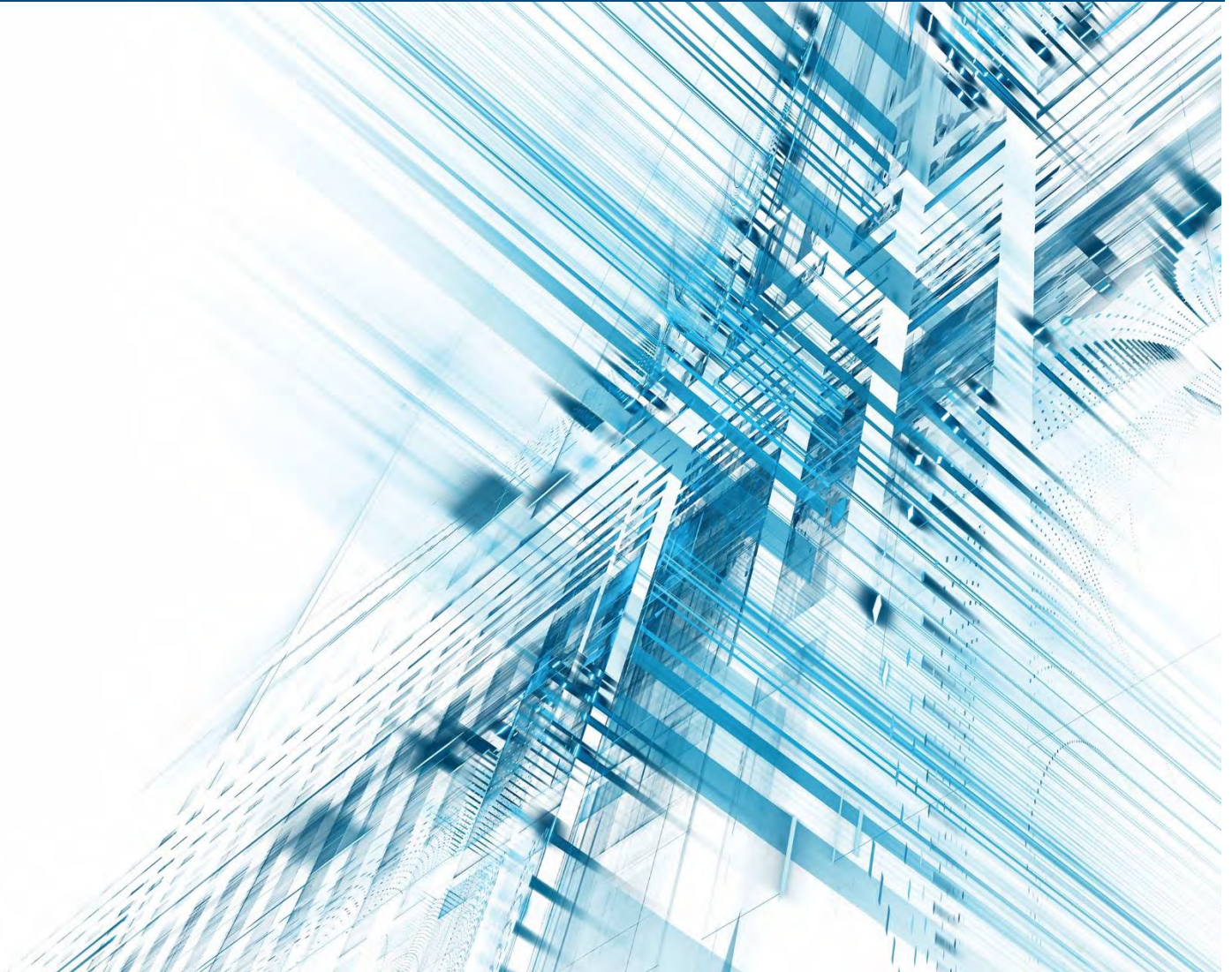


Hospice Care Research

An Analysis of End-of-Life Costs for Terminally Ill
Medicare Fee-for-Service (FFS) Cancer Patients





Hospice Care Research: An Analysis of End-of-Life Costs for Terminally Ill Medicare Fee-for-Service (FFS) Cancer Patients

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Hospice Care Research: An Analysis of End-of-Life Costs for Terminally Ill Medicare Fee-for-Service (FFS) Cancer Patients

Section 1: Report Overview

1.1 Introduction

Aging of the American population prompts questions that often center around the value of health care services, particularly at the end of life. For persons facing death, and the people closest to them, it can be a period of high stress and vulnerability—physically, emotionally and financially. Society must consider the efficient use of resources and the effectiveness of intense care and medical services that may cause more harm than benefit to the patient. A critical question is whether in-home care, and particularly hospice care, can enhance the quality of the remaining days of life while also mitigating the use of costly and often unwanted medical services such as emergency department visits, hospitalizations and days in the Intensive Care Unit (ICU).

Medicare offers a hospice benefit as part of its Fee-for-Service (FFS) program. Hospice is available to Medicare recipients who are diagnosed with a terminal illness and have a life expectancy of less than six months. The goal of hospice is to provide the patient with the care that they need to remain comfortable and pain-free during their remaining days (i.e., palliative care). A secondary benefit of hospice care is that, in most cases, the total cost of end-of-life care is substantially reduced.

The purpose of this research project was to perform a retrospective analysis of the cost of care for deceased cancer patients over the last six months of life and compare the average cost difference between patients who enrolled in hospice versus their non-hospice counterparts. Potential savings were estimated based on increasing hospice participation and also getting late enrollees (i.e., patients that start hospice within a week of their death) into hospice sooner. The analysis was done at both a national and a regional level. The regional analysis uses the 10 regions defined by Centers for Medicare and Medicaid Services (CMS) and, in some instances, the state and metropolitan area.

1.2 Data Sources and Limitations

Four years (2013–2016) of the Medicare 5% Limited Data Set (LDS) was used to complete the analysis. To ensure fair cost comparisons between patients, we utilized the Clinical Risk Groups (CRGs) software developed by 3M to identify cancer patients and group them based on their clinical attributes. Sections 2.1 and 2.2 provide a detailed description of the LDS, how the LDS was applied to the research and the limitations of the LDS that had to be considered when designing the analysis methodology. Sections 2.5 and Appendices A and B provide a detailed description of the CRGs and their application to the analysis.

1.3 Caveats and Limitations

The intent of this research project was strictly to analyze claim costs via the use of the LDS. The research did not consider any factors besides claim costs or any variables that cannot be analyzed from the LDS. Several considerations play a role in the decision for a patient to choose hospice care. Such considerations are ultimately the mutual decision of the patient, the patient's family and/or caretaker and the patient's medical team. It was not the intent of this research to account for or opine on any such considerations.

1.4 Summary of Results

We estimate there is potential for CMS to reduce Medicare FFS medical costs (excluding prescription drugs) by about \$200 million annually through the following two ways:

- Informing qualified patients about the benefits of hospice care who otherwise would not have sought out hospice care and then as a result increasing hospice participation rates.
- Informing patients about the benefits of hospice care upon receiving a qualifying diagnosis and, as a result, getting a portion of patients to take advantage of hospice benefits sooner than they otherwise would have.

The analysis results show that 33% of FFS Medicare-eligible seniors who had Malignancies under Active Treatment were not enrolled in the hospice program prior to their deaths. On average, the non-hospice patients had 25% higher medical costs (excluding prescription drugs) than their hospice-enrolled counterparts over their last six months of life. Assuming that 50% of those patients could have benefited from hospice, we estimate that medical costs could have been reduced by \$120–\$170 million annually. The per patient savings is approximately \$5,000–\$7,000, or 7%–9% of the total cost of care over the six-month period.

The results also show that out of the 67% of deceased patients who had Malignancies under Active Treatment and were enrolled in hospice, 37% were enrolled for less than a week prior to death (i.e., late enrollees). On average, late enrollees had 20% higher costs than their counterparts who had enrolled earlier. Assuming that 50% of those patients could have benefited from enrolling at an earlier date, we estimate an additional savings potential of about \$65 million. The per patient savings is approximately \$4,000 over the last six months, or 5.5% of the total cost of care.

Recognizing that it is not practical to enroll all terminally ill cancer patients into hospice prior to death, the \$120–\$170 million savings estimate assumed there is potential to transition half (50%) of the non-hospice patients. Similarly, the \$65 million savings estimate also assumes that 50% of late enrollees could have been enrolled earlier. The actual potential for transition may be higher or lower, and the resulting cost reduction would change accordingly.

Malignancies under Active Treatment is a term defined by 3M's CRG software that refers to either patients who are hospitalized for chemotherapy or radiation therapy or patients otherwise treated with certain chemotherapy drugs. Appendix A contains a more complete and comprehensive definition of Malignancies under Active Treatment.

Some of the other important findings are the following:

- The claims data suggest that most hospice patients, among the FFS Medicare-eligible seniors, enrolled during a hospitalization. This indicates an opportunity for outreach to such patients to encourage hospice enrollment prior to suffering through a medical episode that leads to a hospitalization. It also indicates an opportunity to begin providing palliative care services prior to a patient's eligibility for hospice, in order to manage pain and symptoms outside of the hospital setting that originate from the ongoing cancer treatment.
- Three cancer types (Lung, Leukemia and Non-Hodgkin's Lymphoma) represented more than 50% of the total potential savings among the patients with Malignancies under Active Treatment. Melanoma and Brain/CNS malignancy had the highest per patient savings potential.
- New York State and the areas of New Jersey near New York City had substantially lower hospice enrollment rates compared to the national average. The low enrollment rates were especially pronounced in New York City and Long Island. The New York City metropolitan area has the most potential for reductions in medical costs because of a combination of the low hospice enrollment rates along with a large cost differential between hospice-enrolled and non-hospice patients.
- California had the highest cost differential (\$34k per patient compared to the national average of \$14k) between hospice-enrolled and non-hospice patients with Malignancies under Active Treatment. The high cost to treat cancer patients in California provides an opportunity to reduce medical costs by encouraging more patients to enroll in hospice and to enroll earlier. This indicates an opportunity for services such as home-based or clinic-based palliative care, provided outside the hospice setting and alongside active treatment, to play a role in encouraging earlier election of hospice once a patient has decided to stop pursuing active treatment.

Section 2: Methodology

2.1 Data Sources and Criteria

Four years (2013–2016) of the Medicare 5% Limited Dataset (LDS) were used for the analysis. Patients were then identified using the following criteria:

1. Age 65 or older
2. Minimum of six months of FFS eligibility prior to death
3. Both Part A and Part B coverage
4. Death date between July 1st and December 31st of the death year
5. CRG category related to a malignant condition

The LDS claims are partitioned into the following data sets based on the type of service rendered:

1. Inpatient Facility
2. Skilled Nursing Facility
3. Home Health Agency
4. Hospice
5. Outpatient Facility
6. Carrier (e.g., professional claims)
7. Durable Medical Equipment

2.2 Data Source Limitations

The LDS has the following limitations:

1. Does not include prescription drug claims
2. Cannot track members across multiple years
 - a. The same members are not included in each of the four years
 - b. Patient identification numbers (IDs) are not consistent between years
3. Does not include Medicare Advantage claims experience
4. CMS does not permit the display of any cell size (e.g., patient count) less than 11 (excluding 0).
 - a. The categories in Tables 6, 12 and 13 were truncated and combined into a single category named “Cells with Fewer than 11 Patients” if any of the patients counts reported were between 1 and 10.
 - b. Table 15-B excludes 11 states because they have hospital patient counts between 1 and 10.

The lack of prescription drug data means that our analysis understated the actual cost of care because we are limited to Part A and Part B services. We thought that it was better to proceed with the analysis excluding prescription drug data rather than attempt to estimate the cost of Part D drugs.

Since we are unable to track patients across multiple years, we had to limit the time horizon of the study period. We thought that the best approach was to identify patients who died in the second half of each year and then capture their claim costs in the six-month period prior to death (see Section 2.3, “Case Series vs. Cohort Study”). We are not attempting to normalize our study results to account for seasonal differences in claim costs or death rate.

The lack of Medicare Advantage claim experience means that our study population understates the number of Medicare-eligible patients who otherwise would have meet the clinical criteria for the study. Medicare Advantage membership substantially varies by region, so our study population is particularly understated in areas where Medicare Advantage plans are more prevalent. We are not attempting to normalize our study results to account for Medicare Advantage populations.

If a Medicare Advantage member enrolls in hospice, they are disenrolled from their Medicare Advantage plan and enrolled in Medicare FFS. The claims that are incurred while enrolled in Medicare FFS are present in the LDS data, but their prior claims incurred while enrolled in a Medicare Advantage plan are not present in the LDS. To capture a full six months of claims experience for each patient in the study, we limited the study to patients who had FFS enrollment for each of the six months prior to death.

2.3 Case Series vs. Cohort Study

The research design is a Case Series analysis, which differs from a Cohort Study. The Case Series analysis identifies patients with the same trigger event (i.e., death) and then retrospectively studies that population for a certain time period prior to the trigger event. On the other hand, a Cohort Study would identify patients with the same trigger event (e.g., first cancer diagnosis) and then prospectively study that population. Because of the limitations of our data source, we were not able to perform a Cohort Study since we cannot track patients across years and cannot identify the first cancer diagnosis for each patient.

2.4 Annualized Savings Estimates

The savings results from the data analysis were multiplied by 5 to project annualized savings (see the calculation below). This is to recognize that our study data contain four years of 5% LDS that are limited to patients who died in the second half of each year. It is not practical to transition all of the non-hospice patients into hospice enrollees. To better capture a reasonable savings estimate, we assume that 50% of the non-hospice patients could have been enrolled. There is no adjustment for medical trends or Consumer Price Index between the years.

Annualized Savings =

$$\begin{aligned}
 & \text{Savings Calculated from the Studied Population} \\
 & \times 2 \text{ (Estimate of a full year of deceased based on six months of deceased in the study)} \\
 & \times 20 \text{ (Estimate of the full FFS Medicare population based on the 5\% LDS in the study)} \\
 & / 4 \text{ (4 years of LDS in the study data)} \\
 & \times 50\% \text{ (Percentage of non-hospice patients transitioned into hospice enrollees)} \\
 & = 5 \times \text{Study Savings}
 \end{aligned}$$

2.5 Clinical Risk Groups (CRGs)

Clinical Risk Groups (CRGs), a product developed by the Health Information Systems Division of 3M, classifies individuals into mutually exclusive hierarchical clinical categories based on diagnostic and procedural history from medical claims data. All diagnosis codes are assigned to a diagnostic category (acute or chronic) and a body system, and all procedure codes are assigned to a procedure category. Every individual is grouped to a hierarchically defined core health status group and then to a CRG category and severity level (if chronically ill).

We chose to use CRGs for this research project because the categories are clinically descriptive and intuitive. Aside from describing the types of malignancy, the CRG also assigns each patient to a health status group and severity of illness. Nine hierarchical statuses describe if the condition is acute or chronic and, if chronic, the presence of comorbidities. If a major chronic condition is present (Status 5–9), up to six severity levels describe the total burden of illness within each status.

For this research we used Software Version 2.0 and the Concurrent (i.e., QCRG) model. There are a total of 1,440 QCRG categories with 362 related to chronic malignancies. The 362 malignancy QCRG categories aggregate into 21 QACRG3 categories that are based on patient health status and severity of illness. We used the QCRG categories to identify malignant patients but then used the QACRG3 categories for most of the cost analysis.

Table 1 shows the number of QCRG categories within each QACRG3 status and severity combination.

Table 1: Number of Concurrent (QCRG) Categories by Health Status and Severity of Illness**Table 1-A: All QCRGs**

Clinical Condition Patient Status	Severity of Illness (QACRG3)							Total
	0	1	2	3	4	5	6	
1) Healthy	18							18
2) History of Significant Acute Disease	22							22
3) Single Minor Chronic Disease		50	50					100
4) Minor Chronic Disease in Multiple Organ Systems		1	1	1	1			4
5) Single Dominant or Moderate Chronic Diseases		91	128	123	57	70	31	500
6) Significant Chronic in Multiple Organ Systems		77	78	79	87	100	47	468
7) Dominant Chronic in 3+ Organ Systems		26	31	28	28	28	27	168
8) Malignancy, Under Active Treatment		24	30	30	24	12		120
9) Catastrophic Conditions		6	7	11	8	4	4	40
Total	40	275	325	272	205	214	109	1,440

Table 1-B: Malignancy QCRGs

Clinical Condition Patient Status	Severity of Illness (QACRG3)						Total
	1	2	3	4	5	6	
5) Single Dominant or Moderate Chronic Diseases	34	32			32	30	128
6) Significant Chronic in Multiple Organ Systems	25	17	17	18	16	9	102
7) Dominant Chronic in 3+ Organ Systems	2	2	2	2	2	2	12
8) Malignancy, Under Active Treatment	24	30	30	24	12		120
Total	85	81	49	44	62	41	362

Observations

- Since there are no comorbidities in Status 5, the QCRG categories map to only four of the QACRG3 severity levels (i.e., severity levels 3 and 4 are not used)
- Status 7 has only two base QCRGs (Malignancy/Diabetes/CHF and Malignancy and 2+ Other Major Chronic Diseases)
- Status 8 has only five QACRG3 severity levels (severity 6 is not used)

Following is a brief description of Statuses 5–8. They are presented in descending order since the status groups are hierarchical.

