) among the dually eligible, which was probably a function of the latter group's considerably greater average age.

Among the major reasons for hospitalization in the last calendar year of life, respiratory disorders had the highest reimbursement ratios in the year of death, both for the MO decedents (17.5) and for the DE decedents (3.5), and also in the year immediately prior to the year of death—4.7 and 1.7, respectively (table 7). Persons hospitalized with respiratory disorders in the year of death appear to have experienced patterns of high use for several prior years. For example, the reimbursement ratio for the MO decedents with respiratory illness was 1.6 in the

TABLE 7  
Reimbursement Ratios for Medicare-Only and Medicare-Medicaid Decedents,  
by Cause of Hospital Stay in the Year of Death:  
All Covered Services, 1984-1988

Cause of hospitalization <sup>a</sup>	Year				
	1984	1985	1986	1987	1988
Medicare-only decedents					
Neoplasms	0.87	0.87	1.43	3.60*	14.68*
Cardiovascular	1.08	1.28	2.09*	3.18*	14.04*
Respiratory	1.66	1.50	2.09*	4.73*	17.59*
No hospital	0.87*	1.06*	1.20	2.10*	0.69*
Medicare-Medicaid decedents					
Neoplasms	0.59	0.75	0.62	0.85	2.49*
Cardiovascular	0.51*	0.68	0.80	1.12	2.21*
Respiratory	0.77	1.03	1.19	1.76	3.54*
No hospital	1.39*	1.44*	1.45*	1.53*	1.61*

\*  $P < .01$ .

<sup>a</sup> ICD-9-CM codes.

fifth year before death, compared with a 0.8 ratio for decedents who had no hospital stay in the last year of life. Medicare-only decedents with cardiovascular illness show a similar pattern of reimbursement ratios during the four-year period preceding the year of death. The DE decedents, on the other hand, show a more compressed pattern of expenditures, suggesting that the incremental costs associated with death are lower in this population.

Reimbursement ratios for patients hospitalized with cancer increased rapidly as they approached death. Among the MO decedents, reimbursement ratios for individuals with cancer hospitalizations declined to below 1 in the fourth and fifth year prior to death. Among the dually eligible decedents, the reimbursement ratios for cancer patients were below 1 in all years before the year of death.

Of equal, or greater, interest are the patterns of reimbursement ratios exhibited by decedents who did not experience hospitalization in the calendar year of death. Almost half of the Medicare-only decedents (46.8 percent) and the majority of the dually eligible decedents (70.5 percent) died without hospital-related interventions. In the year of death, the cost of care for these dually eligible decedents was 60 percent higher than the cost for the general elderly population. The reimbursement ratios increase slowly over the years leading up to death. The ratios for the Medicare-only decedents were consistently low, at times below 1, in the year of death and before. This again suggests that a substantial number of older individuals die without a prolonged period of acute illness, and that their deaths place few, if any, additional demands on the acute health care system.

An examination of the distribution of enrollees by amount reimbursed shows that 41 percent of the Medicare-only decedents had incurred no, or relatively small (less than \$1,000), Medicare reimbursements in their last year of life (table 8). An almost identical proportion—42 percent—can be observed for the Medicare reimbursement of the dually eligible decedents, showing that a significant number of decedents may indeed have used very few acute and/or ambulatory services paid for by Medicare.

Furthermore, the distribution of Medicare dollars is remarkably similar for the Medicare-only and the dually eligible decedents. Among the former, 21 percent had Medicare expenses greater than \$10,000 in the last year of life, accounting for 67 percent of all reimbursements. Among the dually eligible, 20 percent had expenses (greater than

TABLE 8  
 Percent Distribution of Decedents and Survivors, and Their Reimbursement,  
 in Last Year of Life—1988

Reimbursement (\$)	Decedents		Survivors	
	Percent of persons	Percent of reimbursement	Percent of persons	Percent of reimbursement
<b>Medicare dollars</b>				
<b>Medicare-only enrollees</b>				
Total	100	100	100	100
None	22	0	42	0
<1,000	19	1	42	10
1,000-2,999	7	2	7	12
3,000-4,999	13	9	4	13
5,000-9,999	16	20	3	20
10,000-14,999	10	21	1	16
15,000-19,999	5	15	1	10
20,000+	6	31	1	20
<b>Medicare-Medicaid enrollees</b>				
Total	100	100	100	100
None	11	0	15	0
<1,000	31	2	51	7
1,000-2,999	9	3	13	9
3,000-4,999	13	8	7	10
5,000-9,999	15	18	7	18
10,000-14,999	9	19	3	16
15,000-19,999	4	12	2	11
20,000+	7	39	2	28
<b>Medicare and Medicaid dollars</b>				
<b>Medicare-Medicaid enrollees</b>				
Total	100	100	100	100
None	2	0	5	0
<1,000	6	0	21	1
1,000-2,999	7	1	14	2
3,000-4,999	9	2	6	2
5,000-9,999	19	9	9	5
10,000-14,999	19	15	8	7
15,000-19,999	12	14	9	12
20,000+	26	58	29	71

