


Medicare Cost at End of Life

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Abstract

As the Medicare program struggles to control expenditures, there is increased focus on opportunities to manage patient populations more efficiently and at a lower cost. A major source of expense for the Medicare program is beneficiaries at end of life. Estimates of the percentage of Medicare costs that arise from patients in the last year of life differ, ranging from 13% to 25%, depending on methods and assumptions. We analyze the most recently available Medicare Limited Data Set to update prior studies of end-of-life costs and examine different methods of performing this calculation. Based upon these findings, we conclude that higher estimates that take into account the spending over the 12 months leading up to death more accurately reflect the full cost of a patient's last year of life. Comparing current year costs of decedents with Medicare's current year costs understates the full budgetary impact of end-of-life patients. Because risk-taking entities such as Medicare Advantage plans and Accountable Care Organizations (ACOs) need to reduce costs while improving the quality of care, they should initiate programs to better manage the care of patients with serious or advanced illness. We also calculate costs for beneficiaries dying in different settings and conclude that more effective use of palliative care and hospice benefits offers a lower cost, higher quality alternative for patients at end of life.

Keywords

medicare, end-of-life costs, hospice, palliative care, population management, inpatient

Background

As the Medicare program struggles to control expenditures, there is increased focus on opportunities to manage patient populations more efficiently and at a lower cost. Patients at end of life (EOL) represent a disproportionate share of Medicare's costs, implying that these patients are an appropriate population for management by risk-taking Medicare entities such as Medicare Advantage plans and Accountable Care Organizations (ACOs), whose mission is to reduce cost as well as improve the quality of care. Because risk-taking entities need to reduce costs to share savings, they seek opportunities for more intense patient engagement and management. Actuaries, health economists, policy analysts, and health services researchers have studied expenditures at the EOL for Medicare decedents for more than 30 years. What is important from the perspective of managing patients and costs is that for patients at the EOL, alternative care pathways that involve palliative care are available which can result in higher quality of life at less cost.

The objectives of this article are 4-fold:

1. To summarize some of the main findings of previously published research articles on EOL expenditures and utilization patterns.
2. To propose an appropriate methodology for estimating the proportion of Medicare spending accounted for by

patients at EOL that takes into account spending during the final year of life, not just at the time of death.

3. To investigate recent Medicare EOL expenditures using the most recent Medicare Limited Data Set (LDS) data for calendar year (CY) 2015 to 2016.
4. To model the opportunity for Medicare Advantage plans and Medicare Shared-savings Program (MSSP) ACOs to reduce cost of care for members in their final year of life while maintaining or improving care quality.

Literature Review on EOL Costs

There is a considerable literature about EOL costs, delivery, and financing from different disciplines. To better understand

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EOL costs and utilization patterns, we summarize examples of different aspects, as well as some recent developments in palliative care, quality, and futile care.

Numerous articles on EOL costs show that a large proportion of Medicare expenditures occur during the last 6 months of life.¹⁻⁹ This phenomenon has continued for many years as the number of Medicare decedents has increased with the aging American population. Medicare expenditures for EOL have increased dramatically from 1983 to 2016, primarily because of the increase in the number of decedents. Other articles compare EOL expenditures in the United States to other countries^{10,11} or focus on Medicare expenditures for specific diseases.¹²⁻¹⁴ A recent development in the literature challenges the idea that EOL costs are responsible for a high percentage of health-care costs.¹⁵ Below, we discuss methodological differences that could account for differences in estimated proportions. Utilization trends also affect Medicare expenditures and utilization patterns at the EOL, including a higher proportion of Medicare decedents electing hospice. In addition, an increasing proportion of Medicare decedents electing hospice are living longer than 6 months, and noncancer patients now constitute the majority of hospice patients.

