Longevity and Health Care Expenditures:
The Real Reasons Older People Spend More

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Objectives. In this study, we investigated the relative contributions of both age and time to death to health care expenditures for elderly Medicare beneficiaries. We also analyzed differences in expenditure patterns by age and time to death for various service types and payers.

Methods. We conducted graphical analysis of person-month level data on 25,994 elderly persons from the 1992–1998 Medicare Current Beneficiary Survey Cost and Use files.

Results. Monthly health care expenditures for elderly people increase substantially with age primarily because mortality rates increase with age and health care expenditures increase with closeness to death. Time to death is the main reason for higher inpatient care expenditures, whereas aging is the main reason for higher long-term care expenditure.

Discussion. Both increases in the absolute number of elderly persons and in their longevity will increase future Medicare expenditures. Yet, the expected increase in per person health care expenditures caused by greater longevity of Medicare beneficiaries will be less than expected because of the concentration of expenditures at the end of life rather than during extra years of a relatively healthy life. The latter conclusion may be altered, however, because of other underlying considerations, such as technological change.

FUTURE health care expenditures are expected to soar as the baby boom generation becomes eligible for Medicare. No one disputes that total health care expenditures will rise in part from the increased *number* of Medicare enrollees and their projected increase in longevity. What is being debated, however, is whether steady improvements in longevity will increase *per person* health care expenditures proportionately, or whether there will be a less than proportionate increase in per person expenditures. The baby boom generation is expected to live longer than earlier generations. Mortality rates from all causes have fallen steadily over the last century, and life expectancy has gone from 48 in 1900 to 76.5 in 1990 (Cutler & Meara, 2001). The mean life expectancy has been projected to increase from 76 in 1998 to 86 by the year 2070 (Lee & Tuljapurkar, 1998). If these projections come true, then the way in which the increases in longevity affect Medicare and Medicaid budgets becomes an important public policy problem.

Some argue that gains in longevity will lead to higher health care expenditures (for a review, see Norton, 2000). Substantial evidence indicates that, on average, health care expenditures rise with age. Developed countries with a high percentage of elderly people have higher health care expenditures than countries with a small percentage of elderly people (Getzen, 1992). In addition, health care expenditures of the population over age 65 have been found to increase faster than those of the nonelderly population in the United States (Lubitz, Greenberg, Gorina, Wartzman, & Gibson, 2000). Collectively, this evidence implies that health care expenditures increase with age, so advances in longevity will increase per person lifetime health care expenditures.

Others argue that health care expenditures do not rise with age per se, but that people close to death—who are older on average—tend to have much higher health care expenditures than those at the same age who survive (Miller, 2001; Zweifel, Felder, & Meiers, 1999). Therefore, elderly persons spend more on average not only because their morbidity rates are higher, but also because their mortality rates are higher than nonelderly persons. Zweifel and colleagues used longitudinal data from Switzerland to study the relationship between health care expenditures, age, and time to death. The strong relationship between age and health care expenditures disappeared when they controlled for time to death in a regression on quarterly health care expenditures. The authors concluded that end-of-life expenditures are independent of age. However, their conclusions have been questioned in relation to the United States, not only because of the external validity of a small sample of Swiss, but also for their empirical methods (Dow & Norton, 2002; Salas & Raftery, 2001).

To answer the question of how increases in longevity will affect per person health care expenditures, it is important to have a clear picture of how age and time to death affect elderly health care expenditures. If the effect of proximity to death on health care expenditures is ignored, then the apparent effect of age on health care expenditures will be overstated. For example, one recent study used three sources of data (Medicare claims and eligibility data for a 0.1% random sample of beneficiaries from 1993 to 1998, the Medicare Current Beneficiary Survey Cost [MCBS] and Use Files from 1992 to 1998, and the 1993 National Mortality Followback Survey) to analyze the cost of health care in the last year of life for Medicare beneficiaries (Hogan, Lunney, Gabel, & Lynn, 2001). They found Medicare beneficiaries

use health care much more intensively in the last year of life than during earlier periods, with a particular increase in the utilization of nursing home and hospice services. However, their article did not differentiate the effect of aging from proximity to death on health care expenditures, nor did it investigate the utilization patterns of different kinds of medical services when Medicare beneficiaries are getting old and close to death. Miller (2001) argues that controlling for time until death greatly improves projections of future Medicare expenditures, and compares models both with and without controlling for time until death.

Our study builds on the prior research and provides strong descriptive evidence in support of the hypothesis that health care expenditures depend primarily on time to death, not age. Furthermore, we also show that, when monthly expenditure patterns by age and time to death are disaggregated by selected payer and service types, substantial differences in the patterns arise. An understanding of the differences in the patterns may be helpful when predicting the effects of increased longevity on health care expenditures and may ultimately be helpful for developing policies to help ensure rational and efficient use of health care services at the end of life. We improve on past research by using a large representative sample from the United States in the 1990s, carefully controlling for time until death, and doing subanalyses by payer and service type.

METHODS

Data

We analyzed data from the MCBS Cost and Use Files for years 1992–1998. The survey is a longitudinal survey of a representative sample of more than 10,000 Medicare beneficiaries per year (Adler, 1994). The MCBS has several characteristics that make it ideal for research on longevity and end-of-life expenditures. First, the Cost and Use Files contain information on both decedents and survivors. Therefore, we can graph how health care expenditures change both as people age and as people approach the end of their life. Second, respondents are followed for up to 5 years, allowing observation of health care expenditures over a long period. Third, the survey combines survey information on demographics and insurance coverage with Medicare claims data, as well as survey information on all resource use and health care expenditures, including nursing home and prescription drug costs that are not available from Medicare claims.