\$10,000), accounting for 70 percent of all Medicare dollars. Yet, when all expenses for Medicare and Medicaid are examined for the dually eligible decedents, a less skewed picture emerges, with 57 percent of decedents accounting for 87 percent of expenses, which does not differ too much from the 46 percent of dually eligible survivors who account for 90 percent of expenses.

## Summary and Discussion

In 1988, 4.7 percent of the Monroe County older (65+ years) population died. Of the total amount paid in that year by Medicare and Medicaid for care of the older county residents, 29.4 percent went toward treating persons who were in their last year of life. This "high cost of dying" (Ginzberg 1980) has generated concern among researchers, policy makers, and health ethicists, particularly as the population of the elderly grows rapidly. Much of this concern stems from the belief that care for the dying is highly technical, centering around often inappropriate cure-oriented services provided in hospitals.

Some evidence on appropriateness of care in the last year of life has been presented by Scitovsky (1988), who found that "the elderly who got expensive, high-technology care in their last year of life were those with good functional status, especially the 'younger old' (65 to 79 years), the kind of patient a physician would not feel justified in not treating aggressively." This study provides us with additional, although indirect, evidence that care extended to the dying may, more appropriately, not always be of the high-technology kind. For example, whereas decedents who were dually eligible for Medicare and Medicaid used similar amounts of medical resources in the last 18 months of life, regardless of age at death, the distribution of resources according to type of service used varied significantly by age at death. The "younger old" (ages 65 to 74) decedents used 55 percent of their medical care resources for hospital care, whereas the oldest decedents (85+) used only 26 percent of their resources on hospital services, with 67 percent going for more supportive care (i.e., nursing-home and home health care).

Our study also shows that when all types of medical services are included, as was done here for the dually eligible decedents, the "older old" are somewhat less costly, in the year of death, than the younger decedents. However, when expenses in the calendar year prior to the year

of death are also counted, the older old (85+) DE decedents appear to have been neither more nor less costly than persons who die at a younger age. Of particular interest is that much of the cost for older decedents may be more a function of aging and related debility than of medical interventions associated with death. Our data seem to indicate that dying has a greater impact on utilization and cost among younger decedents than among older ones. In the year of death and during the preceding calendar year, Medicare and Medicaid together spent the same amount on behalf of the dually eligible decedents aged 65 to 74 as they did on behalf of decedents aged 85 and older. In the last year of life, the younger decedents cost, on the average, 285 percent more than the general population of comparable age. The oldest decedents (aged 85+), on the other hand, were only 35 percent more expensive than the general population of equivalent age. Therefore, it appears that the costs directly attributed to services associated with illness and debility leading to death are substantially lower among the oldest decedents.

In their first study Lubitz and Prihoda (1984) suggested, in an attempt to explain lower Medicare reimbursement for older decedents, that the time between illness and death may be shorter for older decedents. Although our data in this study do not support the contention that older decedents use overall fewer resources than younger ones, our analyses somewhat support the notion of a compression of costs associated with morbidity in older age groups. The data show that persons who die at a younger age exhibit a pattern of high use of acute services over a longer period of time, perhaps indicating a prolonged spell of illness, compared with individuals who die at an older age. A comparison of hospital use among the oldest decedents with use among the general and the survivor populations reveals that older decedents use hospital care at a higher than average rate only in the year of death, in contrast to the younger decedents, who exhibit a prolonged pattern of high use for several years before death. These data suggest that, although the older decedents may have more disability, as evidenced by their reliance on nursing-home care, prior to death than do the younger decedents, they may have lower rates of acute disease requiring hospitalization. This is consistent with the prevalence of hospitalization of the older versus the younger decedents during their last year of life. Fifty-seven percent of the dually eligible decedents were 85 years of age or older, yet only 30 percent of the DE group was hospitalized in the last year of life.