Status 8: Malignancy, under Active Treatment

Status 8 consists of malignancy patients who are either hospitalized for chemotherapy or radiation therapy, or treated with certain chemotherapy drugs. Appendix A contains a more clinically detailed description of Status 8 malignancies.

Status 7: Dominant Chronic Disease in Three or More Organ Systems

Status 7 consists of patients whose claim history indicates the presence of dominant chronic disease in at least three different organ systems. This category includes malignancies for patients who have at least two other significant chronic diseases but do not fall into Status 8. An example of a Status 7 health condition would be a patient with Lung Malignancy, Congestive Heart Failure (CHF) and Diabetes.

Status 6: Significant Chronic Disease in Multiple Organ Systems

Status 6 consists of patients who do not have three or more dominant chronic diseases but do have multiple chronic diseases with at least one dominant or moderate chronic disease. The CRG categories are described by the primary

conditions of the two most severe organ systems. An example of a Status 6 health condition would be a patient with Lung Malignancy and Diabetes.

Status 5: Single Dominant or Moderate Chronic Disease

Status 5 consists of patients who have a single dominant or moderate chronic disease. This category includes malignancies for patients who do not have any other significant chronic diseases but do not fall into Status 8. An example of a Status 6 health condition would be a patient with Lung Malignancy with no other major comorbidities.

See Appendix A for more detailed information regarding the CRG methodology, and Appendix B for the complete list of the 362 QCRGs used to identify patients for this study.

Section 3: End-of-Life (EOL) Analysis

3.1 Analysis Design

The population of deceased cancer patients was partitioned between those who enrolled in hospice (i.e., hospice enrollees) versus those who did not enroll (i.e., non-hospice). The identification of hospice enrollees was done by analyzing the hospice LDS claim file and creating a unique list of members who had hospice claims. The hospice LDS claim file had a record of each patient's hospice start date.

The hospice enrollees were then subdivided into three groups based on the length of enrollment prior to death. The groupings were the following: (a) Within one week of death (i.e., late enrollees), (b) Longer than one week but less than one month (i.e., mid-duration enrollees) and (c) Longer than one month (i.e., early enrollees). The assignment was based on comparing each patient's death date to their hospice start date.

3M's CRG software was used to group patients into clinically homogenous categories based the status, severity and the most dominant type of cancer present.

The cost analyses include all Part A and Part B allowed charges (i.e., prior to member cost sharing).

3.2 Clinically Homogeneous Groupings Based on QACRG3 Status and Severity

In the study data, we identified 25,264 deceased cancer patients who met our design criteria. The average cost per patient was \$47,470 over the six-month period prior to death.

Tables 2-A to 2-D show the patient counts and corresponding average costs summarized by QACRG3 Status/Severity grid.

- Table 2-A: Patient Counts
- Table 2-B: Average Cost Per Patient
- Table 2-C: Patient Percentages
- Table 2-D: Cost Percentages

Table 2: Deceased Patients by Malignancy QACRG3 Status/Severity
Table 2-A: Patient Count

Core Health Status	Severity of Illness (QACRG3)						Total
	1	2	3	4	5	6	
5) Single Dominant or Moderate Chronic	1,744	685	N/A	N/A	1,656	838	4,923
6) Significant Chronic in Multiple Organ	2,358	2,275	2,678	2,426	1,841	1,193	12,771
7) Dominant Chronic in 3+ Organ Systems	69	246	119	105	106	65	710
8) Malignancy, Under Active Treatment	394	1,145	2,078	2,288	955	N/A	6,860
Total	4,565	4,351	4,875	4,819	4,558	2,096	25,264

Table 2-B: Patient Allocation

Core Health Status	Severity of Illness (QACRG3)						Total
	1	2	3	4	5	6	
5) Single Dominant or Moderate Chronic	6.9%	2.7%	N/A	N/A	6.6%	3.3%	19.5%
6) Significant Chronic in Multiple Organ	9.3%	9.0%	10.6%	9.6%	7.3%	4.7%	50.6%
7) Dominant Chronic in 3+ Organ Systems	0.3%	1.0%	0.5%	0.4%	0.4%	0.3%	2.8%
8) Malignancy, Under Active Treatment	1.6%	4.5%	8.2%	9.1%	3.8%	N/A	27.2%
Total	18.1%	17.2%	19.3%	19.1%	18.0%	8.3%	100.0%

Table 2-C: Average Cost Per Patient (Part A/B Benefits in 6 Months Prior to Death)

Core Health Status	Severity of Illness (QACRG3)						Total
	1	2	3	4	5	6	
5) Single Dominant or Moderate Chronic	\$19,750	\$29,560	N/A	N/A	\$31,810	\$49,520	\$30,240
6) Significant Chronic in Multiple Organ	\$22,970	\$31,540	\$38,690	\$48,660	\$61,550	\$73,960	\$43,000
7) Dominant Chronic in 3+ Organ Systems	\$31,410	\$50,160	\$62,200	\$77,510	\$87,390	\$113,680	\$65,770
8) Malignancy, Under Active Treatment	\$44,680	\$54,920	\$65,100	\$70,360	\$81,380	N/A	\$66,250
Total	\$23,740	\$38,430	\$50,520	\$59,590	\$55,500	\$65,420	\$47,470

Table 2-D: Cost Allocation

Core Health Status	Severity of Illness (QACRG3)						Total
	1	2	3	4	5	6	
5) Single Dominant or Moderate Chronic	2.9%	1.7%	N/A	N/A	4.4%	3.5%	12.4%
6) Significant Chronic in Multiple Organ	4.5%	6.0%	8.6%	9.8%	9.4%	7.4%	45.8%
7) Dominant Chronic in 3+ Organ Systems	0.2%	1.0%	0.6%	0.7%	0.8%	0.6%	3.9%
8) Malignancy, Under Active Treatment	1.5%	5.2%	11.3%	13.4%	6.5%	N/A	37.9%
Total	9.0%	13.9%	20.5%	23.9%	21.1%	11.4%	100.0%

Observations

The QACRG3 Status/Severity grid is 4x6, but we have only 21 groupings since there are no malignancy QACRG3s in Status 5 for Severity 3 or 4 and no Status 8 categories for Severity 6.

From Table 2-B we see that just over half (50.6%) of the patients who were assigned to malignancy QACRG3 categories are assigned to Status 6, meaning that the patients had cancer plus at least one other significant comorbidity. Slightly more than a quarter (27.2%) were assigned to Status 8, meaning that the patients had Malignancies under Active Treatment. Nineteen and a half percent (19.5%) were assigned to Status 5 (no chronic disease other than cancer), and the remaining 2.8% were assigned to Status 7 (cancer plus at least two other dominant comorbidities).

From Table 2-C the average costs per patient tended to increase based on both status and severity. The only exception was that Status 7 has higher costs than Status 8 for Severities 4 and 5; however, Status 7/Severity 4-5 accounts for less than 1% of the total patients. Because average cost increases substantially with status, Status 8 represented 27.2% (Table 2-B) of patients but 37.9% of total costs (Table 2-D).

3.3 Condensing the QACRG3 Status/Severity into Eight Groupings

Tables 3-A to 3-D show the same information as the Table 2 counterparts but collapses the 4x6 grid with 21 groupings into a 3x3 grid with eight groupings:

- Status 6 and 7 are combined: Cancer + one or more Chronic(s)
- Severity 1 and 2 are combined
- Severity 3 and 4 are combined
- Severity 5 and 6 are combined

Table 3: Deceased Patients by Condensed QACRG3 Status/Severity

Table 3-A: Patient Count

Core Health Status	Severity of Illness (QACRG3)			Total
	1-2	3-4	5-6	
Cancer Only	2,429	N/A	2,494	4,923
Cancer + 1 or More Chronic(s)	4,948	5,328	3,205	13,481
Under Active Treatment	1,539	4,366	955	6,860
Total	8,916	9,694	6,654	25,264

Table 3-B: Patient Allocation

Core Health Status	Severity of Illness (QACRG3)			Total
	1-2	3-4	5-6	
Cancer Only	9.6%	N/A	9.9%	19.5%
Cancer + 1 or More Chronic(s)	19.6%	21.1%	12.7%	53.4%
Under Active Treatment	6.1%	17.3%	3.8%	27.2%
Total	35.3%	38.4%	26.3%	100.0%

Table 3-C: Average Cost Per Patient

Core Health Status	Severity of Illness (QACRG3)			Total
	1-2	3-4	5-6	
Cancer Only	\$22,520	N/A	\$37,760	\$30,240
Cancer + 1 or More Chronic(s)	\$28,380	\$44,520	\$68,090	\$44,200
Under Active Treatment	\$52,300	\$67,850	\$81,380	\$66,250
Total	\$30,910	\$55,030	\$58,630	\$47,470

Table 3-D: Cost Allocation

Core Health Status	Severity of Illness (QACRG3)			Total
	1-2	3-4	5-6	
Cancer Only	4.6%	N/A	7.9%	12.4%
Cancer + 1 or More Chronic(s)	11.7%	19.8%	18.2%	49.7%
Under Active Treatment	6.7%	24.7%	6.5%	37.9%
Total	23.0%	44.5%	32.5%	100.0%

Observations

The condensed groupings helped to make the table illustrations more concise while preserving most of the clinical homogeneity between the groupings. The conciseness of the eight groupings has an illustrative advantage over the 21 groupings. As we later partition the data into more groupings in subsequent analyses, the 21 QACRG3 groupings became too cumbersome to illustrate and make easy visual comparisons.

Cost comparisons in subsequent analyses are done using both the eight groupings as well as the 21 groupings (plus two other grouping levels), but for concise illustration, most of the tables in this report use the eight groupings.

3.4 Hospice-Enrolled vs. Non-Hospice Patient Costs

Tables 4-A to 4-C show the same eight groupings as Table 3 but now also split by hospice-enrollees vs. non-hospice enrollees.

- Table 4-A: Patient Counts
- Table 4-B: Average Costs Per Patient
- Table 4-C: Average Cost Difference

Table 4: Average Cost of Patients in Hospice vs. Patients Not in Hospice

Clinical Condition	Non-Hospice: Count				Hospice: Count				Percent with Hospice			
	Severity of Illness (QACRG3)				Severity of Illness (QACRG3)				Severity of Illness (QACRG3)			
Patient Status	1-2	3-4	5-6	Total	1-2	3-4	5-6	Total	1-2	3-4	5-6	Total
Cancer Only	561	NA	779	1,340	1,868	NA	1,715	3,583	76.9%	N/A	68.8%	72.8%
Cancer + 1 or More Chronics	986	1,773	1,358	4,117	3,962	3,555	1,847	9,364	80.1%	66.7%	57.6%	69.5%
Under Active Treatment	400	1,395	454	2,249	1,139	2,971	501	4,611	74.0%	68.0%	52.5%	67.2%
Total	1,947	3,168	2,591	7,706	6,969	6,526	4,063	17,558	78.2%	67.3%	61.1%	69.5%

Clinical Condition	Non-Hospice: Per Patient				Hospice: Per Patient				Hospice/Non-Hospice Relativity			
	Severity of Illness (QACRG3)				Severity of Illness (QACRG3)				Severity of Illness (QACRG3)			
Patient Status	1-2	3-4	5-6	Average	1-2	3-4	5-6	Average	1-2	3-4	5-6	Average
Cancer Only	\$20,100	NA	\$40,790	\$32,130	\$23,250	NA	\$36,380	\$29,530	1.16	N/A	0.89	0.98
Cancer + 1 or More Chronics	\$28,490	\$46,330	\$72,010	\$50,530	\$28,350	\$43,620	\$65,200	\$41,410	1.00	0.94	0.91	0.94
Under Active Treatment	\$56,550	\$81,100	\$86,380	\$77,800	\$50,810	\$61,630	\$76,840	\$60,610	0.90	0.76	0.89	0.80
Total	\$31,840	\$61,640	\$65,140	\$55,290	\$30,650	\$51,820	\$54,470	\$44,030	0.99	0.83	0.90	0.89

Clinical Condition	Per Patient				Aggregate (\$1,000's)				Hospice/Non-Hospice Percent			
	Severity of Illness (QACRG3)				Severity of Illness (QACRG3)				Severity of Illness (QACRG3)			
Patient Status	1-2	3-4	5-6	Average	1-2	3-4	5-6	Total	1-2	3-4	5-6	Total
Cancer Only	(\$3,140)	N/A	\$4,410	\$1,240	(\$1,760)	N/A	\$3,440	\$1,670	-15.7%	N/A	10.8%	3.9%
Cancer + 1 or More Chronics	\$140	\$2,710	\$6,810	\$3,450	\$130	\$4,810	\$9,250	\$14,200	0.5%	5.9%	9.5%	6.8%
Under Active Treatment	\$5,740	\$19,460	\$9,530	\$15,020	\$2,290	\$27,150	\$4,330	\$33,780	10.2%	24.0%	11.0%	19.3%
Total	\$340	\$10,090	\$6,570	\$6,440	\$670	\$31,960	\$17,020	\$49,660	1.1%	16.4%	10.1%	11.7%

Observations

At the bottom right corner of Table 4-A, 69.5% of all patients were enrolled in hospice at some point prior to death. This percentage was mostly consistent across the three status groupings with a slightly higher percentage for the Cancer Only group.

Table 4-B shows the average cost per patient. The totals for the Hospice/Non-Hospice Relativities are mix adjusted to recognize patient count differences between the status/severity mix of hospice and non-hospice patients.

Table 4-C shows the average cost difference between the hospice-enrolled and non-hospice groups. For seven out of eight groupings, the hospice-enrolled groups had lower costs than their non-hospice counterparts, and the cost differential tends to increase substantially with status and severity. The only anomaly was with the Cancer Only/Severity 1–2 group, where the hospice group had higher costs than the non-hospice group.

From the bottom middle of Table 4-C, the aggregate cost difference across all groups was nearly \$50 million (\$49,660k), with more than two-thirds of the cost difference attributed to the patients in the Malignancies under Active Treatment group. It should be noted that although the Malignancies under Active Treatment group represented such a high portion of the total cost difference, it represented only about 29% (2,249/7,706) of all non-hospice. Malignancies under Active Treatment was the only group that exhibited a double-digit percentage cost difference across all three severity groupings. The Severity 3–4 group (within Malignancies under Active Treatment) exhibited the largest cost difference of more than \$27 million (\$27,150k), which represents 24.0% lower costs than the non-hospice counterparts. This group represented 55% (\$27,150k/\$49,660k) of the total cost difference despite representing only 18% (1,395/7,706) of the non-hospice patients.

3.5 Potential Savings Calculation Using Four Different CRG Grouping Scenarios

Table 5 shows cost savings results for four different scenarios. Each scenario represents a different level of grouping of the CRG categories. The purpose of analyzing the cost differences using various grouping levels is because the average cost of each group will differ based on how the groupings are defined. The more refined the groupings, the more clinical homogeneity there is between the hospice-enrolled and non-hospice cohorts that are being compared. However, too much refinement results in the patients being spread too thin across the groups and thus a lack of credibility in the cost comparisons.

The goal is to calculate average cost differences between hospice and non-hospice patients from each grouping within each scenario and then aggregate the cost differences across the groupings. This is the same calculation exercise that was done in Table 4 but is now being done using tables with greater dimension. The results will allow us to observe how sensitive the savings calculations are to changes in grouping levels, and then pick the scenario(s) that offers the best trade-off between clinical refinement and patient volume credibility.

Scenario no. 1: Eight groupings based on the Condensed QACRG3 status and severity (same groupings as Table 4).