Our analysis includes all survey respondents age 65 or older. Because we are interested in health care expenditures as people age and get close to death, we created an analysis file at the person-month level. Health care expenditures were assigned to calendar months according to the date of service. If no medical service was consumed in a calendar month, the level of expenditures was coded as zero. We deleted observations on respondents age 101 and older because of the small sample size after this age, observations for a small number of people with invalid Primary Sampling Unit codes, and observations on one person with exceptionally high inpatient expenditure (more than half a million dollars within 1 month). The final analysis file has 754,170

observations at the person-month level, representing 65,679 person-years for 25,994 unique people. Twenty-four percent of people were surveyed only 1 year, 21% for 2 years, 40% for 3 years, 11% for 4 years, and 6% for 5 years. The people who were followed for less than 5 years either died, were lost to follow-up, were rotated out of the sample, or were added to the survey after 1994.

We generated two variables to keep track of time. One variable is *time until death*, which equals one in the calendar month in which death occurred, equals two in the calendar month before death, and so forth. Therefore, the variable time until death counts down as the end of life approaches. For persons who were still alive at the end of their last survey year, *time until censoring*—not time until death—is relevant. Time until censoring equals one in the last calendar month before censoring, two in the calendar month before that, and so forth.

The primary outcome of interest is the average health care expenditures of elderly persons in each calendar month. In addition to analyzing health care expenditures for all payers and services, we also conducted subgroup analysis for selected payers and service types. The three most important payers are Medicare, Medicaid, and out-of-pocket. The remaining payers—included in total expenditures, but not analyzed separately—were non-Medicare Health Maintenance Organizations, private insurance companies, and other public payers (e.g., Department of Veterans Affairs). The three services with the highest expenditures are inpatient, nursing home, and home health. The remaining service types—included in total expenditures, but not analyzed separately—were outpatient, medical provider, prescription drugs, hospice, and other.

Our method of calculating monthly health care expenditures creates an apparent drop in average expenditures in the last month of life for some types of expenditures. The drop occurs because of the distinction between last calendar month of life and last 30 days of life. Because a person may die on any day during the last calendar month of life, a decedent's health care expenditures during the last calendar month of life may occur over less than a full month. On average, decedents were only alive 15 days in the last calendar month, so the actual health care expenditures in the last 30 days of life are expected to be much higher than the actual health care expenditures in the last *calendar* month of life for decedents. This difference is most apparent for nursing home expenditures.

The survey population has an average age of 75 and is 60% female (see the first four columns of Table 1 for summary statistics). Minority groups account for about 10% of the whole population. About 40% of the population are widowed. Most of the survey population is enrolled in both Part A and Part B of Medicare, 13% are Medicaid beneficiaries, and about 9% are Medicare risk health maintenance organization enrollees.

Analytic Methods

We conducted a descriptive data analysis using person-month level data. We constructed two subgroups, based on knowledge regarding date of death, from the full sample of 754,170 person-month observations. The first group, which

Table 1. Descriptive Statistics (Adjusted for Survey Weights)

Characteristic	Whole Sample				Decedent Sample Mean	Survivor Sample Mean
	Mean	*SE*	Minimum	Maximum		
Demographics						
Age	74.857	0.046	65	100	79.91	74.91
Male	0.4025	0.0028	0	1	0.45	0.40
Race						
White	0.8849	0.0061	0	1	0.88	0.87
Black	0.0795	0.0051	0	1	0.08	0.08
Other/unknown	0.0411	0.0029	0	1	0.04	0.04
Marital Status						
Married	0.5238	0.0053	0	1	0.40	0.53
Never Married	0.0430	0.0020	0	1	0.05	0.04
Separated	0.0657	0.0020	0	1	0.06	0.07
Widowed	0.3662	0.0050	0	1	0.49	0.36
Health Insurance						
Medicare status						
Part A only	0.0171	0.0014	0	1	0.01	0.02
Part B only	0.0101	0.0008	0	1	0.01	0.01
Both Parts A and B	0.9725	0.0017	0	1	0.98	0.97
Medicaid	0.1304	0.0048	0	1	0.28	0.12
HMO-HCPP	0.0188	0.0027	0	1	0.02	0.02
HMO-Medicare risk	0.0846	0.0056	0	1	0.06	0.08
HMO-Private	0.0446	0.0035	0	1	0.04	0.05
Monthly Health Care Expenditures (1998$)						
Expenditure for all services						
Total expenditure by all payers	720.14	11.11	0	178,280	3169.82	589.54
Medicare expenditure	429.41	8.31	0	166,972	2125.37	334.31
Medicaid expenditure	82.96	3.23	0	25,413	360.34	69.60
Out-of-pocket expenditure	113.07	2.67	0	134,890	397.57	100.18
All other payers' expenditure	94.70	2.99	0	138,859	286.57	85.44
Inpatient						
Total expenditure by all payers	240.82	4.99	0	163,393	1421.38	177.79
Medicare expenditure	214.05	4.75	0	159,425	1299.54	155.33
Medicaid expenditure	2.62	0.13	0	13,139	17.14	1.98
Out-of-pocket expenditure	4.97	0.26	0	41,166	22.89	4.21
All other payers' expenditure	19.17	0.70	0	116,065	81.85	16.27
Outpatient						
Total expenditure by all payers	60.89	1.09	0	36,365	147.65	53.94
Medicare expenditure	31.67	0.74	0	34,509	82.29	28.16
Medicaid expenditure	1.47	0.09	0	7,691	4.89	1.28
Out-of-pocket expenditure	4.49	0.12	0	24,127	9.97	4.18
All other payers' expenditure	23.25	0.51	0	36,365	50.49	20.31
Nursing homes						
Total expenditure by all payers	198.39	6.44	0	152,633	932.81	164.35
Medicare expenditure	39.84	2.01	0	30,873	221.21	29.39
Medicaid expenditure	75.95	3.14	0	25,269	329.86	63.52
Out-of-pocket expenditure	64.24	2.66	0	134,889	301.27	53.87
All other payers' expenditure	18.40	2.54	0	152,633	80.51	17.63
Home health care						
Total expenditure by all payers	38.45	1.92	0	99,517	153.55	31.79
Medicare expenditure	36.68	1.88	0	12,128	146.07	30.38
All other payers' expenditure	1.77	0.38	0	96,258	7.48	1.41
All other types of health care						
Total expenditure by all payers	181.54	2.46	0	73,425	514.43	161.57
Medicare expenditure	107.16	1.73	0	26,148	376.26	91.03
Medicaid expenditure	2.92	0.14	0	12,464	8.45	2.81
Out-of-pocket expenditure	39.35	0.61	0	56,699	63.45	37.93
All other payers' expenditure	30.77	0.53	0	43,227	66.28	29.80
No. of people	25,954				4,394	19,932
No. of person-months	754,170				42,565	457,657