On the other hand, of the Medicare-only decedents only 32 percent were 85 or older, but 53 percent of the MO decedents had a hospital stay in the year of death.

The "high cost of dying" has been of particular concern because the population of the older-old, or persons aged 75+, is expected to grow most rapidly over the next decade or two. This study suggests that excessive, high-technology care for the elderly in their last year of life may be much less of a problem than the overall long-term-care needs of the frail and disabled elderly population in need of chronic, supportive care. If, as projected, life expectancy continues to increase, we can anticipate that the proportion of persons dying at older ages will also increase, and that the total number of person-years of disability prior to death will increase as well. As the total population ages, planning for preventive interventions directed at the elderly must focus not only on increasing longevity, but also on the important task of reducing disability, if the quest for an overall compression of morbidity is to be realized.

## References

- Binstock, R.H., and S.G. Post. Eds. 1991. *Too Old For Health Care? Controversies in Medicine, Law, Economics, and Ethics*. Baltimore: Johns Hopkins University Press.
- Callahan, D. 1987. *Setting Limits: Medical Goals in an Aging Society*. New York: Simon and Schuster.
- . 1990. *What Kind of Life: A Challenging Exploration of the Goals of Medicine*. New York: Simon and Schuster.
- Fries, J.F. 1989. The Compression of Morbidity: Near or Far? *Milbank Quarterly* 67(2):208-32.
- Ginzberg, E. 1980. The High Cost of Dying. *Inquiry* 17:293-5.
- Guralnick, J. M., A.Z. LaCroix, L.G. Branch, S.V. Kasl, and R. B. Wallace. 1991. Morbidity and Disability in Older Persons in the Years Prior to Death. *American Journal of Public Health* 81(4):443-7.
- House, J.S., R.C. Kessler, A.R. Herzog, et al. 1990. Age, Socioeconomic Status, and Health. *Milbank Quarterly* 68(3):383-409.
- Johnson, R.E., J.P. Mullooly, and M.R. Greenlick. 1990. Morbidity and Medical Care of Old and Very Old Persons. *Health Services Research* 25(4):639-59.
- Lubitz, J., and R. Prihoda. 1984. Use and Cost of Medicare Services in the Last Two Years of Life. *Health Care Financing Review* 5:117-31.

- McCall, N. 1984. Utilization and Cost of Medicare Services by Beneficiaries in Their Last Year of Life. *Medical Care* 22:329-42.
- McMillan, A., and M. Gornick. 1984. The Dually Entitled Elderly Medicare and Medicaid Population Living in the Community. *Health Care Financing Review* 6(2):73-85.
- McMillan, A., R.M. Mentnech, J. Lubitz, A.M. McBean, and D. Russell. 1990. Trends and Patterns in Place of Death for Medicare Enrollees. *Health Care Financing Review* 12(1):1-7.
- McMillan, A., P.L. Pine, M. Gornick, and R. Prihoda. 1983. A Study of the "Crossover Population": Aged Persons Entitled to Both Medicare and Medicaid. *Health Care Financing Review* 4(4):19-46.
- Riley, G., and J. Lubitz. 1989. Longitudinal Patterns of Medicare Use by Cause of Death. *Health Care Financing Review* 11(2):1-12.
- Riley, G., J. Lubitz, R. Prihoda, and E. Rabey. 1987. The Use and Cost of Medicare Services by Cause of Death. *Inquiry* 24:233-44.
- Roos, N.P., P. Montgomery, and L.L. Roos. 1987. Health Care Utilization in the Years Prior to Death. *Milbank Quarterly* 65(2):231-54.
- Scitovsky, A.A. 1988. Medical Care in the Last Twelve Months of Life: The Relation Between Age, Functional Status, and Medical Care Expenditures. *Milbank Quarterly* 66(4):640-60.

---

*Acknowledgments:* This article was presented at the meetings of the American Public Health Association in Atlanta, Georgia, in November 1991. The study was supported, in part, by the John A. Hartford Foundation of New York City.

We are very grateful to T. Franklin Williams, MD, for his helpful comments on an early version of this manuscript. We also wish to thank Anne A. Scitovsky and an anonymous reviewer for their useful comments and suggestions.

*Address correspondence to:* Helena Temkin-Greener, PhD, Community Coalition for Long Term Care, 311 Alexander Street, Suite 201, Rochester, NY 14604.