Scenario no. 2: 21 groupings based on the QACRG3 status and severity (same groupings from Table 2).

Scenario no. 3: 254 groupings based on the QACRG3 status and severity, plus most dominant cancer type.

Scenario no. 4: 362 groupings based on the QCRG categories.

The detailed cost comparisons along with the respective patient counts for each scenario can be found in Appendix C. Table 5 summarizes the resulting potential savings.

Table 5: Potential Savings Comparison by Grouping Level

Scenario:	Total Savings (\$1,000's)				Savings Per Patient				Percentage of Total			
	#1	#2	#3	#4	#1	#2	#3	#4	#1	#2	#3	#4
No. Groupings:	8	21	254	362								
<u>Status</u>												
5	\$1,670	(\$2,030)	(\$3,000)	(\$3,130)	\$1,240	(\$1,510)	(\$2,240)	(\$2,340)	3.4%	-5.1%	-10.3%	-11.0%
6-7	\$14,200	\$8,660	\$8,690	\$8,290	\$3,450	\$2,160	\$2,170	\$1,850	28.6%	21.6%	29.7%	29.0%
8	\$33,780	\$33,580	\$23,620	\$23,470	\$15,020	\$14,930	\$10,500	\$10,430	68.0%	83.5%	80.6%	82.0%
Study Total	\$49,660	\$40,220	\$29,300	\$28,630	\$6,440	\$5,210	\$3,800	\$3,710	100.0%	100.0%	100.0%	100.0%
	<i>Annualized Savings (Study Savings x 5)</i>											
<u>Status</u>												
5	\$8,360	(\$10,150)	(\$15,040)	(\$15,690)								
6-7	\$71,020	\$43,340	\$43,450	\$41,460								
8	\$168,920	\$167,930	\$118,110	\$117,380								
Annualized	\$248M	\$201M	\$146M	\$143M								

Clinical Grouping Level #1: Condensed Status/Severity
 Clinical Grouping Level #2: Status/Severity
 Clinical Grouping Level #3: Cancer Type and Status/Severity
 Clinical Grouping Level #4: Cancer Category and Status/Severity

Observations

As described in Section 2 on our methodology, the Annualized Savings are calculated as Study Savings times 5. The four scenarios produced a wide range of potential savings results. The annualized savings calculation ranged from \$143 million (Scenario no. 4) to \$248 million (Scenario no. 1), and directionally the results decreased as the patients were split into more groupings. In addition, the calculated savings result was \$432 million (not shown in the table) when no QCRG groupings were used to partition the patients prior to comparing average costs.

The results show that the savings calculation is very sensitive to the use of QCRGs to group the patients (\$432 million savings without QCRGs to \$248 million with eight groupings) and also sensitive to the level of QCRG grouping. The sensitivity plateaus with Scenario no. 3 because there was only a \$3 million marginal difference in annual savings by increasing from 254 to 362 groupings.

We believe that Scenario no. 2 (21 groupings based on QACRG3 status/severity) provided for the best compromise of clinical homogeneity and credibility, but Scenario no. 3 (254 groupings based on QACRG3 status/severity, plus cancer type) was the most clinically practical because it provided a sense of which types of cancer may yield the most savings.

Based on the above results, and our analysis of preferred scenarios, there was an annual savings potential of between \$146 million (Scenario no. 3) and \$201 million (Scenario no. 2) across all of the clinical status categories.

Malignancies under Active Treatment (Status 8) represented more than 80% of the total potential savings in both Scenarios no. 2 and no. 3. Due to the aggressiveness of the malignancy in Status 8 patients, and the disproportional amount of potential savings, we believe that patients in the Malignancies under Active Treatment category are the patients who can benefit the most from hospice care. The annualized savings for enrolling all Status 8 patients would have been between \$118 million (scenario no. 3) and \$168 million (scenario no. 2). *Rounding to the nearest \$10 million yields savings estimates ranging from \$120–\$170 million annually.*

3.6 Potential Savings for the Malignancies under Active Treatment Group by Cancer Type

Table 6 shows the savings potential for Malignancies under Active Treatment by the most dominant cancer present. The total savings found in this table is the same total savings as Scenario no. 3 from Table 5 and is aligned with the low end of the savings range that was previously stated. Results are listed in descending order by the total amount of potential savings.

Table 6: CRG Status 8 — Potential Savings by Cancer Type (from Scenario No. 3)

<u>Cancer Type</u>	<u>Non-Hospice Patients</u>	<u>Per Patient Savings</u>	<u>Study Savings (\$1,000's)</u>	<u>Annualized (\$1,000's)</u>	<u>Percent of Total Savings</u>
Lung	621	\$9,920	\$6,160	\$30,830	26.1%
Lymphoma (Non-Hodgkins)	240	\$12,940	\$3,100	\$15,530	13.2%
Leukemia	186	\$16,430	\$3,050	\$15,280	12.9%
Melanoma	40	\$43,200	\$1,720	\$8,640	7.3%
ENT	123	\$11,580	\$1,420	\$7,120	6.0%
Breast	169	\$6,930	\$1,170	\$5,850	5.0%
Pancreatic	163	\$6,920	\$1,120	\$5,640	4.8%
Esophageal	88	\$11,520	\$1,010	\$5,070	4.3%
Myeloma	131	\$6,860	\$890	\$4,490	3.8%
Brain/CNS	25	\$30,830	\$770	\$3,850	3.3%
Ovarian	71	\$10,770	\$760	\$3,820	3.2%
Colon	157	\$4,100	\$640	\$3,220	2.7%
Prostate	97	\$5,490	\$530	\$2,660	2.3%
Genitourinary	27	\$15,070	\$400	\$2,030	1.7%
Stomach	41	\$9,130	\$370	\$1,870	1.6%
Kidney	20	\$13,190	\$260	\$1,310	1.1%
Cells with less than 11 Patients	50	\$17,830	\$160	\$830	0.7%
Total	2,249	\$10,500	\$23,620	\$118,110	100.0%

Observations

The top three cancer types (Lung, Non-Hodgkin’s Lymphoma and Leukemia) represent more than half (52.2%) of the total potential savings. Lung cancer had the highest potential annualized savings of \$30.83 million. The average savings per patient was less than \$10k (\$9,920), but it ranked at the top due to consisting of 27.6% (621/2,249) of all non-hospice patients. Non-Hodgkin’s Lymphoma and Leukemia ranked second and third. Melanoma (\$43,200) and Brain/CNS malignancy (\$30,830) had the highest per patient savings potential but ranked outside of the top 3 because of low non-hospice patient volume.

3.7 Cost Comparison Based on Hospice Duration

All the cost comparisons and savings analysis in the prior sections did not account for the length of hospice enrollment prior to death. The duration of hospice enrollment varied widely by patient. Table 7 shows a distribution of days for cancer patients in hospice prior to death.

Table 7: Hospice Duration

<u>Percent</u>	<u>Days</u>	<u>Note</u>
10%	1.4	
25%	4.9	
50%	17	Median
68%	39	Average
75%	53	
90%	137	

Observations

Twenty-five percent of hospice enrollees were enrolled less than five days prior to death, and 50% were enrolled less than 2 ½ weeks (17 days). Since some patients enroll in hospice earlier during treatment, and live longer, the average enrollment duration of 39 days is substantially longer than the median duration of 17 days. More than two out of every three hospice enrollees were enrolled for fewer days than the average.

Length of life post-enrollment in hospice can vary widely because enrollment in hospice is often based on a balance between estimated life expectancy by a physician and the patient’s desire to continue fighting the disease. Medicare patients are eligible for hospice if they have been diagnosed as terminal with a prognosis of less than six months. The prognosis is an estimate based on the clinical estimate of the physician, but some patients will live much longer than expected while others will die much sooner than expected.

3.8 Three Groupings of Hospice Duration for Malignancies under Active Treatment (Scenario no. 1)

Table 8 shows the same information from Table 3 (eight groupings) but splits the hospice-enrolled patients into three categories based on their respected enrollment duration.

Hospice Duration Groupings:

- **T > 1 mo:** Patients enrolled in hospice longer than one month (early enrollees)
- **1 wk < T < 1 mo:** Patients enrolled longer than one week but less than one month week (mid-duration enrollees)
- **T < 1 wk:** Patients enrolled less than one week (late enrollees)
- **Never:** Patients who were never enrolled in hospice

Table 8: Average Cost of Status 8 Patients by Hospice Enrolled Duration (from Scenario No. 1)

Table 8-A: Hospice Patients Count

Severity	Hospice Enrollment Time Prior to Death				Total
	T > 1mo	1wk < T < 1mo	T < 1wk	Never	
1-2	407	425	307	400	1,539
3-4	750	1,070	1,151	1,395	4,366
5-6	108	164	229	454	955
Total	1,265	1,659	1,687	2,249	6,860

Table 8-B: Average Cost of Hospice Patient

Severity	Hospice Enrollment Time Prior to Death				Average
	T > 1mo	1wk < T < 1mo	T < 1wk	Never	
1-2	\$41,980	\$54,090	\$57,960	\$56,550	\$52,300
3-4	\$53,040	\$60,820	\$68,000	\$81,100	\$67,850
5-6	\$65,900	\$71,180	\$86,060	\$86,380	\$81,380
Total	\$50,580	\$60,120	\$68,620	\$77,800	\$66,250

Table 8-C: Potential Savings Grid

Hospice Duration	Potential Duration			
	Never	T < 1wk	1wk < T < 1mo	T > 1mo
Never		\$17.9M	\$36.2M	\$54.3M
T < 1wk			\$12.9M	\$26.7M
1wk < T < 1mo				\$14.3M
T > 1mo				

Observations

- Table 8-A shows the number of patients in each severity group, how many went into hospice and at what point prior to death. There is a distinct pattern that the higher the severity level, the less likely the patient was to enroll in hospice, and if they did enroll, they enrolled closer to death.
- Table 8-B illustrates that average costs tended to increase the closer to death the patient enrolled in hospice and were most costly if they had never enrolled.
- Table 8-C illustrates a grid of potential savings if patients had enrolled in hospice earlier. This grid shows that not only was there savings potential by enrolling the non-hospice group, but there was also savings potential if the groups that did enroll were enrolled earlier. *If 50% of the late enrollees were to enroll mid-duration, the annualized potential savings would have been \$64.5 million (\$12.9M × 5).*

3.9 Hospice Enrollment Triggers

We wanted to investigate weekly claim costs by timing of hospice enrollment to determine if there were any noticeable claim patterns leading up to hospice enrollment and thereafter.

We analyzed average costs per patient in a two-dimensional grid:

1. Weekly Costs for 15 Weeks Prior to Death (vertical axis)
2. Number of Weeks Enrolled in Hospice Prior to Death (horizontal axis)

For illustrative purposes we limited Table 9 to patients that started their hospice enrollment no more than 13 weeks prior to death.

Table 9-A shows the average costs of all Part A and Part B services. The diagonal (highlighted blue) represents the week the patients enrolled in hospice. Cells above and to the right of the highlighted line represent average weekly costs prior to hospice care, and cells below and to the left represent costs while in hospice care.

Table 9-A: All Part A and Part B Medical Costs (QACRG3 Status 5-8)

Week No.	Weeks Enrolled in Hospice Prior to Death													
	13	12	11	10	9	8	7	6	5	4	3	2	1	Never
15	\$1,820	\$1,320	\$1,420	\$1,310	\$1,120	\$1,430	\$1,430	\$1,190	\$1,360	\$1,050	\$1,340	\$1,250	\$1,180	\$1,220
14	\$2,350	\$1,410	\$1,400	\$1,590	\$1,190	\$1,440	\$1,140	\$1,530	\$1,240	\$1,440	\$1,260	\$1,360	\$1,370	\$1,250
13	\$3,550	\$1,740	\$1,880	\$1,550	\$1,330	\$1,280	\$1,200	\$1,280	\$1,520	\$1,480	\$1,360	\$1,360	\$1,330	\$1,320
12	\$480	\$3,580	\$2,090	\$1,990	\$1,830	\$1,750	\$1,490	\$1,400	\$1,710	\$1,500	\$1,370	\$1,370	\$1,300	\$1,440
11	\$630	\$500	\$4,220	\$1,810	\$1,620	\$1,690	\$1,610	\$1,810	\$1,560	\$1,480	\$1,420	\$1,450	\$1,460	\$1,490
10	\$900	\$680	\$510	\$4,810	\$2,240	\$1,720	\$1,820	\$1,790	\$1,810	\$1,700	\$1,600	\$1,460	\$1,440	\$1,500
9	\$1,410	\$1,150	\$850	\$410	\$4,450	\$1,950	\$2,190	\$1,710	\$1,830	\$1,780	\$1,730	\$1,610	\$1,630	\$1,660
8	\$1,380	\$1,030	\$940	\$890	\$510	\$4,940	\$1,890	\$1,890	\$2,000	\$1,880	\$1,730	\$1,760	\$1,850	\$1,800
7	\$1,090	\$1,470	\$1,150	\$1,010	\$820	\$470	\$4,300	\$2,250	\$1,990	\$2,020	\$1,920	\$1,900	\$1,890	\$1,950
6	\$1,380	\$1,220	\$1,230	\$1,350	\$1,020	\$760	\$420	\$5,200	\$2,490	\$1,950	\$2,440	\$1,970	\$2,030	\$2,080
5	\$1,420	\$1,350	\$1,350	\$1,190	\$1,430	\$1,030	\$760	\$500	\$5,410	\$2,380	\$2,130	\$2,250	\$2,300	\$2,260
4	\$1,310	\$1,190	\$1,300	\$1,670	\$1,300	\$1,290	\$1,030	\$860	\$510	\$5,300	\$2,580	\$2,640	\$2,560	\$2,410
3	\$1,540	\$1,250	\$1,250	\$1,220	\$1,340	\$1,340	\$1,270	\$990	\$800	\$520	\$6,520	\$3,200	\$2,990	\$2,930
2	\$1,300	\$1,300	\$1,260	\$1,190	\$1,510	\$1,290	\$1,280	\$1,160	\$1,130	\$960	\$540	\$8,010	\$3,660	\$3,540
1	\$4,440	\$4,330	\$4,700	\$4,450	\$4,330	\$4,560	\$4,510	\$4,370	\$4,510	\$4,090	\$3,720	\$3,120	\$12,260	\$16,280
6 mo Total	\$37,940	\$34,370	\$39,150	\$41,910	\$38,020	\$38,670	\$37,690	\$40,600	\$40,610	\$41,650	\$43,160	\$46,620	\$50,820	\$54,290

Observations

There was a distinct pattern of claims spiking during the week of hospice enrollment week followed by a sharp drop in claims the following week and then a final spike in claims during the last week of life. The spike in claims during the week of hospice enrollment suggests there is a high likelihood of correlation between hospice enrollment timing and the occurrence of a major medical episode. In Table 9-B we isolate Inpatient Facility claims to determine if there is a noticeable pattern of inpatient claims relative to the week of hospice enrollment.

Table 9-B shows the same grid as Table 9-A but focuses exclusively on Inpatient Facility claims. Costs related to the other six LDS claim files (Skilled Nursing, Home Health, Hospice, Outpatient Facility, Carrier and DME) are excluded.