Note: HMO = health maintenance organization; HCPP = Health Care Prepayment Plus.

we call the *decedent* sample, included the 42,565 observations within 1 year of death (see the fifth column of Table 1). We used this sample to compute expenditures by age for persons who are relatively close to the end of their life. The second group, which we call the *survivor* sample, included the 457,657 observations at least 1 year before death and at least 1 year before being censored (see the last column of Table 1). We eliminated observations within 1 year of being censored because someone who is censored may actually be close to death (e.g., may die early in 1999 after the survey is over). We used the survivor sample to compute expenditures by age for persons who are not close to death.

We computed the average monthly expenditures by payer and service types for the decedent sample, the survivor sample, and the full sample separately. All monthly expenditures were adjusted for inflation to 1998 dollars using the Consumer Price Index (Bureau of Labor Statistics, U.S. Department of Labor). We used cross-sectional weights and adjusted for the complex survey design for the estimates of the means and standard errors of monthly expenditures.

First, we investigated how health care expenditures change with age when people are close to death, compared with when they are not close to death. We plotted the average monthly health care expenditures by age for both the decedent sample and the survivor sample and compared the shape of the graphs. Next, we investigated how health care expenditures change when people of different ages are approaching death. We expanded the decedent sample from within 1 year of death to within 3 years of death, and split the expanded sample into three age groups: age 65–74, age 75–84, and age 85 or higher. Then, we plotted the average monthly health care expenditures by time to death of these three age groups and compared the shape of the graphs.

RESULTS

Summary Statistics

As shown in the first four columns of Table 1, after adjustment all expenditures to 1998 dollars, the average total monthly health care expenditure per person was more than $700. The biggest payer was Medicare, which accounts for more than half of the total at $429. Medicare was also the main payer of inpatient care at $214. The biggest payer of nursing home care was Medicaid (Norton & Newhouse, 1994), which covered about 38% of the nursing home expenditures in our sample. The average amount spent per month on services was $241 for inpatient care, $198 for nursing home care, and $38 for home health.

As shown in the last two columns of Table 1, the decedent sample was predictably different from the survivor sample. The decedent sample was older than the survivor sample (average age was 79.9 vs. 74.9). There were more widowed people in the decedent sample than the survivor sample (49% vs. 36%). Also, the average monthly health care expenditures for different payers and service types were much higher in the decedent sample than the survivor sample. Therefore, even at an aggregate level, the data suggest that people die at older ages, and when they are close to death, they have higher health care expenditures.

Graphical Results

To move beyond simple descriptive statistics and show how health care expenditures vary by age and time to death, we created graphs of average monthly health care expenditures. Monthly health care expenditures increase with age from $500 per month at age 65 to more than $2,000 per month at age 97 (see Figure 1). Therefore, health care expenditures per month rise by nearly fourfold as someone ages from 65 to 97. The small dip in expenditures at the highest ages may be because of small sample size, or to substitution of lower priced subacute care for hospital care. The 95% confidence intervals shown in the graph also increase with age, because there are fewer observations after age 85, and higher mean expenditures lead to higher variance. From Figure 1 alone, one might be tempted to conclude that, because older people spend more money on health care than younger people, the baby boom generation will cause a tremendous increase in Medicare expenditures in the future. However, that simplistic view does not consider underlying patterns of health care expenditures by age and time to death.

Average monthly health care expenditures start to increase about 24 months before death, and increase faster in the last 6 months of life up through the last (potentially partial) calendar month of life (see Figure 2A). This finding has been documented repeatedly in the empirical literature (e.g., Felder, Meier, & Schmitt, 2000; Lubitz & Riley, 1993; McGrail et al., 2000; Zweifel et al., 1999). One reason for this finding is that the monthly mortality rate also rises steadily with age, as shown in Figure 2B. Therefore, because people are more likely to die as they get older and because people spend more when they are close to death, aging per se is not the only reason for higher total health care expenditures for the elderly population. Instead, health care expenditures are higher on average at higher ages because a greater fraction of the population is in their last year of life.