Cost Savings

Several researchers have studied the hypothesis that hospice care reduces Medicare expenditures.¹⁶⁻¹⁸ Although the evidence is mixed, recent research challenges this hypothesis, although methodological issues make testing difficult.¹⁹ Hospice eligibility is based upon a prognosis of 6 months or less, but predicting the remaining length of life for most terminally ill patients is difficult, especially for those with noncancer diagnoses. The Centers for Medicare and Medicaid Services (CMS) reimburses hospices on a per diem basis for all care related to the terminal prognosis, including nursing care, social services, spiritual care, medications, medical equipment, personal aides, volunteers, and bereavement services. Based upon a per diem payment system, patients with long lengths of stay in hospice are less likely to create savings.²⁰ The patient's diagnosis is an important variable.²¹⁻²⁵ Several innovative programs have been tried to alter the payment methods for the delivery of hospice services designed to improve the coordination of EOL care and better control of EOL costs. Descriptions of experimental and successful palliative care programs are provided in the March 2018 MedPAC report and several other references.^{19,26-30} Finally, physicians have noted that some care, particularly in acute hospitals, is futile. Attempts to define, identify, and address such care is in its infancy.^{26,31}

Data/Methods

The Medicare 5% LDS Analytical File (“Medicare 5% File”)

For the purpose of understanding cost of care at the EOL, we perform analysis of the Medicare 5% file for the years 2015 and 2016. This file is a random sample of Medicare's claims for the

2 years, containing experience of approximately 2.9 million patients for each year. Approximately 30% of these patients are enrolled in managed care plans (Medicare Advantage Health Maintenance Organization [HMOs] and Preferred Provider Organization [PPOs]), leaving approximately 2.1 million beneficiaries enrolled in “traditional Medicare” and available for analysis. We exclude members who have <6 months of eligibility in any year. Our sample shows 259 000 of the 5.8 million total patients (including Medicare Advantage patients) died in 2015 to 2016, or 4.47%, a rate that is consistent with the Krumholz et al's study³² and Medicare's published rate.

Deaths are assigned to a particular place of death based on the last service date. For deaths reported in the eligibility file, the service with the latest reported date determines the place of death. We calculated the Medicare expenditures for inpatient, outpatient, professional, emergency department, physician office visits, hospital outpatient visits, hospice, skilled nursing facility, home health, and durable medical supplies. Outpatient pharmaceutical data are not included in the 5% files, although inpatient and outpatient infused drugs are paid under Medicare Part B and are included.

Results

Medicare Costs at EOL

The share of Medicare's total costs represented by subpopulations helps identify areas of opportunity for program management. There is some controversy over the share of Medicare's cost that Medicare decedents represent. A defined period, usually the last 12 months of life, is essential for assessing the cost of EOL patients because of the exponential increase in cost in the last months of life (see, eg, Table 1). However, some comparisons are made on a calendar period basis, which (by definition) includes patients with differing life expectancies. A typical statistic is that 25% of all Medicare's annual costs are accounted for by decedents (Riley and Lubitz¹ based on 2006 Medicare payments). Cubanski et al in a 2016 Kaiser Family Foundation Data Note³³ report that “in 2014, beneficiaries who died at some point during the year accounted for 4% of all beneficiaries in traditional Medicare, but 13.5% of traditional Medicare spending . . . This estimate is lower than the 25% estimate cited earlier because it is based on Medicare spending for people who died at some point in a given CY (in this case, 2014), rather than the last 12 months of spending for people who died.” Aldridge and Kelley¹⁵ also challenge the traditional estimate from the perspective of total EOL spending in the population (not restricted to Medicare patients). They report 13% of total spending due to patients in the last year of life. French et al³⁴ compare international costs at EOL, reporting 8.5% for the United States. Finally, a recent article by Finkelstein et al,³⁵ using Medicare data from 2007 to 2008, reports that patients dying in 2008 accounted for 15% of total Medicare cost for that year. Whether total spending on EOL patients is 13% or closer to 25% matters in terms of the priority given to managing this subpopulation.

Table 1. Average Medicare Expenditures Prior to Death.