Table 9-B: Part A Hospital Inpatient Costs (QACRG3 Status 5-8)

Week No.	Weeks Enrolled in Hospice Prior to Death (Part A Hospital Inpatient Costs)													Never
	13	12	11	10	9	8	7	6	5	4	3	2	1	
15	\$560	\$440	\$460	\$410	\$300	\$600	\$600	\$380	\$430	\$270	\$430	\$390	\$350	\$400
14	\$1,170	\$480	\$310	\$660	\$410	\$470	\$290	\$520	\$550	\$490	\$400	\$510	\$480	\$420
13	\$2,390	\$640	\$610	\$590	\$460	\$290	\$380	\$400	\$730	\$500	\$520	\$410	\$470	\$510
12	\$50	\$2,430	\$730	\$920	\$810	\$720	\$490	\$540	\$730	\$530	\$470	\$480	\$440	\$600
11	\$0	\$70	\$2,720	\$680	\$500	\$700	\$460	\$830	\$620	\$550	\$530	\$530	\$490	\$600
10	\$30	\$0	\$60	\$3,110	\$960	\$730	\$780	\$780	\$800	\$580	\$670	\$480	\$510	\$560
9	\$0	\$210	\$140	\$0	\$3,200	\$810	\$1,030	\$660	\$740	\$640	\$680	\$570	\$640	\$710
8	\$140	\$0	\$130	\$90	\$30	\$3,580	\$820	\$880	\$820	\$820	\$690	\$670	\$790	\$780
7	\$120	\$260	\$0	\$90	\$120	\$40	\$2,920	\$950	\$800	\$880	\$830	\$730	\$840	\$880
6	\$40	\$0	\$80	\$40	\$70	\$60	\$10	\$3,740	\$1,040	\$660	\$1,280	\$830	\$930	\$920
5	\$130	\$80	\$40	\$40	\$190	\$20	\$90	\$60	\$3,860	\$880	\$900	\$1,010	\$1,080	\$1,080
4	\$180	\$90	\$40	\$140	\$120	\$90	\$90	\$100	\$30	\$3,700	\$1,020	\$1,270	\$1,280	\$1,080
3	\$300	\$80	\$30	\$110	\$20	\$120	\$40	\$70	\$80	\$50	\$4,830	\$1,450	\$1,410	\$1,460
2	\$190	\$150	\$60	\$20	\$220	\$50	\$40	\$60	\$160	\$100	\$70	\$6,110	\$1,700	\$1,760
1	\$610	\$450	\$440	\$330	\$320	\$320	\$340	\$320	\$340	\$270	\$200	\$140	\$8,710	\$13,140
6 mo Total	\$10,310	\$8,220	\$9,810	\$13,210	\$11,750	\$12,380	\$11,420	\$14,510	\$14,890	\$14,390	\$16,800	\$19,170	\$23,710	\$28,590

Observations

The claim spike observed in Table 9-A was magnified when focusing on inpatient claims. There was a clear and substantial claim spike in Inpatient Facility claims during the week of hospice enrollment. For the patients who did not enroll in hospice, there was a very big claim spike during the last week of life. A fairly stable pattern is seen along the blue diagonal, which suggests the closer to death a patient waits to enroll in hospice, the higher the cost of the hospitalization. That pattern is especially noticeable starting at three weeks prior to death. We find an average hospitalization cost of \$4,830 for patients who enroll into hospice within three weeks prior to death, \$6,110 within two weeks prior to death, \$8,710 within one week of death and \$13,140 for those who never enroll.

Table 9-C calculates the Inpatient Hospital claims as a percentage of total claims.

Table 9-C: Part A Hospital Inpatient as Percent of Total Cost (QACRG3 Status 5-8)

Week No.	Weeks Enrolled in Hospice Prior to Death (Part A Hospital Inpatient Costs)													Never
	13	12	11	10	9	8	7	6	5	4	3	2	1	
15	31%	33%	32%	32%	27%	42%	42%	32%	32%	26%	32%	31%	30%	33%
14	50%	34%	23%	42%	35%	33%	26%	34%	45%	34%	32%	38%	35%	34%
13	67%	37%	33%	39%	35%	23%	32%	31%	48%	34%	38%	30%	36%	39%
12	11%	68%	35%	46%	44%	41%	33%	39%	43%	36%	34%	36%	34%	42%
11	0%	15%	64%	37%	31%	42%	29%	46%	40%	37%	37%	36%	34%	40%
10	4%	0%	13%	65%	43%	43%	43%	44%	44%	34%	42%	33%	36%	37%
9	0%	19%	16%	0%	72%	42%	47%	39%	41%	36%	40%	36%	39%	43%
8	10%	0%	15%	11%	7%	73%	44%	47%	41%	43%	40%	38%	43%	43%
7	11%	18%	0%	9%	15%	10%	68%	42%	40%	44%	43%	39%	45%	45%
6	4%	0%	6%	3%	8%	9%	3%	72%	42%	34%	53%	42%	46%	44%
5	9%	6%	3%	4%	13%	3%	13%	14%	71%	37%	42%	45%	47%	48%
4	14%	8%	4%	8%	9%	7%	9%	12%	7%	70%	40%	48%	50%	45%
3	20%	7%	3%	9%	2%	10%	4%	7%	11%	11%	74%	45%	47%	50%
2	15%	12%	5%	2%	15%	5%	4%	5%	15%	10%	13%	76%	46%	50%
1	14%	11%	10%	7%	8%	7%	8%	7%	8%	7%	6%	5%	71%	81%
6 mo Total	27%	24%	25%	32%	31%	32%	30%	36%	37%	35%	39%	41%	47%	53%

Observations

Table 9-C shows that inpatient claims represented approximately 70% of total claims for the hospice enrollment week. These results confirm a large correlation between hospitalization and hospice enrollment. The claim patterns confirm the clinical reasoning that a hospitalization represents the time when relevant parties (the patient, patient’s family, patient’s physician, chaplain and hospice case worker) were together to discuss end-of-life options and make decisions.

For all enrollment cohorts, there was a substantial claim spike in the final week of life, but the spike was especially large in the patient groups that either never enrolled in hospice or enrolled in their final week that is driven by hospitalization costs.

Table 10 shows the costs in the final week of life as a percentage of total costs in the last six months of life by enrollment duration cohort.

Table 10: Percent of Claims in Final Week

<u>Weeks</u> <u>Enrolled</u>	<u>Patient</u> <u>Count</u>	<u>Final</u> <u>Week</u>	<u>26 Week</u> <u>Total</u>	<u>% Claims in</u> <u>Final Week</u>
26+	1,221	\$4,650	\$33,260	14%
17-26	1,045	\$4,360	\$37,270	12%
12-16	1,057	\$4,390	\$37,490	12%
9-11	1,009	\$4,470	\$39,630	11%
7-8	1,049	\$4,530	\$38,140	12%
5-6	1,634	\$4,470	\$40,770	11%
4	1,132	\$4,090	\$41,980	10%
3	1,645	\$3,720	\$43,740	9%
2	2,787	\$3,130	\$47,260	7%
1	4,991	\$12,350	\$51,430	24%
0	7,724	\$16,520	\$55,240	30%

Observations

Aside from the groups that either never enrolled or enrolled in their final week, the average cost per durational cohort ranged between \$3,130 (two weeks enrolled) and \$4,650 (26+ weeks enrolled) in the final week of life. The three cohorts with the lowest average cost in the final week are the patients who enrolled two weeks (\$3,130), three weeks (\$3,720) and four weeks (\$4,090) prior to death (all mid-duration enrollees). We were not able to isolate a determining factor that explains the dip in final week average claims for mid-duration hospice enrollees, but nonetheless it is a significant finding.

Final week average costs were substantially higher for the group that enrolled in hospice during the week of their death (\$12,350) and for the group that never enrolled in hospice (\$16,520). The cost incurred in the final week for these two groups represented 24% and 30%, respectively, of the total costs incurred over the last 26 weeks of life. For all the other cohorts, the costs in the final week ranged between 7% (2 weeks enrolled) and 14% (26+ weeks enrolled) of the 26-week total.

Section 4: Regional Cost Analysis

4.1 Analysis Design and CMS Region Definitions

The purpose of the regional analysis was to determine if there are substantial differences in the costs and enrollment of end-of-life treatment for cancer patients by geographic region. This analysis was completed by splitting the data into the same eight condensed QACRG3 status/severity categories as in the end-of-life analysis, but now also splitting the data by the 10 CMS regions. Different levels of geographic splits were explored, but for credibility reasons we thought that using the 10 CMS regions would be appropriate.

- 1. Region 1 (New England)**
 - 1.1. Connecticut (CT)
 - 1.2. Massachusetts (MA)
 - 1.3. Maine (ME)
 - 1.4. New Hampshire (NH)
 - 1.5. Rhode Island (RI)
 - 1.6. Vermont (VT)
- 2. Region 2 (NY/NJ)**
 - 2.1. New Jersey (NJ)
 - 2.2. New York (NY)
 - 2.3. Puerto Rico (PR)
- 3. Region 3 (Mid-Atlantic)**
 - 3.1. District of Columbia (DC)
 - 3.2. Delaware (DE)
 - 3.3. Maryland (MD)
 - 3.4. Pennsylvania (PA)
 - 3.5. Virginia (VA)
 - 3.6. West Virginia (WV)
- 4. Region 4 (Southeast)**
 - 4.1. Alabama (AL)
 - 4.2. Florida (FL)
 - 4.3. Georgia (GA)
 - 4.4. Kentucky (KY)
 - 4.5. Mississippi (MS)
 - 4.6. North Carolina (NC)
 - 4.7. South Carolina (SC)
 - 4.8. Tennessee (TN)
- 5. Region 5 (North Central)**
 - 5.1. Illinois (IL)
 - 5.2. Indiana (IN)
 - 5.3. Michigan (MI)
 - 5.4. Minnesota (MN)
 - 5.5. Ohio (OH)
 - 5.6. Wisconsin (WI)
- 6. Region 6 (South Central)**
 - 6.1. Arkansas (AR)
 - 6.2. Louisiana (LA)
 - 6.3. New Mexico (NM)
 - 6.4. Oklahoma (OK)
 - 6.5. Texas (TX)
- 7. Region 7 (Central)**
 - 7.1. Iowa (IA)
 - 7.2. Kansas (KS)
 - 7.3. Missouri (MO)
 - 7.4. Nebraska (NE)
- 8. Region 8 (Rockies)**
 - 8.1. Colorado (CO)
 - 8.2. Montana (MT)
 - 8.3. North Dakota (ND)
 - 8.4. South Dakota (SD)
 - 8.5. Utah (UT)
 - 8.6. Wyoming (WY)
- 9. Region 9 (Southwest)**
 - 9.1. Arizona (AZ)
 - 9.2. California (CA)
 - 9.3. Hawaii (HI)
 - 9.4. Nevada (NV)
- 10. Region 10 (Northwest)**
 - 10.1. Alaska (AK)
 - 10.2. Idaho (ID)
 - 10.3. Oregon (OR)
 - 10.4. Washington (WA)

Hospice enrollees were also subdivided between those who received hospice care in a hospital-based setting versus those who received it in a non-hospital-based setting.

4.2 Patient Counts and Hospice Enrollment by CMS Region

Table 11-A displays the total count of deceased cancer patients by the 10 regions. In addition to the patient counts, we also include two other statistics at the bottom of the table. The second row from the bottom shows the percentage of all deceased patients from the LDS who are represented in this study, and then the bottom row shows the overall decedent rate of the entire LDS population.

Table 11: Patient Counts by CMS Region

Table 11-A: Total Patient Counts

Status	Severity	CMS Regions										Total
		1	2	3	4	5	6	7	8	9	10	
Cancer Only	1-2	129	158	260	514	430	268	153	102	270	145	2,429
Cancer Only	5-6	120	224	271	523	422	282	151	89	287	125	2,494
Cancer + 1 or More Chronics	1-2	280	408	548	1,090	888	549	318	166	488	213	4,948
Cancer + 1 or More Chronics	3-4	338	500	570	1,226	921	610	328	143	526	166	5,328
Cancer + 1 or More Chronics	5-6	206	337	429	693	578	326	156	57	337	86	3,205
Under Active Treatment	1-2	92	131	178	346	220	178	110	50	175	59	1,539
Under Active Treatment	3-4	266	466	470	977	733	501	237	123	424	169	4,366
Under Active Treatment	5-6	58	97	93	211	191	117	48	18	90	32	955
Total Deceased Cancer Patients		1,489	2,321	2,819	5,580	4,383	2,831	1,501	748	2,597	995	25,264
<i>Cancer Deceased as % of All Deceased (all causes)</i>		20.9%	21.0%	21.0%	19.6%	20.0%	19.3%	20.3%	19.3%	20.7%	20.9%	20.2%
<i>All Deceased as % of Senior Population</i>		4.9%	4.8%	4.9%	5.0%	5.2%	5.0%	5.2%	4.6%	4.3%	4.6%	4.9%

Observations

Table 11-A shows substantial variance in the number of deceased cancer patients by region. However, these counts do not provide much meaningful insight unless they are normalized to consider regional variations in overall population.

The regional number of deceased patients was also affected by the prevalence of Medicare Advantage enrollment in the region. As stated in our methodology, Medicare Advantage patients were excluded from this analysis; therefore our analysis will understate the number of deceased cancer patients, and the understatement will vary depending on the maturity of the Medicare Advantage market in each region.

To provide more meaning to the patient counts, we included the additional statistics in the bottom two rows (all statistics derived from the LDS):

1. Deceased cancer patients as a percentage of all deceased patients
2. All deceased patients as a percentage of total senior population

There was very little variation in these two statistics across the regions. Cancer patients represented 20.2% of all deceased patients, and each region is within 1% of the average (range of 19.3%–21.0%).

Deceased patients (all causes) represented 4.9% of all seniors with regions ranging from 4.3% to 5.2%. Only Region 9 (Southwest states) was more than 0.3% lower than the average.

Table 11-B shows the percentage of deceased cancer patients who were enrolled in hospice. The last line of the table also displays the percentage of all (not just cancer) deceased patients who were enrolled in hospice.

Table 11-B: Hospice Patient Percents

Status	Severity	CMS Regions										Total
		1	2	3	4	5	6	7	8	9	10	
Cancer Only	1-2	72.9%	67.1%	80.0%	78.2%	77.4%	81.3%	79.1%	69.6%	77.4%	73.1%	76.9%
Cancer Only	5-6	67.5%	59.4%	68.6%	73.6%	73.7%	71.6%	72.2%	55.1%	67.6%	52.0%	68.8%
Cancer + 1 or More Chronics	1-2	76.4%	69.9%	81.6%	81.2%	81.0%	84.2%	80.2%	78.9%	81.1%	78.9%	80.1%
Cancer + 1 or More Chronics	3-4	64.2%	58.8%	67.2%	69.8%	68.2%	67.7%	69.5%	67.8%	63.5%	63.3%	66.7%
Cancer + 1 or More Chronics	5-6	54.4%	45.4%	58.0%	59.9%	63.1%	58.6%	64.1%	54.4%	54.6%	54.7%	57.6%
Under Active Treatment	1-2	69.6%	67.9%	74.7%	77.2%	78.6%	76.4%	73.6%	74.0%	71.4%	57.6%	74.0%
Under Active Treatment	3-4	68.0%	56.9%	72.1%	70.4%	72.3%	66.1%	70.9%	65.9%	61.8%	74.6%	68.0%
Under Active Treatment	5-6	53.4%	42.3%	49.5%	57.3%	51.8%	53.8%	47.9%	50.0%	56.7%	53.1%	52.5%
Deceased Cancer Patients in Hospice		66.8%	58.9%	70.6%	72.0%	72.1%	71.2%	72.3%	67.6%	67.6%	67.1%	69.5%
<i>All Deceased Patients in Hospice</i>		<i>49.8%</i>	<i>37.7%</i>	<i>49.9%</i>	<i>54.1%</i>	<i>54.4%</i>	<i>54.9%</i>	<i>54.8%</i>	<i>49.0%</i>	<i>49.8%</i>	<i>49.5%</i>	<i>51.4%</i>

Observations

Across all regions, 69.5% of deceased cancer patients and 51.4% of all deceased were enrolled in hospice. Except for Region 2, the other regions were consistent, ranging from 66.8% to 72.3% hospice enrollment rates for deceased cancer patients, and 49.0% to 54.9% hospice enrollment rates for all deceased patients. Region 2 had substantially lower hospice enrollment rates of 58.9% for deceased cancer patients and 37.7% for all deceased patients. Those rates were 10.6 and 13.7 percentage points lower than their respective averages. Our analysis shows that Region 2 is an outlier in terms of hospice enrollment rates.

4.3 Region 2 (New York/New Jersey) Hospice Enrollment Rates

Table 11-B shows that Region 2 had substantially lower hospice enrollment rates than all the other regions. This warrants deeper analysis into the hospice enrollment rates for Region 2. Table 12 delves deeper into the Region 2 hospice enrollment rates by showing patient counts by state and metropolitan area within each state.