The timing of expenditures is only part of the story, because the composition of who pays for health care and what services are purchased also shifts with age. We plotted graphs of health care expenditures against age for different payers and service types (see Figures 3A and 3B). Although Medicare expenditures increase gradually with age, peaking
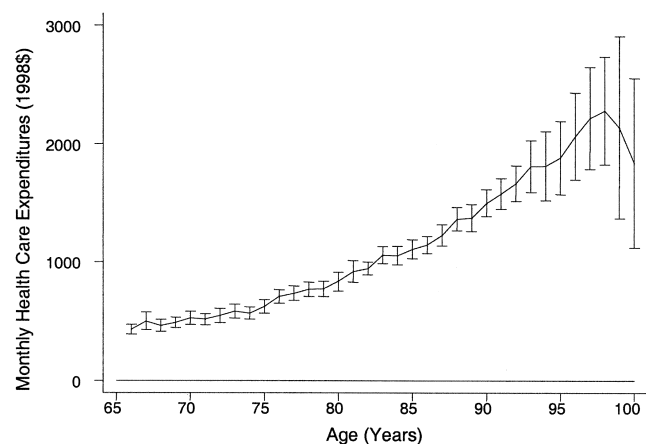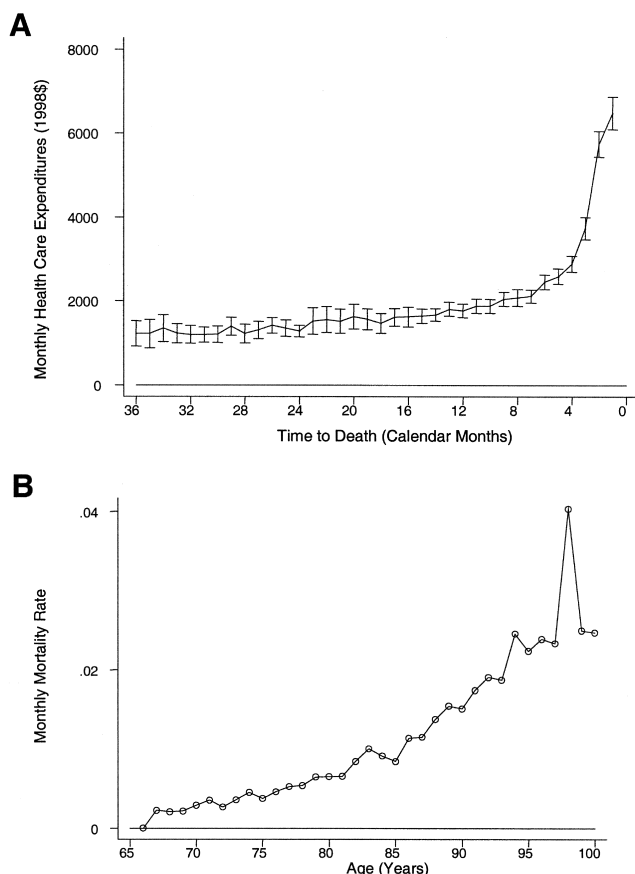

Figure 1. Health care expenditures by age.

A

B

Figure 2. (**A**) Health care expenditures by time to death. (**B**) Monthly mortality rate by age.

at age 97, Medicaid and out-of-pocket expenditures increase much more noticeably after age 80 (see Figure 3A). By the time someone reaches their mid-90s, average monthly expenditures for Medicaid and out-of-pocket payments combined are as high as for Medicare. Health care expenditures by service type follow similar patterns. Figure 3B shows that monthly inpatient expenditures do not increase much with age, and home health care expenditures only increase slightly with age. Monthly nursing home expenditures, however, steadily increase after age 75. These trends reflect the fact that the main payers of nursing home care are Medicaid and out-of-pocket. Therefore, as people age, they use more nursing home and home health care, but not substantially more inpatient care.

To compare the separate effects of age and time to death on health care expenditures, we plotted expenditures by age for those close to death and for those not close to death, and plotted expenditures by time to death for different age groups (see Figures 4–8). Average monthly expenditures have a different pattern when plotted against age for the sample within 1 year of death than for those more than 1 year from death. Monthly health care expenditures in the last year of life are much higher than monthly expenditures for people more than 1 year before death (see Figure 4A). For people within a year of death, monthly expenditures do not show an upward trend. In contrast, monthly expenditures for people more than 1 year

before death increase steadily but modestly with age until age 99. Figure 4B provides a more explicit assessment of whether end-of-life expenditures vary by age. Before 4 months to death, people aged 85 and older constantly have slightly higher expenditures per month than younger people, but there is a reversal in this pattern within 4 months before death. The three age groups have almost the same monthly expenditures at 4 months before death, but expenditures are highest for people aged 65–74 and lowest for people aged 85 and older during the 2 months before death. As people approach death, however, the rate of increase in monthly expenditures is less for the oldest old than for the younger old.

To test the statistical significance of the differences in total health care expenditures between age groups, we bootstrapped 95% confidence intervals for expenditures each month before death for each age group (see Table 2). In the month of death, the 95% confidence interval of the oldest group (aged 85 and older) does not overlap with the intervals for the younger groups, which means the persons aged 65–74 and 75–84 have significantly higher expenditures than the oldest group. In contrast, the confidence intervals for the three age groups overlap substantially at 3 and 4 months before death. At 24 months before death, the youngest age group has significantly lower expenditures than the older groups aged 75 and above. In addition, as shown in Figure 4B, from
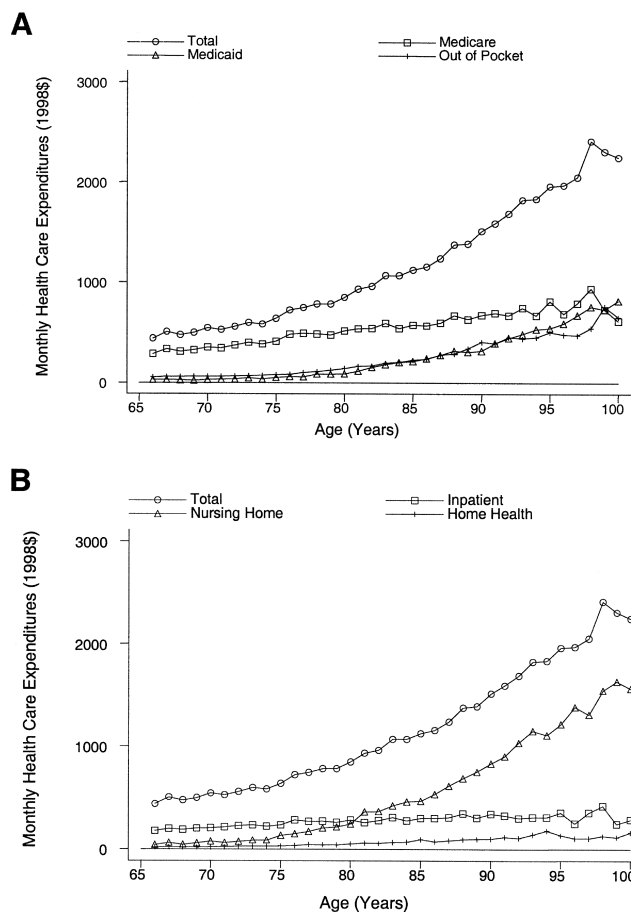
A