Year	Place of Death	Place of Service								Total	Members	% Place of Death
		Inpatient	Carrier	Hospice	Outpatient	SNF	HHA	DME				
Average Medicare expenditures 90 days prior to death (per decedent, per month)												
2015	Home	\$807.95	\$410.63	\$30.13	\$311.63	\$248.71	\$88.67	\$117.01	\$2014.72	2592	4.5%	
2015	Home health agency	\$3541.09	\$1129.44	\$65.01	\$1064.56	\$962.87	\$1039.89	\$180.12	\$7982.98	1251	2.2%	
2015	Hospice	\$3984.60	\$1272.44	\$2048.64	\$1062.14	\$986.45	\$287.67	\$63.14	\$9705.09	26 924	46.6%	
2015	Inpatient	\$11 231.53	\$2476.00	\$61.66	\$1530.73	\$1072.00	\$286.44	\$88.30	\$16 746.66	14 462	25.0%	
2015	Outpatient	\$1712.01	\$852.84	\$47.11	\$1382.93	\$628.29	\$120.87	\$55.62	\$4799.68	9593	16.6%	
2015	SNF	\$7485.28	\$1905.60	\$63.02	\$1164.98	\$4134.56	\$231.27	\$37.75	\$15 022.45	2945	5.1%	
2015	Subtotal	\$5447.80	\$1494.59	\$984.06	\$1204.35	\$1075.27	\$264.15	\$71.84	\$10 542.06	57 767	100.0%	
2016	Home	\$711.86	\$364.74	\$39.86	\$285.47	\$228.63	\$78.15	\$106.93	\$1815.63	2332	4.1%	
2016	Home health agency	\$3533.62	\$1077.95	\$26.56	\$1000.65	\$856.60	\$1029.46	\$111.59	\$7636.43	1249	2.2%	
2016	Hospice	\$4148.12	\$1306.42	\$2176.84	\$1109.27	\$942.44	\$293.76	\$57.56	\$10 034.41	26 989	48.0%	
2016	Inpatient	\$11 615.17	\$2527.64	\$73.58	\$1598.92	\$1078.33	\$287.51	\$90.01	\$17 271.17	13 816	24.6%	
2016	Outpatient	\$1607.58	\$828.37	\$51.47	\$1388.16	\$574.70	\$127.75	\$49.15	\$4627.18	9201	16.4%	
2016	SNF	\$7281.36	\$1885.30	\$49.01	\$1276.51	\$4444.66	\$239.22	\$35.88	\$15 211.95	2674	4.8%	
2016	Subtotal	\$5559.16	\$1511.54	\$1075.31	\$1246.51	\$1050.63	\$269.88	\$66.37	\$10 779.41	56 261	100.0%	
Average Medicare expenditures 180 days prior to death (per decedent, per month)												
2015	Home	\$806.06	\$397.52	\$29.20	\$329.83	\$263.06	\$89.55	\$106.04	\$2021.24	2592	4.5%	
2015	Home health agency	\$2784.61	\$967.75	\$66.15	\$956.38	\$753.71	\$736.66	\$160.65	\$6425.93	1251	2.2%	
2015	Hospice	\$2723.59	\$1046.77	\$1331.48	\$1079.11	\$794.01	\$244.16	\$65.16	\$7284.28	26 924	46.6%	
2015	Inpatient	\$6596.72	\$1700.23	\$50.03	\$1368.61	\$802.04	\$230.94	\$86.65	\$10 835.21	14 462	25.0%	
2015	Outpatient	\$1404.19	\$706.89	\$41.93	\$1132.55	\$542.94	\$104.69	\$53.64	\$3986.84	9593	16.6%	
2015	SNF	\$4665.84	\$1346.00	\$48.70	\$1035.39	\$2449.90	\$206.48	\$45.15	\$9797.46	2945	5.1%	
2015	Subtotal	\$3488.42	\$1138.34	\$645.29	\$1121.95	\$814.05	\$219.50	\$71.51	\$7499.06	57 767	100.0%	
2016	Home	\$724.97	\$359.45	\$39.18	\$325.86	\$238.44	\$84.94	\$99.91	\$1872.74	2332	4.1%	
2016	Home health agency	\$2686.65	\$934.45	\$27.81	\$921.75	\$674.89	\$738.28	\$110.31	\$6094.14	1249	2.2%	
2016	Hospice	\$2826.87	\$1079.75	\$1407.14	\$1122.95	\$770.13	\$249.25	\$60.29	\$7516.38	26 989	48.0%	
2016	Inpatient	\$6810.05	\$1727.88	\$58.56	\$1444.93	\$800.33	\$229.60	\$91.13	\$11 162.49	13 816	24.6%	
2016	Outpatient	\$1292.79	\$684.30	\$43.57	\$1163.83	\$483.42	\$109.32	\$49.44	\$3826.66	9201	16.4%	
2016	SNF	\$4563.45	\$1343.12	\$43.92	\$1149.66	\$2593.48	\$215.89	\$44.30	\$9953.83	2674	4.8%	
2016	Subtotal	\$3546.43	\$1153.67	\$700.86	\$1172.47	\$793.16	\$224.00	\$68.08	\$7658.68	56 261	100.0%	

³Places of death of home includes professional and DME claims. Abbreviations: SNF, skilled-nursing Facility; HHA, home health Agency; DME, durable medical equipment.