Table 12: CMS Region 2 Patient Counts and Hospice Enrollment Rates by State and Metropolitan Area

State	Metropolitan Area	Cancer Deceased				All Deceased			
		Hospice	Non-Hospice	Total	% Hospice	Hospice	Non-Hospice	Total	% Hospice
NJ	Camden, NJ	85	40	125	68.0%	303	292	595	50.9%
NJ	Edison-New Brunswick, NJ	174	101	275	63.3%	582	637	1,219	47.7%
NJ	New York-White Plains-Wayne, NY-NJ	108	69	177	61.0%	347	505	852	40.7%
NJ	Newark-Union, NJ-PA	116	61	177	65.5%	371	466	837	44.3%
NJ	Trenton-Ewing, NJ	22	12	34	64.7%	86	109	195	44.1%
NJ	Cells with less than 11 Patients	60	28	88	68.2%	231	196	427	54.1%
NY	Albany-Schenectady-Troy, NY	36	17	53	67.9%	122	202	324	37.7%
NY	Buffalo-Niagara Falls, NY	42	24	66	63.6%	123	192	315	39.0%
NY	Nassau-Suffolk, NY	165	110	275	60.0%	500	800	1,300	38.5%
NY	New York-White Plains-Wayne, NY-NJ	281	299	580	48.4%	822	1,823	2,645	31.1%
NY	Poughkeepsie-Newburgh-Middletown, NY	37	34	71	52.1%	92	202	294	31.3%
NY	Rochester, NY	35	13	48	72.9%	98	122	220	44.5%
NY	Syracuse, NY	29	24	53	54.7%	73	210	283	25.8%
NY	U a-Rome, NY	16	17	33	48.5%	28	141	169	16.6%
NY	Not Part of a Metropolitan Area	93	56	149	62.4%	235	565	800	29.4%
NY	Cells with less than 11 Patients	48	35	83	57.8%	105	275	380	27.6%
PR	Total	19	15	34	55.9%	42	141	183	23.0%
NJ	Total	565	311	876	64.5%	1,920	2,205	4,125	46.5%
NY	Total	782	629	1,411	55.4%	2,198	4,532	6,730	32.7%
CMS Region #2 Grand Total		1,366	955	2,321	58.9%	4,160	6,878	11,038	37.7%

Observations

The number of deceased in Puerto Rico was very small and did not contribute substantially to the Region 2 total, with only 1.5% of the deceased patients.

New Jersey represented 37.7% (876/2,321) of deceased cancer patients and 37.3% (4,125/11,038) of all deceased patients in Region 2. Hospice enrollment rates were about five percentage points lower than the national average for both deceased cancer patients and all deceased patients. The areas of northern New Jersey that are close to the New York City metropolitan area appeared to be the driver of the lower hospice enrollment rates in New Jersey.

New York represented 60.8% (1,411/2,321) of cancer patients and 60.9% (6,730/11,038) of all deceased patients in Region 2 and had the biggest impact on the lower hospice enrollment rates. Enrollment in this area was 14 percentage points below the national average for both deceased cancer patients and all deceased patients.

Enrollment rates were consistently low across the entire state of New York, but because of patient volume, the metropolitan areas of New York City and Long Island were the main contributors to the low state average. The New York City metropolitan area had a 48.4% enrollment rate for deceased cancer patients and 31.1% for all deceased patients. Both of those percentages were 20 percentage points lower than the national average. The same enrollment percentages for Long Island were 60.0% for deceased cancer patients and 38.5% for all deceased patients.

4.4 Region 2 Dual vs. Non-Dual Hospice Enrollment Rates

Table 13 analyzes the hospice enrollment statistics for Region 2 from Table 11 and further splits them by Medicaid Dual Eligible vs. Non-Duals. Patients with Dual Eligibility receive benefits from both Medicare and Medicaid, while Non-Duals receive only Medicare benefits.

Table 13: CMS Region 2 Dual Eligible vs. Non-Dual Hospice Enrollment

State	Metro	Dual Eligible (Cancer Patients)				Non-Dual (Cancer Patients)			
		Hospice	Non-Hospice	Total	% Hospice	Hospice	Non-Hospice	Total	% Hospice
NJ	Newark-Union, NJ-PA	15	13	28	53.6%	101	48	149	67.8%
NJ	Cells with less than 11 Patients	49	23	72	68.1%	400	227	627	63.8%
NY	New York-White Plains-Wayne, NY-NJ	62	72	134	46.3%	219	227	446	49.1%
NY	Not Part of a Metropolitan Area	13	13	26	50.0%	80	43	123	65.0%
NY	Cells with less than 11 Patients	34	19	53	64.2%	374	255	629	59.5%
NJ	Total	64	36	100	64.0%	501	275	776	64.6%
NY	Total	109	104	213	51.2%	673	525	1,198	56.2%
CMS Region 2 Grand Total		174	140	314	55.4%	1,192	815	2,007	59.4%
National Totals		2,502	1,245	3,747	66.8%	15,024	6,442	21,466	70.0%

Observations

- Nationwide, the hospice enrollment rate for Dual-Eligible patients was 66.8%, which was 3.2 percentage points lower than the enrollment rate for Non-Duals (70.0%).
- In New Jersey, the Dual enrollment rate was 2.8 percentage points lower than the national average at 64.0%, and 5.4 percentage points lower for Non-Duals at 64.6%.
- In New York, the Dual enrollment rate was 15.6 percentage points lower than the national average at 51.2%, and 13.8 percentage points lower for Non-Duals at 56.2%.
- Medicaid eligibility did not appear to be a main driver of the low hospice enrollment rates in New York.

4.5 Average Cost by Region

Tables 14-A and 14-B show the average cost for hospice and non-hospice patients by region, and Table 14-C projects the average savings potential.

- Table 14-A shows the average costs for non-hospice by the eight patient groupings.
- Table 14-B shows the same information for hospice enrollees.
- Table 14-C calculates potential cost savings as the difference between enrollees and non-hospice.

Table 14: Average Costs by CMS Region

Table 14-A: Non-Hospice Patient Average Costs

Status	Severity	CMS Regions										Total
		1	2	3	4	5	6	7	8	9	10	
Cancer Only	1-2	\$17,650	\$21,990	\$17,940	\$18,560	\$19,770	\$19,680	\$19,480	\$24,630	\$16,890	\$30,350	\$20,100
Cancer Only	5-6	\$48,080	\$49,020	\$34,050	\$35,530	\$34,630	\$42,520	\$42,580	\$41,460	\$49,040	\$39,890	\$40,790
Cancer + 1 or More Chronics	1-2	\$29,750	\$32,910	\$21,560	\$26,650	\$29,280	\$25,340	\$28,580	\$33,710	\$31,180	\$31,940	\$28,490
Cancer + 1 or More Chronics	3-4	\$51,560	\$54,370	\$50,140	\$40,980	\$42,690	\$41,770	\$38,910	\$37,670	\$56,260	\$49,340	\$46,330
Cancer + 1 or More Chronics	5-6	\$74,710	\$86,950	\$68,930	\$63,440	\$67,820	\$76,190	\$60,830	\$65,650	\$80,030	\$67,660	\$72,010
Under Active Treatment	1-2	\$57,660	\$67,140	\$47,960	\$57,280	\$49,200	\$50,620	\$52,820	\$44,940	\$65,050	\$67,860	\$56,550
Under Active Treatment	3-4	\$83,360	\$95,470	\$86,510	\$71,940	\$77,600	\$69,720	\$71,910	\$76,410	\$100,440	\$62,570	\$81,100
Under Active Treatment	5-6	\$85,860	\$102,760	\$94,760	\$73,580	\$90,080	\$68,660	\$74,140	\$74,060	\$111,690	\$79,790	\$86,380
Total		\$58,050	\$67,660	\$55,230	\$49,450	\$52,260	\$52,500	\$47,730	\$47,530	\$65,780	\$49,680	\$55,290

Table 14-B: Hospice Patient Average Costs

Status	Severity	CMS Regions										Total
		1	2	3	4	5	6	7	8	9	10	
Cancer Only	1-2	\$25,110	\$21,700	\$23,610	\$23,650	\$23,160	\$22,980	\$22,850	\$20,370	\$23,760	\$23,100	\$23,250
Cancer Only	5-6	\$36,940	\$44,070	\$36,100	\$31,900	\$36,860	\$35,680	\$31,270	\$36,490	\$43,840	\$33,330	\$36,380
Cancer + 1 or More Chronics	1-2	\$31,460	\$30,910	\$29,070	\$28,020	\$27,050	\$27,910	\$26,390	\$23,840	\$31,190	\$26,470	\$28,350
Cancer + 1 or More Chronics	3-4	\$48,530	\$47,880	\$43,800	\$40,790	\$42,880	\$41,460	\$43,400	\$41,120	\$48,770	\$43,230	\$43,620
Cancer + 1 or More Chronics	5-6	\$61,980	\$73,430	\$66,740	\$58,200	\$66,390	\$63,830	\$55,000	\$56,120	\$81,830	\$58,660	\$65,200
Under Active Treatment	1-2	\$49,810	\$55,720	\$50,050	\$47,640	\$54,300	\$49,020	\$49,340	\$40,800	\$56,540	\$50,330	\$50,810
Under Active Treatment	3-4	\$66,760	\$70,900	\$64,760	\$58,450	\$62,280	\$56,000	\$53,020	\$55,590	\$69,620	\$54,630	\$61,640
Under Active Treatment	5-6	\$74,640	\$98,130	\$79,910	\$71,550	\$69,720	\$75,030	\$84,260	\$82,590	\$86,210	\$65,900	\$76,840
Total		\$47,430	\$51,280	\$45,350	\$41,610	\$44,040	\$41,840	\$39,760	\$37,230	\$49,500	\$39,030	\$44,030

Table 14-C: Potential Average Savings Per Patient

Status	CMS Regions										Total
	1	2	3	4	5	6	7	8	9	10	
Cancer Only	\$2,330	\$3,250	(\$3,420)	(\$270)	(\$2,770)	\$2,940	\$4,960	\$4,660	\$410	\$6,830	\$1,000
Cancer + 1 or More Chronics	\$5,160	\$7,930	\$1,750	\$1,460	\$930	\$3,590	\$70	\$4,060	\$2,650	\$6,680	\$2,980
Under Active Treatment	\$13,810	\$18,990	\$15,480	\$10,570	\$13,860	\$7,720	\$9,360	\$13,300	\$25,540	\$11,890	\$14,270
Total	\$7,180	\$10,690	\$4,590	\$3,850	\$3,910	\$4,830	\$3,680	\$6,680	\$9,070	\$8,050	\$5,930

Observations

- **Table 14-C illustrates that** patients who had Malignancies under Active Treatment had the highest potential for savings, especially in Region 9 (\$25,540 cost differential) and Region 2 (\$18,990 cost differential).
- Not shown in the table, the large cost differential in Region 9 was driven exclusively by California (\$34,000+ cost differential), and Region 2 was driven mostly by the areas near New York City.

4.6 Hospital-Based vs. Non-Hospital-Based Hospice

Tables 15-A and 15-B show the distribution by region on whether the patient received their hospice care in a hospital or outside of a hospital.

Table 15-A shows the hospital vs. non-hospital split by CMS region.

Table 15-A: Hospice Setting: Hospital vs. Non-Hospital

Table 15-A: By CMS Region

<u>CMS Region</u>	<u>Hospital</u>	<u>Other</u>	<u>Total</u>	<u>% Hospital</u>
1 - CT/MA/ME/NH/RI/VT	34	958	992	3.4%
2 - NJ/NY/PR	146	1,213	1,359	10.7%
3 - DC/DE/MD/PA/VA/WV	305	1,673	1,978	15.4%
4 - AL/FL/GA/KY/MS/NC/SC/TN	355	3,637	3,992	8.9%
5 - IL/IN/MI/MN/OH/WI	704	2,435	3,139	22.4%
6 - AR/LA/NM/OK/TX	155	1,855	2,010	7.7%
7 - IA/KS/MO/NE	249	828	1,077	23.1%
8 - CO/MT/ND/SD/UT/WY	112	390	502	22.3%
9 - AZ/CA/HI/NV	185	1,562	1,747	10.6%
10 - AK/ID/OR/WA	231	431	662	34.9%
Total	2,476	14,982	17,458	14.2%

Observations

- One hundred fewer hospice-enrolled patients are reported in Table 15 (17,458) compared to Table 4 (17,558) because there were 100 patients who had received hospice care in both a hospital setting and a non-hospital setting. These 100 patients who had care in both settings were excluded from this analysis.
- There was a distinct pattern that some regions had very low incidence of hospital-based hospice (e.g., Regions 1, 4 and 6 were all less than 10%) and some regions had high incidence (e.g., Regions 5, 7 and 8 were all above 20%, and Region 10 was over 30%).

Table 15-B shows the same split, but by state and CMS region

Table 15-B: By State and CMS Region

CMS Region	State	Hospital	Other	Total	% Hospital
1	MA	21	425	446	4.7%
2	NJ	80	481	561	14.3%
2	NY	64	715	779	8.2%
3	DC	0	29	29	0.0%
3	DE	0	94	94	0.0%
3	MD	25	374	399	6.3%
3	PA	70	704	774	9.0%
3	VA	201	324	525	38.3%
4	FL	37	1,381	1,418	2.6%
4	GA	64	431	495	12.9%
4	KY	41	229	270	15.2%
4	MS	26	185	211	12.3%
4	NC	78	532	610	12.8%
4	SC	72	264	336	21.4%
4	TN	31	322	353	8.8%
5	IL	215	649	864	24.9%
5	IN	103	304	407	25.3%
5	MI	85	562	647	13.1%
5	MN	84	102	186	45.2%
5	OH	152	548	700	21.7%
5	WI	65	270	335	19.4%
6	AR	42	159	201	20.9%
6	OK	36	252	288	12.5%
6	TX	62	1,102	1,164	5.3%
7	IA	98	188	286	34.3%
7	KS	31	212	243	12.8%
7	MO	65	332	397	16.4%
7	NE	55	96	151	36.4%
8	CO	12	187	199	6.0%
8	MT	27	42	69	39.1%
8	ND	17	29	46	37.0%
8	SD	40	21	61	65.6%
8	WY	11	25	36	30.6%
9	AZ	27	333	360	7.5%
9	CA	143	1,082	1,225	11.7%
9	HI	0	48	48	0.0%
9	NV	15	99	114	13.2%
10	AK	0	24	24	0.0%
10	ID	24	71	95	25.3%
10	OR	51	135	186	27.4%
10	WA	156	201	357	43.7%

CT, ME, NH, RI, VT, PR, WV, AL, LA, NM, and UT are not displayed due to having hospital patient counts between 1 and 10

Observations

- Splitting the patient counts by state shows that substantial variation in the prevalence rate of hospital-based hospice care within the CMS regions. The results clearly show that the prevalence of hospital-based hospice care vs. non-hospital-based has high regional sensitivity and is probably highly dependent on the prevalence of hospice homes in the region or if the local hospitals have hospice units.
- **Region 1:** All the states had less than 10% hospital-based prevalence rates.
- **Region 2:** NJ and NY had 14.3% and 8.2% prevalence, respectively.
- **Region 3:** There was significant variance between the states. VA was an outlier with 38.3% prevalence, while DC and DE both had 0.0% prevalence. MD and PA had prevalence rates of 6.3%, and 9.0%, respectively.
- **Region 4:** FL had the lowest prevalence rate of 2.6%, while SC had the highest prevalence rate of 21.4%, and the other five states ranged in the middle from 8.8% to 15.2%.
- **Region 5:** MN was an outlier with 45.2% prevalence rate, while the other five states ranged from 13.1% to 25.3%.

- **Region 6:** AR had the highest prevalence rate of 20.9%, while TX and OK had lower rates of 5.3% and 12.5%, respectively.
- **Region 7:** KS and MO had lower prevalence rates of 12.8% and 16.4% respectively, while IA and NE had higher rates of 34.3 and 36.4% respectively.
- **Region 8:** There was significant variance between the states. CO had a low rate of 6.0%, while WY, ND and MT had high rates of 30.6%, 37.0% and 39.1%, respectively, and SD had an exceptionally high rate of 65.6%.
- **Region 9:** HI had 0.0% prevalence rate, while AZ, CA and NV had rates of 7.5%, 11.7% and 13.2% respectively.
- **Region 10:** AK had 0.0% prevalence rate, while the other three states had high prevalence rates of 25.3%, 27.4% and 43.7% for ID, OR and WA, respectively.

Claim Cost Analysis

- An in-depth analysis of the average cost comparison for hospital-based vs. non-hospital-based care is not included in this report because we were unable to sufficiently conclude that there is a cost difference between hospital-based and non-hospital-based care. Our analysis indicated that hospital-based patients tended to have slightly lower costs, but because of a low volume of hospital-based patients, we could not confidently support the conclusion that hospital-based hospice care is less costly than non-hospital-based hospice care.