B

Figure 3. (**A**) Health care expenditures of different payers vs. age. (**B**) Health care expenditures of different service types vs. age.
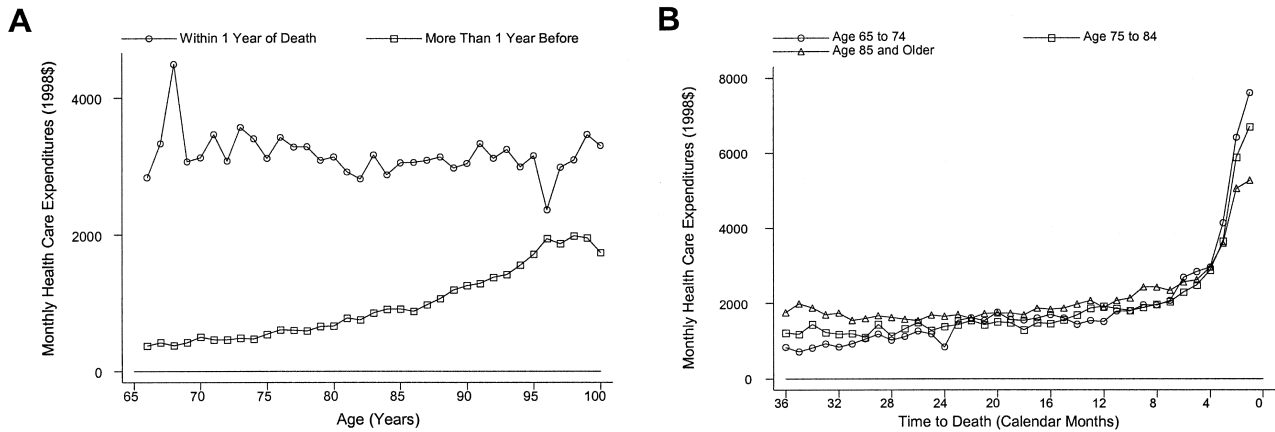
Figure 4. (**A**) Health care expenditures by age and time to death. (**B**) Health care expenditures by time to death and age.

24 months before death to 36 months before death, the youngest group consistently spends less than the older groups, although the confidence intervals (not shown) overlapped to a great extent because of small sample sizes.

Medicare expenditures are similar to inpatient expenditures when each are plotted either against age or time until death, as shown in Figure 5. This result is not surprising

because Medicare is the biggest payer of inpatient care. Figures 5A and 5C show that people who die at older ages use fewer Medicare covered services and less inpatient care in the last year of life than do people who die at younger ages. In contrast, monthly inpatient expenditures and monthly Medicare expenditures for the people who are more than 1 year before death are very flat. Figures 5B and 5D show
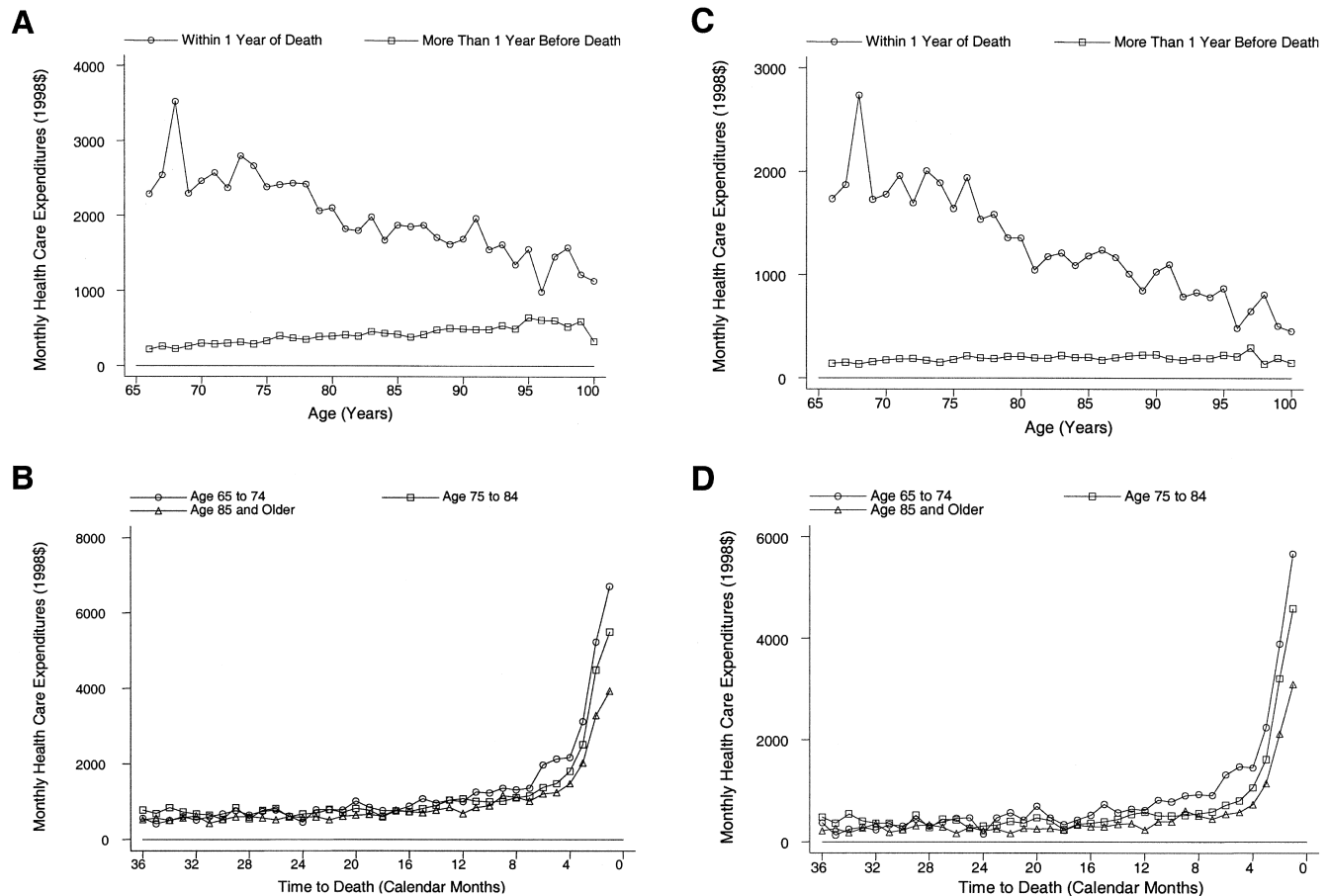