Table 2. Last 12 Months of Cost of Persons Dying in 2015.

Costs in Year	Disposition	Total Allowed Amount	% of Total Cost
2015	2015 survivor	\$16 421 958 669	86.6%
2015	2015 decedents	\$2 535 371 134	13.4%
	Subtotal	\$18 957 329 802	100.0%
2014	2015 decedents	\$1 204 327 168	6.4%
2015	Subtotal: 2015 decedents	\$3 739 698 301	19.7%
2015	2016 decedents	\$1 165 667 047	6.1%
2015	Total 2015 cost	\$17 791 662 755	93.9%
	2015 decedents	\$3 739 698 301	21.0%

Medicare’s cost in the last 12 months of EOL patients can be estimated on a current cost basis, by dividing the cost of those members who die in a year by Medicare’s total cost in the year.

As we show in Table 2, allowed cost for those members who died in 2015 is US\$2.5 billion; total allowed cost for 2015 amounted to US\$19.0 billion, resulting in a share of decedents of 13.4%. However, this current cost basis overlooks 2 important adjustments that are necessary to estimate accurately the cost of decedents that takes their final 12 months of costs into consideration:

1. Depending on the date of death in 2015, the last 12 months of a member’s life will include some months in 2014. To estimate the percentage of cost represented by the last 12 months of life of 2015 decedents, it is necessary to add to the 2015 costs their cost in those months in 2014 that are part of the member’s last 12 months. For 2014 decedents, these costs amount to US\$1.4 billion. Without this adjustment, the cost of people dying in 2015 as a percentage of 2015 total costs

Table 3. Average Medicare Expenditures—Outliers Removed.

Year	Inpatient	Carrier	Hospice	Outpatient	SNF	HHA	DME	Total	Members
PMPM 90 days prior to death—outliers removed									
2015	\$5290.62	\$1465.97	\$983.70	\$1054.72	\$1072.38	\$264.04	\$50.26	\$10 181.71	57 767
2016	\$5400.69	\$1485.45	\$1075.28	\$1094.30	\$1045.47	\$269.72	\$42.80	\$10 413.72	56 261
PMPM 180 days prior to death—outliers removed									
2015	\$3378.66	\$1102.26	\$644.64	\$935.67	\$812.92	\$219.29	\$50.86	\$7144.31	57 767
2016	3440.19	\$117.98	\$700.80	\$980.45	\$790.83	\$223.73	\$45.92	\$7299.90	56 261

Abbreviations: SNF, skilled-nursing Facility; HHA, home health Agency; DME, durable medical equipment; PMPM, per member per month.

is 13.4%; adding the full 12 months of costs, the percentage rises to 19.7%.

- In addition to adjusting the numerator of the percentage calculation, we also need to adjust the denominator. The cost of all members in 2015 is US\$19.0 billion. At some point in 2016, some of those costs will be attributed to members who die in 2016. It is therefore appropriate to deduct the 2015 cost of 2016 decedents from the 2015 costs. We reduce the 2015 costs by this amount to reflect the total cost incurred by 2015 decedents and survivors.

With these 2 adjustments, the percentage of Medicare's cost represented by 2015 decedents rises to 21%. This percentage is somewhat lower than that reported by Riley and Lubitz based upon Medicare data between 1978 and 2006,¹ although these authors report a decreasing trend in EOL costs. The percentage is higher than that reported by other authors, likely because we include a full 12 months of final year expenses for decedents and defer the current year's final 12-month costs for those members who die in the following year.

Costs by Type of Service

In order to model the opportunity for Medicare Advantage plans and MSSP ACOs through reducing the cost of EOL care, we investigate recent Medicare EOL expenditures by type of service, using the most recent Medicare LDS data for CY 2015 to 2016. Table 1 shows an analysis of Medicare's cost per decedent by type of service during the 90 and 180 days prior to death, according to the place of death.

Average Medicare expenditures per decedent per month are greater in the last 90 days preceding death versus the last 180 days preceding death, confirming the exponential increase in costs as death approaches. The highest spending occurs in acute hospitals. Care provided in skilled nursing, hospice, and home health care are other major sources of Medicare expenditures. An increasing proportion of Medicare decedents' final care is rendered by hospices. Average Medicare expenditures per decedent per month increased by 2% from 2015 to 2016.