Conclusions

We estimate there is potential for CMS to reduce Medicare FFS medical costs (excluding prescription drugs) by about \$200 million annually in two ways:

- Informing qualified patients about the benefits of hospice care who otherwise would not have sought out hospice care and thus as a result increasing hospice participation rates.
- Informing patients about the benefits of hospice care upon receiving a qualifying diagnosis and, as a result, getting a portion of patients to take advantage of hospice benefits sooner than they otherwise would have.

The analysis results show that 33% of FFS Medicare-eligible seniors who had Malignancies under Active Treatment were not enrolled in the hospice program prior to their deaths. On average, the non-hospice patients had 25% higher medical costs (excluding prescription drug) than their hospice-enrolled counterparts over their last six months of life. Assuming that 50% of those patients could have benefited from hospice, we estimate that medical costs could have been reduced by \$120–\$170 million annually. The per patient savings is approximately \$5,000–\$7,000, or 7%–9% of the total cost of care over the six-month period.

The results also show that out of the 67% of deceased patients who had Malignancies under Active Treatment and were enrolled in hospice, 37% were enrolled for less than a week prior to death (i.e., late enrollees). On average, late enrollees had 20% higher costs than their counterparts who had enrolled earlier. Assuming that 50% of those patients could have benefited from enrolling at an earlier date, we estimate an additional savings potential of about \$65 million. The per patient savings is approximately \$4,000 over the last six months, or 5.5% of the total cost of care.

Recognizing that it is not practical to enroll all terminally ill cancer patients into hospice prior to death, the \$120–\$170 million savings estimate assumed a potential to transition half (50%) of the non-hospice patients. Similarly, the \$65 million savings estimate also assumes that 50% of late enrollees could have been enrolled earlier. The actual potential for transition may be higher or lower, and the resulting cost reduction would change accordingly.

Malignancies under Active Treatment is a term defined by 3M’s CRG software that refers to patients who are either hospitalized for chemotherapy or radiation therapy, or patients otherwise treated with certain chemotherapy drugs. Appendix A contains a more complete and comprehensive definition of Malignancies under Active Treatment.

Some of the other important findings were the following:

- The claims data suggest that most hospice patients, among the FFS Medicare-eligible seniors, enrolled during a hospitalization. This indicates an opportunity for outreach to such patients to encourage hospice enrollment prior to suffering through a medical episode that leads to a hospitalization. It also indicates an opportunity to begin providing palliative care services prior to a patient’s eligibility for hospice, in order to manage pain and symptoms that originate from the ongoing cancer treatment outside of the hospital setting.
- Three cancer types (Lung, Leukemia and Non-Hodgkin’s Lymphoma) represented more than 50% of the total potential savings among the patients with Malignancies under Active Treatment. Melanoma and Brain/CNS malignancy had the highest per patient savings potential.
- New York State and the areas of New Jersey close to New York City had substantially lower hospice enrollment rates compared to the national average. The low enrollment rates were especially pronounced in New York City and Long Island. The New York City metropolitan area has the most potential for reductions in medical costs due to a combination of the low hospice enrollment rates along with a large cost differential between hospice-enrolled and non-hospice patients.
- California had the highest cost differential (\$34k per patient compared to the national average of \$14k) between hospice-enrolled and non-hospice patients with Malignancies under Active Treatment. The high cost to treat cancer patients in California provides an opportunity to reduce medical costs by encouraging

more patients to enroll in hospice and to enroll at an earlier time. This indicates an opportunity for services such as home-based or clinic-based palliative care, provided outside the hospice setting and alongside active treatment, to play a role in encouraging earlier election of hospice once a patient has decided to stop pursuing active treatment.

Election in hospice requires a patient to make the decision to stop pursuing active treatment for their disease. This requirement makes it difficult for a patient and their physician to best predict when is the right time to enroll in hospice care. In order to better promote the benefits of hospice care for election of or earlier enrollment in the services, a key factor will be in providing improved pain and symptom control as well as improved communication about a patient's disease and effectiveness of active treatment. Palliative care services, provided alongside active treatment and prior to a patient's election of hospice, can serve as a tool to introduce the benefits of hospice care and can serve as a communication tool for a patient's readiness for hospice care.

Appendix A: Clinical Risk Groups (CRGs) Overview

Below is a brief description of Malignancies Under Active Treatment. For more information on CRGs, please follow the following link to 3M's website:

https://www.3m.com/3M/en_US/company-us/all-3m-products/~/3M-Clinical-Risk-Grouping-Software/?N=5002385+3290603333&rt=rud

The following information is referenced from the following overview of CRG version 2.0 methodology:

Grp401_crg_v2.0_meth_overview.pdf.

Status 8: Malignancies under Active Treatment

Second in the CRG Status hierarchy is Status 8, Malignancies under Active Treatment (first in the hierarchy is Status 9, Catastrophic Conditions). A malignancy Episodic Diagnostic Category (EDC) will have already been selected as the Malignancy Major Diagnostic Category's (MDC) Primary Chronic Disease (PCD) by a seven-step process in Phase II. If the malignancy PCD is selected by virtue of meeting the criteria for "active treatment," then the individual will be assigned to Status 8.

There are three different ways that an individual could meet the criteria for active treatment of a malignancy:

- Malignancy patient hospitalized with an EDC or Episodic Procedure Category (EPC) for chemotherapy or radiation therapy.
- Malignancy patient treated with certain chemotherapy drugs. The data sources for chemotherapy drugs can be HCPCS J codes and/or outpatient prescription pharmaceutical data sets such as the U.S. National Drug Codes (NDC). HCPCS is the Health Care Procedural Coding System, National Level II, and J codes are the codes containing chemotherapy drugs.
- Malignancy patients, age up to 21 years with hospitalization for Primary Diagnosis (PDX) of Malignancy or with PDX or Secondary Diagnosis (SDX) of a complicating condition such as acute hematologic EDCs, which include aplastic anemia, pancytopenia or neutropenia.

If an individual with a malignancy meets one of the criteria for active treatment, the highest ranked malignancy EDC that is marked as receiving active treatment is selected as the PCD (refer to Phase II for further description of this selection process). This malignancy PCD then becomes the basis for assignment to a Status 8 malignancy base CRG.

Each base CRG in Status 8 has four severity levels. One four-level severity matrix is used for all Status 8 malignancy CRGs. All individuals in Status 8 are receiving active treatment, and so the same severity matrix has been applied.

Malignancies without evidence of aggressive treatment are handled like any other chronic disease and are included in the subsequent portions of the CRG status hierarchy. They could be assigned to a CRG in Status 5, 6 or 7, depending on what other chronic illnesses the individual might have.

Table A1 provides the list of base QCRG categories within Status 8 and is reprinted with permission from 3M.

Table A1: Status 8 Base QCRGs

(1) Acute Lymphoid Leukemia	(16) Kidney Malignancy
(2) Acute Non-Lymphoid Leukemia	(17) Liver and Biliary
(3) Bone Malignancy	(18) Lung Malignancy
(4) Brain and Central Nervous System Malignancies	(19) Melanoma
(5) Breast Malignancy	(20) Multiple Myeloma
(6) Cervical Malignancy	(21) Non-Hodgkins Lymphoma
(7) Chronic Lymphoid Leukemia	(22) Other Malignancies
(8) Chronic Non-Lymphoid Leukemia	(23) Ovarian Malignancy
(9) Colon Malignancy	(24) Pancreatic Malignancy
(10) Ear, Nose, and Throat Malignancies	(25) Prostate Malignancy
(11) Esophageal Malignancy	(26) Secondary Malignancy
(12) Genitourinary Malignancy	(27) Small Bowel Malignancy
(13) Gynecological Malignancies Except Uterine, Cervical, and Ovarian	(28) Stomach Malignancy
(14) Hodgkins Lymphoma	(29) Thyroid Malignancy
(15) Kaposis Sarcoma	(30) Uterine Malignancy

Appendix B: List of Malignancy QCRGs

Reprinted with permission from 3M.

CRG Codes		QACRG3 Categories		QCRG Description
QCRG	QACRG3	Status	Severity	
56411	51	5	1	Secondary Malignancy Level - 1
56412	52	5	2	Secondary Malignancy Level - 2
56413	55	5	5	Secondary Malignancy Level - 3
56414	56	5	6	Secondary Malignancy Level - 4
56461	51	5	1	Brain and Central Nervous System Malignancies Level - 1
56462	52	5	2	Brain and Central Nervous System Malignancies Level - 2
56463	55	5	5	Brain and Central Nervous System Malignancies Level - 3
56464	56	5	6	Brain and Central Nervous System Malignancies Level - 4
56471	51	5	1	Lung Malignancy Level - 1
56472	52	5	2	Lung Malignancy Level - 2
56473	55	5	5	Lung Malignancy Level - 3
56474	56	5	6	Lung Malignancy Level - 4
56481	51	5	1	Pancreatic Malignancy Level - 1
56482	52	5	2	Pancreatic Malignancy Level - 2
56483	55	5	5	Pancreatic Malignancy Level - 3
56484	56	5	6	Pancreatic Malignancy Level - 4
56491	51	5	1	Kidney Malignancy Level - 1
56492	52	5	2	Kidney Malignancy Level - 2
56493	55	5	5	Kidney Malignancy Level - 3
56494	56	5	6	Kidney Malignancy Level - 4
56501	51	5	1	Ovarian Malignancy Level - 1
56502	52	5	2	Ovarian Malignancy Level - 2
56503	55	5	5	Ovarian Malignancy Level - 3
56504	56	5	6	Ovarian Malignancy Level - 4
56511	51	5	1	Small Bowel Malignancy Level - 1
56512	52	5	2	Small Bowel Malignancy Level - 2
56513	55	5	5	Small Bowel Malignancy Level - 3
56514	56	5	6	Small Bowel Malignancy Level - 4
56521	51	5	1	Chronic Lymphoid Leukemia Level - 1
56522	52	5	2	Chronic Lymphoid Leukemia Level - 2
56523	55	5	5	Chronic Lymphoid Leukemia Level - 3
56524	56	5	6	Chronic Lymphoid Leukemia Level - 4
56531	51	5	1	Chronic Non-Lymphoid Leukemia Level - 1
56532	52	5	2	Chronic Non-Lymphoid Leukemia Level - 2
56533	55	5	5	Chronic Non-Lymphoid Leukemia Level - 3
56534	56	5	6	Chronic Non-Lymphoid Leukemia Level - 4
56541	51	5	1	Multiple Myeloma Level - 1
56542	52	5	2	Multiple Myeloma Level - 2
56543	55	5	5	Multiple Myeloma Level - 3
56544	56	5	6	Multiple Myeloma Level - 4
56551	51	5	1	Acute Lymphoid Leukemia Level - 1
56552	52	5	2	Acute Lymphoid Leukemia Level - 2
56553	55	5	5	Acute Lymphoid Leukemia Level - 3
56554	56	5	6	Acute Lymphoid Leukemia Level - 4
56561	51	5	1	Acute Non-Lymphoid Leukemia Level - 1
56562	52	5	2	Acute Non-Lymphoid Leukemia Level - 2
56563	55	5	5	Acute Non-Lymphoid Leukemia Level - 3
56564	56	5	6	Acute Non-Lymphoid Leukemia Level - 4

CRG Codes		QACRG3 Categories		QCRG Description
QCRG	QACRG3	Status	Severity	
56571	51	5	1	Colon Malignancy Level - 1
56572	52	5	2	Colon Malignancy Level - 2
56573	55	5	5	Colon Malignancy Level - 3
56574	56	5	6	Colon Malignancy Level - 4
56581	51	5	1	Other Malignancies Level - 1
56582	52	5	2	Other Malignancies Level - 2
56583	55	5	5	Other Malignancies Level - 3
56584	56	5	6	Other Malignancies Level - 4
56601	51	5	1	Hodgkin's Lymphoma Level - 1
56602	52	5	2	Hodgkin's Lymphoma Level - 2
56603	55	5	5	Hodgkin's Lymphoma Level - 3
56604	56	5	6	Hodgkin's Lymphoma Level - 4
56621	51	5	1	Breast Malignancy Level - 1
56622	52	5	2	Breast Malignancy Level - 2
56623	55	5	5	Breast Malignancy Level - 3
56624	56	5	6	Breast Malignancy Level - 4
56631	51	5	1	Prostate Malignancy Level - 1
56632	52	5	2	Prostate Malignancy Level - 2
56633	55	5	5	Prostate Malignancy Level - 3
56634	56	5	6	Prostate Malignancy Level - 4
56641	51	5	1	Genitourinary Malignancy Level - 1
56642	52	5	2	Genitourinary Malignancy Level - 2
56643	55	5	5	Genitourinary Malignancy Level - 3
56644	56	5	6	Genitourinary Malignancy Level - 4
56651	51	5	1	Non-Hodgkin's Lymphoma Level - 1
56652	52	5	2	Non-Hodgkin's Lymphoma Level - 2
56653	55	5	5	Non-Hodgkin's Lymphoma Level - 3
56654	56	5	6	Non-Hodgkin's Lymphoma Level - 4
56791	51	5	1	Esophageal Malignancy Level - 1
56792	52	5	2	Esophageal Malignancy Level - 2
56793	55	5	5	Esophageal Malignancy Level - 3
56794	56	5	6	Esophageal Malignancy Level - 4
56801	51	5	1	Stomach Malignancy Level - 1
56802	52	5	2	Stomach Malignancy Level - 2
56803	55	5	5	Stomach Malignancy Level - 3
56804	56	5	6	Stomach Malignancy Level - 4
56811	51	5	1	Liver and Biliary Malignancy Level - 1
56812	52	5	2	Liver and Biliary Malignancy Level - 2
56813	55	5	5	Liver and Biliary Malignancy Level - 3
56814	56	5	6	Liver and Biliary Malignancy Level - 4
56821	51	5	1	Bone Malignancy Level - 1
56822	52	5	2	Bone Malignancy Level - 2
56823	55	5	5	Bone Malignancy Level - 3
56824	56	5	6	Bone Malignancy Level - 4
56831	51	5	1	Melanoma Level - 1
56832	52	5	2	Melanoma Level - 2
56833	55	5	5	Melanoma Level - 3
56834	56	5	6	Melanoma Level - 4

CRG Codes		QACRG3 Categories		QCRG Description
QCRG	QACRG3	Status	Severity	
56841	51	5	1	Ear, Nose, and Throat Malignancies Level - 1
56842	52	5	2	Ear, Nose, and Throat Malignancies Level - 2
56843	55	5	5	Ear, Nose, and Throat Malignancies Level - 3
56844	56	5	6	Ear, Nose, and Throat Malignancies Level - 4
56851	51	5	1	Gynecological Malignancies Except Uterine, Cervical, and Ovarian Level - 1
56852	52	5	2	Gynecological Malignancies Except Uterine, Cervical, and Ovarian Level - 2
56853	55	5	5	Gynecological Malignancies Except Uterine, Cervical, and Ovarian Level - 3
56854	56	5	6	Gynecological Malignancies Except Uterine, Cervical, and Ovarian Level - 4
56861	51	5	1	Uterine Malignancy Level - 1
56862	52	5	2	Uterine Malignancy Level - 2
56863	55	5	5	Uterine Malignancy Level - 3
56864	56	5	6	Uterine Malignancy Level - 4
56871	51	5	1	Kaposi's Sarcoma Level - 1
56872	52	5	2	Kaposi's Sarcoma Level - 2
56873	55	5	5	Kaposi's Sarcoma Level - 3
56874	56	5	6	Kaposi's Sarcoma Level - 4
56881	51	5	1	Cervical Malignancy Level - 1
56882	52	5	2	Cervical Malignancy Level - 2
56883	55	5	5	Cervical Malignancy Level - 3
56884	56	5	6	Cervical Malignancy Level - 4
56891	51	5	1	Thyroid Malignancy Level - 1
56892	52	5	2	Thyroid Malignancy Level - 2
56893	55	5	5	Thyroid Malignancy Level - 3
56894	56	5	6	Thyroid Malignancy Level - 4
56961	51	5	1	Myelodysplastic and Related Disorders Level - 1
56962	51	5	1	Myelodysplastic and Related Disorders Level - 2
56963	52	5	2	Myelodysplastic and Related Disorders Level - 3
56964	55	5	5	Myelodysplastic and Related Disorders Level - 4
56981	51	5	1	Other Neoplasms of Uncertain Behavior Level - 1
56982	51	5	1	Other Neoplasms of Uncertain Behavior Level - 2
56983	52	5	2	Other Neoplasms of Uncertain Behavior Level - 3
56984	55	5	5	Other Neoplasms of Uncertain Behavior Level - 4
61621	61	6	1	Lung Malignancy and Other Dominant Chronic Disease Level - 1
61622	62	6	2	Lung Malignancy and Other Dominant Chronic Disease Level - 2
61623	63	6	3	Lung Malignancy and Other Dominant Chronic Disease Level - 3
61624	64	6	4	Lung Malignancy and Other Dominant Chronic Disease Level - 4
61625	65	6	5	Lung Malignancy and Other Dominant Chronic Disease Level - 5
61626	66	6	6	Lung Malignancy and Other Dominant Chronic Disease Level - 6
61631	61	6	1	Breast Malignancy and Other Dominant Chronic Disease Level - 1
61632	62	6	2	Breast Malignancy and Other Dominant Chronic Disease Level - 2
61633	63	6	3	Breast Malignancy and Other Dominant Chronic Disease Level - 3
61634	64	6	4	Breast Malignancy and Other Dominant Chronic Disease Level - 4
61635	65	6	5	Breast Malignancy and Other Dominant Chronic Disease Level - 5
61636	66	6	6	Breast Malignancy and Other Dominant Chronic Disease Level - 6