Figure 5. (**A**) Medicare expenditures by age and time to death. (**B**) Medicare expenditures by time to death and age. (**C**) Inpatient expenditures by age and time to death. (**D**) Inpatient expenditures by time to death and age.

virtually identical trends in monthly inpatient and Medicare expenditure before death for different age groups. Before 1 year of death, monthly Medicare and inpatient expenditures are essentially the same for different age groups, but starting at 12 months before death, people who die at relatively younger ages have the highest inpatient and Medicare expenditures.

The trends in Medicaid and nursing home expenditures are completely different from the patterns observed for Medicare and inpatient expenditures (see Figure 6). Because Medicaid is the biggest payer of nursing home expenditure, patterns of nursing home and Medicaid expenditures are about the same. Figures 6A and 6C show that both Medicaid and nursing home expenditures for people in their last year of life are higher than for people who are not close to death. Also, Medicaid and nursing home expenditures increase steadily with age (especially after age 75), regardless of whether people are in their last year of life or not. Average nursing home expenditures for those over age 85 are close to $2,000 per month just before death, about three times higher than for those age 65–74 (see Figures 6B and 6D). Nursing home and Medicaid expenditures both increase with proximity to death, but the increase is more gradual and occurs over a wider time span than the Medi-

care and inpatient expenditures. The big decrease in expenditures in the month of death is because we calculated the expenditures for the calendar month. As described earlier, on average, people die halfway through the last calendar month and by definition have zero expenditures for the remainder of the calendar month after their death. Because nursing home expenditures are fairly constant per day, the average nursing home expenditures in the calendar month of death are lower than in the month before death.

One interesting finding is that the patterns of out-of-pocket payments are similar to the patterns for nursing home and Medicaid expenditures (see Figure 7). Because elderly persons tend to have good insurance coverage for inpatient and outpatient care through Medicare supplemented by Medigap policies and/or Medicaid, the largest uninsured expenditures faced by elderly persons are for long-term care (Lindrooth, Hoerger, & Norton, 2000; Norton, 1995, 2000). Therefore, insurance coverage for health care becomes less complete as people age.