It might be expected that the mean expenditure is influenced by "outliers," which we define as beneficiaries with Medicare expenditures above or below $3.0 \times (Q3 - Q1)$, where $(Q3 - Q1)$ is the interquartile range. However, the results shown in Table 3, when compared to Table 4, show relatively little effect

Table 4. Study Population.^a

Sample Size Description	Member Count
1. All members	3 114 712
2. Non-Medicare advantage members	2 129 432
3. Parts A and part B With >5 months of eligibility	1 668 000
4. Final sample—Members dying between January 1, 2015, and December 31, 2016	114 028

Table 5. Average Cost per Day for Patients Dying in Hospital Compared with Cost per Day in Hospice.

Days Prior to Death	Hospital Cost Per day	Hospice Cost Per day
1-3	\$5983	\$230.74
4-7	638	230.74
8-20	493	190.55
21-40	349	190.55
41-60	267	190.55
60-90	220	190.55
90-130	184	190.55
130-180	156	190.55

on average Medicare payments of removing outliers, implying that people with very high costs are relatively few among all decedents.

Table 5 displays the average Medicare expenditures for patients treated in acute hospitals during the last 180 days of life, compared to the hospice per diem cost. The cost of patients treated in the inpatient setting far exceeds the per diem expenditure for palliative or hospice care. Key to the estimation of potential savings from earlier hospice referral is the reimbursement rates paid by CMS.³⁶ For Fiscal Year 2017 (October 2016 to September 2017), the base rate was US\$190.55; for the last 7 days of life, this rate is boosted by a service intensity add-on of US\$40.19. For the last 7 days of life, total reimbursement is US\$230.74. Thus, savings are possible from admission to hospice within 90 days of death, based on the lower hospice reimbursement rate compared to the average cost of a patient who dies in hospital. With 25% of all Medicare beneficiaries dying in inpatient hospitals, the savings from increased hospice use could be considerable. One challenge, as described by Finkelstein et al,³⁵ is identifying patients who could be eligible for

hospice earlier. An additional challenge is educating patients and families about hospice benefits.

Discussion

Numerous innovative programs and interventions are attempting to help CMS contain Medicare costs. One important statistic for program planning, however, is the ratio between the cost of a patient subpopulation and the number of patients. A relatively high ratio indicates a possible opportunity to reduce overall cost (subject to maintaining quality). Whether the ratio for EOL patients is 2.9 (13.0/4.5), 4.7 (21/4.5), or 5.6 (25/4.5) matters from the perspective of those who are responsible for managing the cost of the program (and particularly risk-taking entities such as MA plans and ACOs). Patients, clinicians, policy analysts, and administrators agree that the most important goal of EOL is to provide services that respect the wishes of the patient and his or her family. Palliative or hospice care can help to ensure that care is concordant with the preferences of patients and their caregivers while at the same time reducing Medicare expenditures. One critical challenge is to provide information to patients and caregivers at an appropriate juncture in a patient's care. A related challenge is to have a discussion between patients and families and providers about treatment options most likely to meet their EOL preferences.

Medicare expenditures increase sharply in the last few days of life, particularly for patients who die in hospital. Recent developments in hospice and palliative care offer the possibility of higher quality care at lower cost to Medicare if patients enter hospice earlier. Finding a lower cost site of care that does not jeopardize patients' wishes is a realistic, worthy goal. Expensive, futile care—especially given in an intensive care unit of an acute hospital—probably does not meet the preferences of most people at the end of life. Identifying those who will benefit from intensive care from those in which aggressive care is likely to be futile and burdensome is a challenge for providers, patients, and families. Published studies show that palliative care services can have a moderating effect on cost while improving quality of care. Examples of studies include the study by Lustbader et al, Center to Advance Palliative Care, and Pham and Krahn, and Smith et al.³⁷⁻⁴⁰ The increased existence of hospital-based palliative care services and the recent development of community-based palliative care programs may help to ensure that care at the EOL is concordant with patient and family goals, while at the same reducing the cost of care.

Conclusion

Beneficiaries at EOL account for a significant portion of Medicare spending. Comparing current year cost of decedents with Medicare's current year costs understates the full budgetary impact of EOL patients. Greater use of hospice and palliative care, with their lower cost per patient, offers the possibility of expense reduction to the Medicare program while also improving quality of life outcomes.


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