CRG Codes		QACRG3 Categories		QCRG Description
QCRG	QACRG3	Status	Severity	
61641	61	6	1	Prostate Malignancy and Other Dominant Chronic Disease Level - 1
61642	62	6	2	Prostate Malignancy and Other Dominant Chronic Disease Level - 2
61643	63	6	3	Prostate Malignancy and Other Dominant Chronic Disease Level - 3
61644	64	6	4	Prostate Malignancy and Other Dominant Chronic Disease Level - 4
61645	65	6	5	Prostate Malignancy and Other Dominant Chronic Disease Level - 5
61646	66	6	6	Prostate Malignancy and Other Dominant Chronic Disease Level - 6
61651	61	6	1	Colon Malignancy and Other Dominant Chronic Disease Level - 1
61652	62	6	2	Colon Malignancy and Other Dominant Chronic Disease Level - 2
61653	63	6	3	Colon Malignancy and Other Dominant Chronic Disease Level - 3
61654	64	6	4	Colon Malignancy and Other Dominant Chronic Disease Level - 4
61655	65	6	5	Colon Malignancy and Other Dominant Chronic Disease Level - 5
61656	66	6	6	Colon Malignancy and Other Dominant Chronic Disease Level - 6
61661	61	6	1	Other Genitourinary Malignancy and Other Dominant Chronic Disease Level - 1
61662	62	6	2	Other Genitourinary Malignancy and Other Dominant Chronic Disease Level - 2
61663	63	6	3	Other Genitourinary Malignancy and Other Dominant Chronic Disease Level - 3
61664	64	6	4	Other Genitourinary Malignancy and Other Dominant Chronic Disease Level - 4
61665	65	6	5	Other Genitourinary Malignancy and Other Dominant Chronic Disease Level - 5
61666	66	6	6	Other Genitourinary Malignancy and Other Dominant Chronic Disease Level - 6
61671	61	6	1	Kidney Malignancy and Other Dominant Chronic Disease Level - 1
61672	62	6	2	Kidney Malignancy and Other Dominant Chronic Disease Level - 2
61673	63	6	3	Kidney Malignancy and Other Dominant Chronic Disease Level - 3
61674	64	6	4	Kidney Malignancy and Other Dominant Chronic Disease Level - 4
61675	65	6	5	Kidney Malignancy and Other Dominant Chronic Disease Level - 5
61676	66	6	6	Kidney Malignancy and Other Dominant Chronic Disease Level - 6
61681	61	6	1	Malignant Melanoma and Other Dominant Chronic Disease Level - 1
61682	62	6	2	Malignant Melanoma and Other Dominant Chronic Disease Level - 2
61683	63	6	3	Malignant Melanoma and Other Dominant Chronic Disease Level - 3
61684	64	6	4	Malignant Melanoma and Other Dominant Chronic Disease Level - 4
61685	65	6	5	Malignant Melanoma and Other Dominant Chronic Disease Level - 5
61686	66	6	6	Malignant Melanoma and Other Dominant Chronic Disease Level - 6
61711	61	6	1	Hematologic Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 1
61712	62	6	2	Hematologic Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 2
61713	63	6	3	Hematologic Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 3
61714	64	6	4	Hematologic Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 4
61715	65	6	5	Hematologic Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 5
61716	66	6	6	Hematologic Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 6
61801	61	6	1	Other Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 1
61802	62	6	2	Other Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 2
61803	63	6	3	Other Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 3
61804	64	6	4	Other Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 4
61805	65	6	5	Other Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 5
61806	66	6	6	Other Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 6
62301	61	6	1	Breast Malignancy and Other Moderate Chronic Disease Level - 1
62302	61	6	1	Breast Malignancy and Other Moderate Chronic Disease Level - 2
62303	62	6	2	Breast Malignancy and Other Moderate Chronic Disease Level - 3
62304	63	6	3	Breast Malignancy and Other Moderate Chronic Disease Level - 4
62305	64	6	4	Breast Malignancy and Other Moderate Chronic Disease Level - 5
62306	65	6	5	Breast Malignancy and Other Moderate Chronic Disease Level - 6

CRG Codes		QACRG3 Categories		QCRG Description
QCRG	QACRG3	Status	Severity	
62311	61	6	1	Prostate Malignancy and Other Moderate Chronic Disease Level - 1
62312	61	6	1	Prostate Malignancy and Other Moderate Chronic Disease Level - 2
62313	62	6	2	Prostate Malignancy and Other Moderate Chronic Disease Level - 3
62314	63	6	3	Prostate Malignancy and Other Moderate Chronic Disease Level - 4
62315	64	6	4	Prostate Malignancy and Other Moderate Chronic Disease Level - 5
62316	65	6	5	Prostate Malignancy and Other Moderate Chronic Disease Level - 6
62321	61	6	1	Other Genitourinary Malignancy and Other Moderate Chronic Disease Level - 1
62322	61	6	1	Other Genitourinary Malignancy and Other Moderate Chronic Disease Level - 2
62323	62	6	2	Other Genitourinary Malignancy and Other Moderate Chronic Disease Level - 3
62324	63	6	3	Other Genitourinary Malignancy and Other Moderate Chronic Disease Level - 4
62325	64	6	4	Other Genitourinary Malignancy and Other Moderate Chronic Disease Level - 5
62326	65	6	5	Other Genitourinary Malignancy and Other Moderate Chronic Disease Level - 6
62331	61	6	1	Kidney Malignancy and Other Moderate Chronic Disease Level - 1
62332	61	6	1	Kidney Malignancy and Other Moderate Chronic Disease Level - 2
62333	62	6	2	Kidney Malignancy and Other Moderate Chronic Disease Level - 3
62334	63	6	3	Kidney Malignancy and Other Moderate Chronic Disease Level - 4
62335	64	6	4	Kidney Malignancy and Other Moderate Chronic Disease Level - 5
62336	65	6	5	Kidney Malignancy and Other Moderate Chronic Disease Level - 6
62341	61	6	1	Malignant Melanoma and Other Moderate Chronic Disease Level - 1
62342	61	6	1	Malignant Melanoma and Other Moderate Chronic Disease Level - 2
62343	62	6	2	Malignant Melanoma and Other Moderate Chronic Disease Level - 3
62344	63	6	3	Malignant Melanoma and Other Moderate Chronic Disease Level - 4
62345	64	6	4	Malignant Melanoma and Other Moderate Chronic Disease Level - 5
62346	65	6	5	Malignant Melanoma and Other Moderate Chronic Disease Level - 6
62411	61	6	1	Hematologic Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 1
62412	61	6	1	Hematologic Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 2
62413	62	6	2	Hematologic Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 3
62414	63	6	3	Hematologic Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 4
62415	64	6	4	Hematologic Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 5
62416	65	6	5	Hematologic Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 6
62501	61	6	1	Other Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 1
62502	61	6	1	Other Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 2
62503	62	6	2	Other Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 3
62504	63	6	3	Other Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 4
62505	64	6	4	Other Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 5
62506	65	6	5	Other Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 6
64351	61	6	1	Moderate Chronic Malignancy and Other Moderate Chronic Disease Level - 1
64352	61	6	1	Moderate Chronic Malignancy and Other Moderate Chronic Disease Level - 2
64353	62	6	2	Moderate Chronic Malignancy and Other Moderate Chronic Disease Level - 3
64354	63	6	3	Moderate Chronic Malignancy and Other Moderate Chronic Disease Level - 4
64355	64	6	4	Moderate Chronic Malignancy and Other Moderate Chronic Disease Level - 5
64356	64	6	4	Moderate Chronic Malignancy and Other Moderate Chronic Disease Level - 6

CRG Codes		QACRG3 Categories		QACRG3 Description
QCRG	QACRG3	Status	Severity	
70701	71	7	1	Dominant Malignancy - Diabetes - Congestive Heart Failure Level - 1
70702	72	7	2	Dominant Malignancy - Diabetes - Congestive Heart Failure Level - 2
70703	73	7	3	Dominant Malignancy - Diabetes - Congestive Heart Failure Level - 3
70704	74	7	4	Dominant Malignancy - Diabetes - Congestive Heart Failure Level - 4
70705	75	7	5	Dominant Malignancy - Diabetes - Congestive Heart Failure Level - 5
70706	76	7	6	Dominant Malignancy - Diabetes - Congestive Heart Failure Level - 6
70711	71	7	1	Dominant Malignancy - 2 or More Other Dominant Chronic Diseases Level - 1
70712	72	7	2	Dominant Malignancy - 2 or More Other Dominant Chronic Diseases Level - 2
70713	73	7	3	Dominant Malignancy - 2 or More Other Dominant Chronic Diseases Level - 3
70714	74	7	4	Dominant Malignancy - 2 or More Other Dominant Chronic Diseases Level - 4
70715	75	7	5	Dominant Malignancy - 2 or More Other Dominant Chronic Diseases Level - 5
70716	76	7	6	Dominant Malignancy - 2 or More Other Dominant Chronic Diseases Level - 6
86411	81	8	1	Secondary Malignancy - Under Active Treatment Level - 1
86412	82	8	2	Secondary Malignancy - Under Active Treatment Level - 2
86413	83	8	3	Secondary Malignancy - Under Active Treatment Level - 3
86414	84	8	4	Secondary Malignancy - Under Active Treatment Level - 4
86461	82	8	2	Brain and Central Nervous System Malignancies - Under Active Treatment Level - 1
86462	83	8	3	Brain and Central Nervous System Malignancies - Under Active Treatment Level - 2
86463	84	8	4	Brain and Central Nervous System Malignancies - Under Active Treatment Level - 3
86464	85	8	5	Brain and Central Nervous System Malignancies - Under Active Treatment Level - 4
86471	82	8	2	Lung Malignancy - Under Active Treatment Level - 1
86472	83	8	3	Lung Malignancy - Under Active Treatment Level - 2
86473	84	8	4	Lung Malignancy - Under Active Treatment Level - 3
86474	85	8	5	Lung Malignancy - Under Active Treatment Level - 4
86481	82	8	2	Pancreatic Malignancy - Under Active Treatment Level - 1
86482	83	8	3	Pancreatic Malignancy - Under Active Treatment Level - 2
86483	84	8	4	Pancreatic Malignancy - Under Active Treatment Level - 3
86484	85	8	5	Pancreatic Malignancy - Under Active Treatment Level - 4
86491	82	8	2	Kidney Malignancy - Under Active Treatment Level - 1
86492	83	8	3	Kidney Malignancy - Under Active Treatment Level - 2
86493	84	8	4	Kidney Malignancy - Under Active Treatment Level - 3
86494	85	8	5	Kidney Malignancy - Under Active Treatment Level - 4
86501	82	8	2	Ovarian Malignancy - Under Active Treatment Level - 1
86502	83	8	3	Ovarian Malignancy - Under Active Treatment Level - 2
86503	84	8	4	Ovarian Malignancy - Under Active Treatment Level - 3
86504	85	8	5	Ovarian Malignancy - Under Active Treatment Level - 4
86511	82	8	2	Small Bowel Malignancy - Under Active Treatment Level - 1
86512	83	8	3	Small Bowel Malignancy - Under Active Treatment Level - 2
86513	84	8	4	Small Bowel Malignancy - Under Active Treatment Level - 3
86514	85	8	5	Small Bowel Malignancy - Under Active Treatment Level - 4
86521	81	8	1	Chronic Lymphoid Leukemia - Under Active Treatment Level - 1
86522	82	8	2	Chronic Lymphoid Leukemia - Under Active Treatment Level - 2
86523	83	8	3	Chronic Lymphoid Leukemia - Under Active Treatment Level - 3
86524	84	8	4	Chronic Lymphoid Leukemia - Under Active Treatment Level - 4
86531	85	8	5	Chronic Non-Lymphoid Leukemia - Under Active Treatment Level - 1
86532	82	8	2	Chronic Non-Lymphoid Leukemia - Under Active Treatment Level - 2
86533	83	8	3	Chronic Non-Lymphoid Leukemia - Under Active Treatment Level - 3
86534	84	8	4	Chronic Non-Lymphoid Leukemia - Under Active Treatment Level - 4

CRG Codes		QACRG3 Categories		QCRG Description
QCRG	QACRG3	Status	Severity	
86541	81	8	1	Multiple Myeloma - Under Active Treatment Level - 1
86542	82	8	2	Multiple Myeloma - Under Active Treatment Level - 2
86543	83	8	3	Multiple Myeloma - Under Active Treatment Level - 3
86544	84	8	4	Multiple Myeloma - Under Active Treatment Level - 4
86551	82	8	2	Acute Lymphoid Leukemia - Under Active Treatment Level - 1
86552	83	8	3	Acute Lymphoid Leukemia - Under Active Treatment Level - 2
86553	84	8	4	Acute Lymphoid Leukemia - Under Active Treatment Level - 3
86554	85	8	5	Acute Lymphoid Leukemia - Under Active Treatment Level - 4
86561	82	8	2	Acute Non-Lymphoid Leukemia - Under Active Treatment Level - 1
86562	83	8	3	Acute Non-Lymphoid Leukemia - Under Active Treatment Level - 2
86563	84	8	4	Acute Non-Lymphoid Leukemia - Under Active Treatment Level - 3
86564	85	8	5	Acute Non-Lymphoid Leukemia - Under Active Treatment Level - 4
86571	81	8	1	Colon Malignancy - Under Active Treatment Level - 1
86572	82	8	2	Colon Malignancy - Under Active Treatment Level - 2
86573	83	8	3	Colon Malignancy - Under Active Treatment Level - 3
86574	84	8	4	Colon Malignancy - Under Active Treatment Level - 4
86581	81	8	1	Other Malignancies - Under Active Treatment Level - 1
86582	82	8	2	Other Malignancies - Under Active Treatment Level - 2
86583	83	8	3	Other Malignancies - Under Active Treatment Level - 3
86584	84	8	4	Other Malignancies - Under Active Treatment Level - 4
86601	81	8	1	Hodgkins Lymphoma - Under Active Treatment Level - 1
86602	82	8	2	Hodgkins Lymphoma - Under Active Treatment Level - 2
86603	83	8	3	Hodgkins Lymphoma - Under Active Treatment Level - 3
86604	84	8	4	Hodgkins Lymphoma - Under Active Treatment Level - 4
86621	81	8	1	Breast Malignancy - Under Active Treatment Level - 1
86622	82	8	2	Breast Malignancy - Under Active Treatment Level - 2
86623	83	8	3	Breast Malignancy - Under Active Treatment Level - 3
86624	84	8	4	Breast Malignancy - Under Active Treatment Level - 4
86631	81	8	1	Prostate Malignancy - Under Active Treatment Level - 1
86632	82	8	2	Prostate Malignancy - Under Active Treatment Level - 2
86633	83	8	3	Prostate Malignancy - Under Active Treatment Level - 3
86634	84	8	4	Prostate Malignancy - Under Active Treatment Level - 4
86641	81	8	1	Genitourinary Malignancy - Under Active Treatment Level - 1
86642	81	8	1	Genitourinary Malignancy - Under Active Treatment Level - 2
86643	82	8	2	Genitourinary Malignancy - Under Active Treatment Level - 3
86644	83	8	3	Genitourinary Malignancy - Under Active Treatment Level - 4
86651	81	8	1	Non-Hodgkins Lymphoma - Under Active Treatment Level - 1
86652	82	8	2	Non-Hodgkins Lymphoma - Under Active Treatment Level - 2
86653	83	8	3	Non-Hodgkins Lymphoma - Under Active Treatment Level - 3
86654	84	8	4	Non-Hodgkins Lymphoma - Under Active Treatment Level - 4
86791	82	8	2	Esophageal Malignancy - Under Active Treatment Level - 1
86792	83	8	3	Esophageal Malignancy - Under Active Treatment Level - 2
86793	84	8	4	Esophageal Malignancy - Under Active Treatment Level - 3
86794	85	8	5	Esophageal Malignancy - Under Active Treatment Level - 4
86801	82	8	2	Stomach Malignancy - Under Active Treatment Level - 1
86802	83	8	3	Stomach Malignancy - Under Active Treatment Level - 2
86803	84	8	4	Stomach Malignancy - Under Active Treatment Level - 3
86804	85	8	5	Stomach Malignancy - Under Active Treatment Level - 4