Home health care has become an increasingly important component of health care services for the elderly population. The patterns of home health expenditures by age and by time to death are unlike the patterns for the other services (see Figure 8). Figure 8A shows that home health expendi-
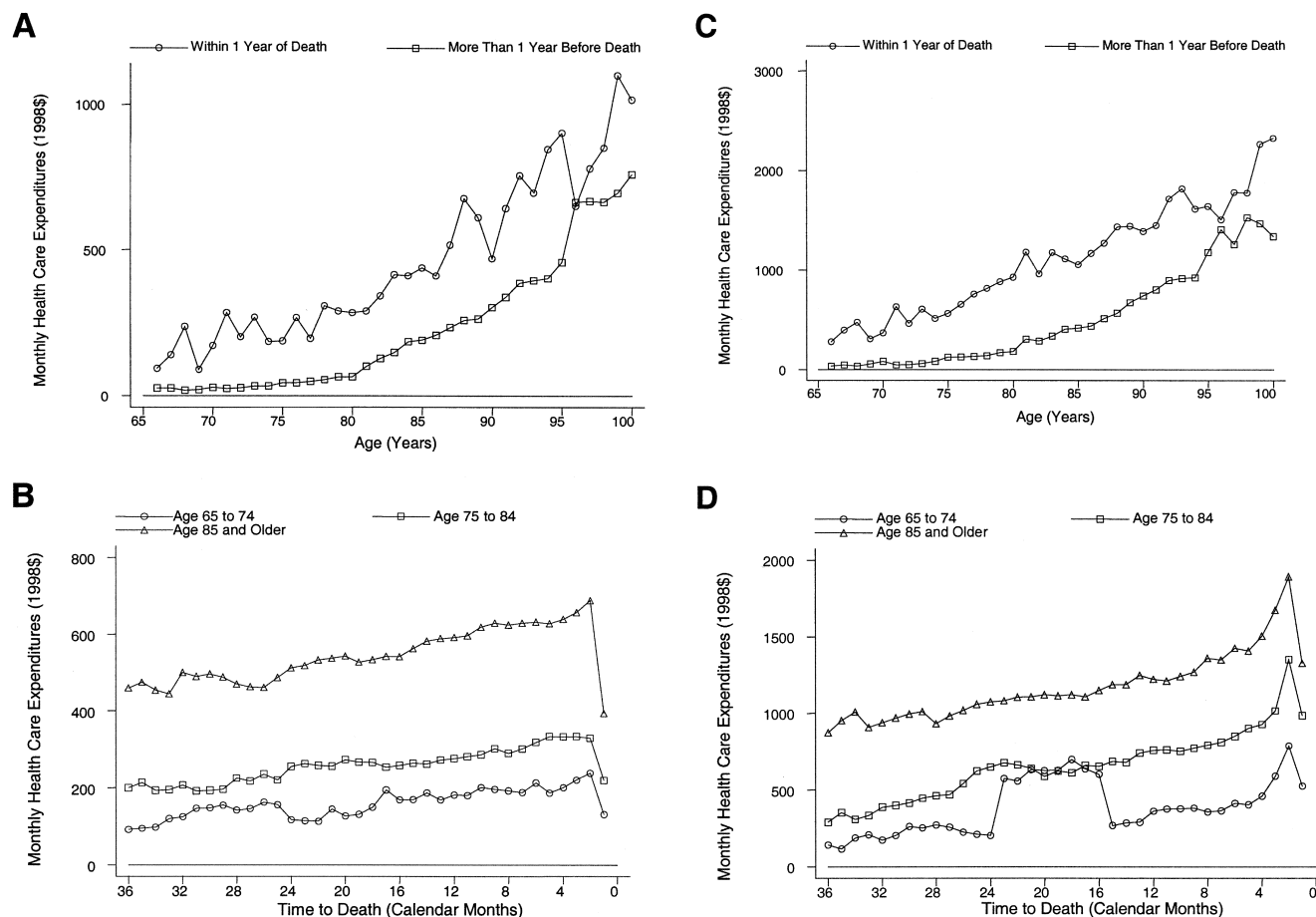

Figure 6. (**A**) Medicaid expenditures by age and time to death. (**B**) Medicaid expenditures by time to death and age. (**C**) Nursing home expenditures by age and time to death. (**D**) Nursing home expenditures by time to death and age.
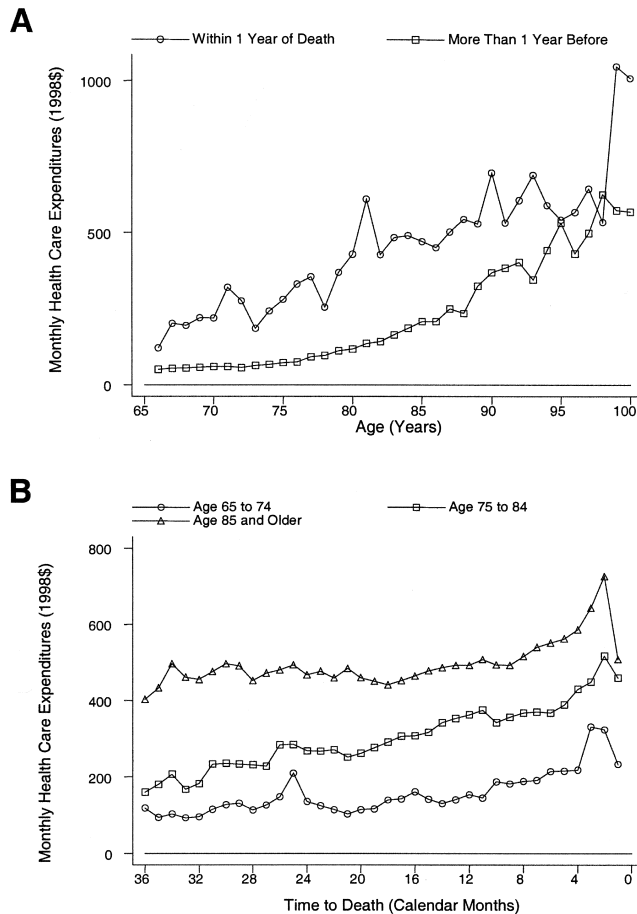
Figure 7. (**A**) Out-of-pocket expenditures by age and time to death. (**B**) Out-of-pocket expenditures by time to death and age.

Figure 8. (**A**) Home health expenditures by age and time to death. (**B**) Home health expenditures by time to death and age.

tures during the last year of life are higher than home health expenditures before the year preceding death at almost all ages. Home health expenditures in the last 3 years of life increase steadily as people approach death, because people age 85 and older always use more home health care than the younger groups. The difference between age groups is not as great, however, as for nursing home expenditures (see Figure 8B).

DISCUSSION

Our figures and tables show that the patterns of health care expenditures by age and by time until death are far more revealing than simple comparisons by age, especially when broken down by payer and type of service. A casual look at Figure 1 might lead to the conclusion that aging is the main reason for projected higher expenditure of the elderly population. After we decomposed the data into survivor and decedent groups and graphed expenditures of different service types and payers by age and time to death separately, the data revealed new insights about health care expenditures for the elderly population that go beyond what others have shown.

Although total monthly health care expenditures for decedents are higher than for survivors, expenditures on decedents at different ages are about the same. This descriptive
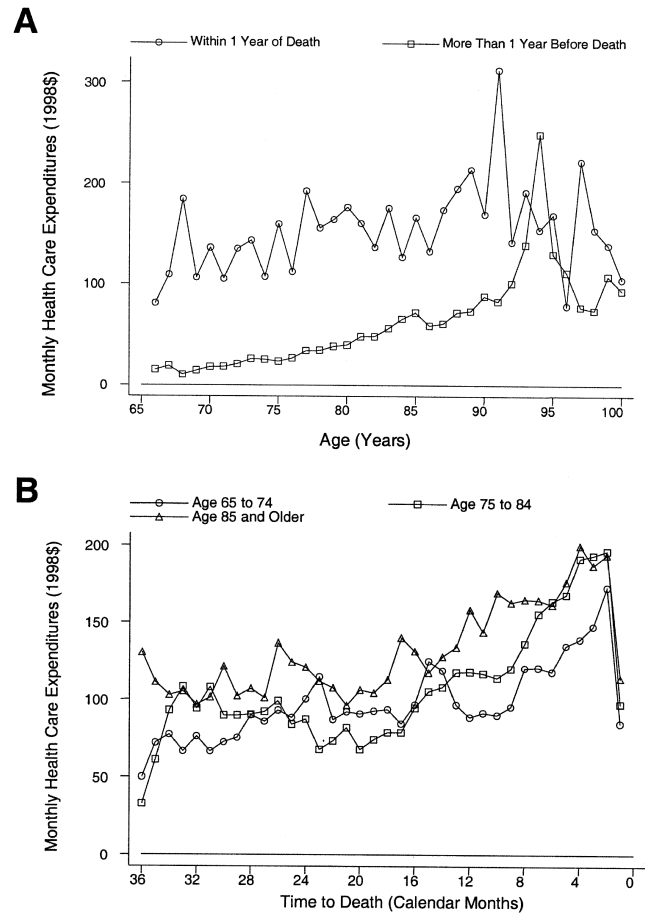
evidence supports the idea that the observed increase in average health care expenditures with age is largely because of an increasing mortality rate coupled with high end-of-life expenditures. However, the story of how health care expenditures depend on age does not stop there. Total health care expenditures of survivors increase with age. When we take separate pictures of expenditures for selected payers and service types by time to death and age, the patterns of utilization of acute care and long-term care are different. Spending on inpatient care in the last year of life declines with age at death, but inpatient expenditures are roughly constant across all ages for those not close to the end of life. Medicare as the main payer of inpatient care carries the same pattern.

On the other hand, nursing home expenditures increase on average with both age and closeness to death. Because Medicaid and out-of-pocket payments are the main payers of nursing home care, they have the same age profile as nursing home care. This may help to explain why the expenditures for decedents across age groups are about the same, but total health care expenditures of survivors steadily increase with age (see Figure 4). During the last year of life, the decrease in inpatient expenditures and the increase in nursing home expenditures make total health care expenditures look roughly constant by age. However, more than 1 year removed

Table 2. 95% Confidence Interval of Total Health Care Expenditures by Time to Death

Time to Death (Calendar Months)	Age Group	n	Mean	95% Confidence Interval
1	65–74	829	7,580	(6,805–8,355)[a]
	75–84	1,804	6,674	(6,205–7,325)
	85 and older	1,756	5,254	(4,942–5,601)
2	65–74	749	6,390	(5,682–7,103)[a]
	75–84	1,728	5,854	(5,394–6,351)
	85 and older	1,682	5,038	(4,743–5,361)
3	65–74	757	4,103	(3,560–4,642)
	75–84	1,661	3,626	(3,289–3,973)
	85 and older	1,611	3,582	(3,330–3,840)
4	65–74	719	2,919	(2,526–3,388)
	75–84	1,586	2,844	(2,585–3,113)
	85 and older	1,552	2,941	(2,731–3,179)
12	65–74	512	1,484	(1,193–1,852)
	75–84	1,176	1,890	(1,671–2,166)
	85 and older	1,101	1,871	(1,727–2,043)
24	65–74	258	820	(621–1,048)[a]
	75–84	624	1,349	(1,119–1,625)
	85 and older	600	1,628	(1,432–1,850)

[a]No overlap of the 95% confidence interval between age group 65–74 and age group 85 and above. Confidence intervals are bias-corrected percentile estimates that were bootstrapped using 1,000 iterations.

from death, this tradeoff is not equal. Prior to a year before death nursing home and home health care expenditures contribute most of the increase in total monthly expenditures.

Therefore, we conclude that elderly persons use much more health care in the last year of life—no matter at what age they die. Closeness to death is the most important reason for higher inpatient expenditures, and aging is the most important reason for higher long-term care expenditures.

According to our results, the projected increase in longevity of the baby boom generation will not raise the Medicare budget as much as many fear. The baby boom generation is expected to live longer; and the longer one lives, the less is spent on inpatient care during the last year of life. Also, monthly inpatient expenditures before 1 year of death are almost constant across different age groups. Therefore, aside from the increased number of beneficiaries, the longer life expectancy of the baby boom generation may not bring as great an increased burden for the Medicare budget as the increased number of beneficiaries would suggest, specifically because Medicare is the main payer of inpatient care. Predictions for Medicaid budgets are less definitive, however, given the increase in nursing home use with age.

Predicting the future is fraught with hazards, so we end with a strong caution about the interpretation of our results. In extending our results to the future, we have assumed that current usage patterns remain the same, which may not happen if insurance coverage or technology changes. In addition, because the probability of nursing home use increases with age whereas inpatient use declines with age, if the cost or use of nursing homes rises faster in the future, then this tradeoff may have the net effect of raising health care expenditures. In the next stage of our research program, we will estimate multivariate models that control not only for

individual demographics, health status, and insurance, but also time to death, age, and time trends. We plan to build on the work of Miller (2001) and others, by controlling for the endogeneity of time until death, and explicitly allowing for interactions between age and time until death. Only after estimating multivariate models will we know the extent to which the predictions of this descriptive study hold.

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