CRG Codes		QACRG3 Categories		QCRG Description
QCRG	QACRG3	Status	Severity	
86811	82	8	2	Liver and Biliary Malignancy - Under Active Treatment Level - 1
86812	83	8	3	Liver and Biliary Malignancy - Under Active Treatment Level - 2
86813	84	8	4	Liver and Biliary Malignancy - Under Active Treatment Level - 3
86814	85	8	5	Liver and Biliary Malignancy - Under Active Treatment Level - 4
86821	81	8	1	Bone Malignancy - Under Active Treatment Level - 1
86822	82	8	2	Bone Malignancy - Under Active Treatment Level - 2
86823	83	8	3	Bone Malignancy - Under Active Treatment Level - 3
86824	84	8	4	Bone Malignancy - Under Active Treatment Level - 4
86831	81	8	1	Melanoma - Under Active Treatment Level - 1
86832	81	8	1	Melanoma - Under Active Treatment Level - 2
86833	82	8	2	Melanoma - Under Active Treatment Level - 3
86834	83	8	3	Melanoma - Under Active Treatment Level - 4
86841	81	8	1	Ear, Nose, and Throat Malignancies - Under Active Treatment Level - 1
86842	82	8	2	Ear, Nose, and Throat Malignancies - Under Active Treatment Level - 2
86843	83	8	3	Ear, Nose, and Throat Malignancies - Under Active Treatment Level - 3
86844	84	8	4	Ear, Nose, and Throat Malignancies - Under Active Treatment Level - 4
86851	81	8	1	Gynecological Malignancies Except Uterine, Cervical, and Ovarian - Under Active Treatment Level - 1
86852	81	8	1	Gynecological Malignancies Except Uterine, Cervical, and Ovarian - Under Active Treatment Level - 2
86853	82	8	2	Gynecological Malignancies Except Uterine, Cervical, and Ovarian - Under Active Treatment Level - 3
86854	83	8	3	Gynecological Malignancies Except Uterine, Cervical, and Ovarian - Under Active Treatment Level - 4
86861	81	8	1	Uterine Malignancy - Under Active Treatment Level - 1
86862	81	8	1	Uterine Malignancy - Under Active Treatment Level - 2
86863	82	8	2	Uterine Malignancy - Under Active Treatment Level - 3
86864	83	8	3	Uterine Malignancy - Under Active Treatment Level - 4
86871	81	8	1	Kaposi Sarcoma - Under Active Treatment Level - 1
86872	82	8	2	Kaposi Sarcoma - Under Active Treatment Level - 2
86873	83	8	3	Kaposi Sarcoma - Under Active Treatment Level - 3
86874	84	8	4	Kaposi Sarcoma - Under Active Treatment Level - 4
86881	81	8	1	Cervical Malignancy - Under Active Treatment Level - 1
86882	81	8	1	Cervical Malignancy - Under Active Treatment Level - 2
86883	82	8	2	Cervical Malignancy - Under Active Treatment Level - 3
86884	83	8	3	Cervical Malignancy - Under Active Treatment Level - 4
86891	81	8	1	Thyroid Malignancy - Under Active Treatment Level - 1
86892	81	8	1	Thyroid Malignancy - Under Active Treatment Level - 2
86893	82	8	2	Thyroid Malignancy - Under Active Treatment Level - 3
86894	83	8	3	Thyroid Malignancy - Under Active Treatment Level - 4

Appendix C: Savings Calculation Details for Four Scenarios (Table 5 from Section 3.5)

Table 5-A: Scenario 1 — 8 Groupings Based on Condensed Status and Severity

Clinical Groups		Patient Count		Average Costs		Potential Savings	
Status	SOI	Hospice	No Hospice	Hospice	Non-Hospice	Per Patient	Total (\$1,000's)
5	1-2	1,868	561	\$23,252	\$20,103	(\$3,149)	(\$1,766)
5	5-6	1,715	779	\$36,383	\$40,799	\$4,416	\$3,440
6-7	1-2	3,962	986	\$28,355	\$28,496	\$141	\$138
6-7	3-4	3,555	1,773	\$43,623	\$46,337	\$2,714	\$4,812
6-7	5-6	1,847	1,358	\$65,203	\$72,017	\$6,814	\$9,253
8	1-2	1,139	400	\$50,812	\$56,558	\$5,746	\$2,298
8	3-4	2,971	1,395	\$61,640	\$81,106	\$19,466	\$27,155
8	5-6	501	454	\$76,846	\$86,385	\$9,539	\$4,330
5	Total	3,583	1,340				\$1,674
6-7	Total	9,364	4,117				\$14,203
8	Total	4,611	2,249				\$33,783
Grand Total		17,558	7,706				\$49,662

Table 5-B: Scenario 2 — 21 Groupings Based on Status and Severity

Clinical Groups		Patient Count		Average Costs		Potential Savings	
Status	SOI	Hospice	Non-Hospice	Hospice	Non-Hospice	Per Patient	Total (\$1,000's)
5	1	1,372	372	\$21,114	\$14,763	(\$6,351)	(\$2,362)
5	2	496	189	\$29,165	\$30,613	\$1,447	\$273
5	5	1,264	392	\$31,499	\$32,820	\$1,321	\$517
5	6	451	387	\$50,070	\$48,880	(\$1,190)	(\$460)
6	1	1,963	395	\$23,510	\$20,316	(\$3,194)	(\$1,261)
6	2	1,784	491	\$31,888	\$30,281	(\$1,608)	(\$789)
6	3	1,873	805	\$38,050	\$40,200	\$2,150	\$1,730
6	4	1,557	869	\$48,076	\$49,722	\$1,645	\$1,429
6	5	1,128	713	\$60,014	\$64,004	\$3,990	\$2,844
6	6	645	548	\$70,336	\$78,246	\$7,910	\$4,334
7	1	50	19	\$32,058	\$29,705	(\$2,353)	(\$44)
7	2	165	81	\$46,672	\$57,283	\$10,611	\$859
7	3	67	52	\$66,341	\$56,886	(\$9,455)	(\$491)
7	4	58	47	\$77,779	\$77,197	(\$582)	(\$27)
7	5	41	65	\$81,470	\$91,128	\$9,658	\$627
7	6	33	32	\$122,039	\$105,066	(\$16,974)	(\$543)
8	1	295	99	\$45,386	\$42,586	(\$2,800)	(\$277)
8	2	844	301	\$52,709	\$61,153	\$8,444	\$2,541
8	3	1,467	611	\$60,570	\$75,992	\$15,422	\$9,422
8	4	1,504	784	\$62,683	\$85,092	\$22,409	\$17,568
8	5	501	454	\$76,846	\$86,385	\$9,539	\$4,330
5	Total	3,583	1,340				(\$2,032)
6-7	Total	9,364	4,117				\$8,668
8	Total	4,611	2,249				\$33,584
Grand Total		17,558	7,706				\$40,224

Table 5-C: Scenario 3 — 254 Groupings Based on Status, Severity, and Most Dominant Cancer Type (1 of 5)

Status	SOI	Cancer Type	Patient Count		Average Costs		Potential Savings	
			Hospice	Non-Hospice	Hospice	Non-Hospice	Per Patient	Total (\$1,000's)
5	1	Bone	3	1	\$25,435	\$7,404	(\$18,032)	(\$18)
5	1	Brain/CNS	20	3	\$28,829	\$18,180	(\$10,649)	(\$31)
5	1	Breast	101	28	\$20,448	\$10,657	(\$9,791)	(\$274)
5	1	Cervical	12	0	\$23,903			
5	1	Colon	148	28	\$19,571	\$15,951	(\$3,620)	(\$101)
5	1	ENT	53	16	\$19,023	\$13,084	(\$5,939)	(\$95)
5	1	Esophageal	41	9	\$18,431	\$17,749	(\$681)	(\$6)
5	1	Genitourinary	56	18	\$23,330	\$10,288	(\$13,042)	(\$234)
5	1	Gynecological (except Uterine/Cervical/Ovarian)	12	1	\$22,893	\$18,607	(\$4,286)	(\$4)
5	1	Kidney	43	7	\$24,389	\$7,528	(\$16,861)	(\$118)
5	1	Liver/Biliary	54	12	\$19,454	\$22,334	\$2,880	\$34
5	1	Lung	301	71	\$20,430	\$10,790	(\$9,640)	(\$684)
5	1	Lymphoma (Hodgkins)	4	1	\$14,642	\$20,276	\$5,634	\$5
5	1	Lymphoma (Non-Hodgkins)	41	14	\$22,232	\$13,819	(\$8,413)	(\$117)
5	1	MDS	39	33	\$24,671	\$27,448	\$2,777	\$91
5	1	Melanoma	22	6	\$23,392	\$11,400	(\$11,991)	(\$71)
5	1	Other	120	33	\$21,694	\$25,172	\$3,478	\$114
5	1	Ovarian	28	11	\$25,603	\$18,938	(\$6,665)	(\$73)
5	1	Pancreatic	85	9	\$20,776	\$22,140	\$1,364	\$12
5	1	Prostate	101	47	\$19,724	\$6,031	(\$13,693)	(\$643)
5	1	Secondary	32	14	\$23,705	\$12,452	(\$11,254)	(\$157)
5	1	Stomach	27	5	\$25,673	\$10,104	(\$15,570)	(\$77)
5	1	Thyroid	2	0	\$8,007			
5	1	Uterine	27	5	\$17,782	\$18,139	\$357	\$1
5	2	Bone	1	0	\$22,711			
5	2	Brain/CNS	9	3	\$40,380	\$21,134	(\$19,247)	(\$57)
5	2	Breast	24	17	\$29,805	\$24,301	(\$5,504)	(\$93)
5	2	Cervical	3	2	\$46,246	\$11,615	(\$34,631)	(\$69)
5	2	Colon	71	26	\$28,244	\$32,909	\$4,665	\$121
5	2	ENT	18	7	\$23,915	\$25,692	\$1,776	\$12
5	2	Esophageal	7	5	\$20,465	\$35,470	\$15,005	\$75
5	2	Genitourinary	32	11	\$31,798	\$23,073	(\$8,725)	(\$95)
5	2	Gynecological (except Uterine/Cervical/Ovarian)	3	0	\$31,413			
5	2	Kidney	22	2	\$27,844	\$20,658	(\$7,186)	(\$14)
5	2	Leukemia	2	2	\$15,912	\$48,020	\$32,108	\$64
5	2	Liver/Biliary	20	5	\$36,242	\$46,757	\$10,516	\$52
5	2	Lung	91	29	\$24,006	\$22,809	(\$1,196)	(\$34)
5	2	Lymphoma (Hodgkins)	0	1		\$85,563		
5	2	Lymphoma (Non-Hodgkins)	17	11	\$24,520	\$28,274	\$3,754	\$41
5	2	MDS	21	18	\$33,860	\$39,247	\$5,386	\$96
5	2	Melanoma	8	3	\$29,665	\$7,303	(\$22,362)	(\$67)
5	2	Other	28	12	\$35,986	\$38,028	\$2,042	\$24
5	2	Ovarian	11	2	\$37,920	\$16,354	(\$21,566)	(\$43)
5	2	Pancreatic	32	3	\$28,509	\$28,284	(\$224)	\$0
5	2	Prostate	32	13	\$32,054	\$33,256	\$1,203	\$15
5	2	Secondary	19	7	\$29,590	\$29,586	(\$4)	\$0
5	2	Small Bowel	1	0	\$17,588			
5	2	Stomach	13	4	\$28,148	\$48,102	\$19,954	\$79
5	2	Uterine	11	6	\$27,967	\$42,689	\$14,723	\$88

Table 5-C: Scenario 3 — 254 Groupings Based on Status, Severity, and Most Dominant Cancer Type (2 of 5)

Status	SOI	Cancer Type	Patient Count		Average Costs		Potential Savings	
			Hospice	Non-Hospice	Hospice	Non-Hospice	Per Patient	Total (\$1,000's)
5	5	Bone	7	1	\$32,808	\$6,870	(\$25,939)	(\$25)
5	5	Brain/CNS	11	3	\$28,752	\$37,653	\$8,901	\$26
5	5	Breast	109	25	\$26,565	\$31,087	\$4,522	\$113
5	5	Cervical	1	0	\$28,514			
5	5	Colon	147	46	\$35,905	\$34,666	(\$1,239)	(\$56)
5	5	ENT	26	14	\$35,171	\$33,048	(\$2,123)	(\$29)
5	5	Esophageal	17	9	\$32,284	\$22,464	(\$9,820)	(\$88)
5	5	Genitourinary	72	19	\$32,968	\$27,920	(\$5,048)	(\$95)
5	5	Gynecological (except Uterine/Cervical/Ovarian)	1	0	\$41,233			
5	5	Kaposi Sarcoma	0	1		\$1,409		
5	5	Kidney	38	6	\$34,909	\$24,212	(\$10,696)	(\$64)
5	5	Leukemia	79	36	\$27,784	\$27,299	(\$485)	(\$17)
5	5	Liver/Biliary	28	5	\$34,251	\$26,491	(\$7,760)	(\$38)
5	5	Lung	265	62	\$28,018	\$29,574	\$1,556	\$96
5	5	Lymphoma (Hodgkins)	1	1	\$46,016	\$96,963	\$50,946	\$50
5	5	Lymphoma (Non-Hodgkins)	31	15	\$36,963	\$46,996	\$10,033	\$150
5	5	MDS	16	20	\$70,828	\$44,793	(\$26,036)	(\$520)
5	5	Melanoma	32	14	\$29,799	\$50,099	\$20,300	\$284
5	5	Myeloma	34	12	\$28,182	\$26,904	(\$1,277)	(\$15)
5	5	Other	34	10	\$38,100	\$37,334	(\$766)	(\$7)
5	5	Ovarian	50	9	\$34,380	\$40,029	\$5,649	\$50
5	5	Pancreatic	41	9	\$26,880	\$30,180	\$3,300	\$29
5	5	Prostate	124	51	\$27,777	\$29,047	\$1,270	\$64
5	5	Secondary	42	12	\$29,645	\$32,250	\$2,605	\$31
5	5	Small Bowel	4	0	\$42,794			
5	5	Stomach	17	4	\$39,238	\$69,698	\$30,460	\$121
5	5	Thyroid	4	2	\$25,654	\$22,172	(\$3,481)	(\$6)
5	5	Uterine	33	6	\$39,382	\$27,392	(\$11,990)	(\$71)
5	6	Bone	1	0	\$122,808			
5	6	Brain/CNS	2	4	\$71,251	\$44,129	(\$27,122)	(\$108)
5	6	Breast	51	38	\$48,580	\$39,870	(\$8,710)	(\$330)
5	6	Colon	58	49	\$50,150	\$57,462	\$7,311	\$358
5	6	ENT	10	11	\$70,182	\$35,757	(\$34,426)	(\$378)
5	6	Esophageal	5	4	\$53,371	\$24,106	(\$29,264)	(\$117)
5	6	Genitourinary	33	20	\$55,879	\$58,897	\$3,018	\$60
5	6	Kidney	12	19	\$50,196	\$50,216	\$20	\$0
5	6	Leukemia	27	27	\$49,270	\$56,254	\$6,984	\$188
5	6	Liver/Biliary	7	11	\$33,620	\$35,210	\$1,590	\$17
5	6	Lung	88	77	\$43,908	\$48,228	\$4,320	\$332
5	6	Lymphoma (Hodgkins)	0	1		\$216,913		
5	6	Lymphoma (Non-Hodgkins)	14	19	\$69,736	\$58,242	(\$11,493)	(\$218)
5	6	Melanoma	6	8	\$56,504	\$35,017	(\$21,488)	(\$171)
5	6	Myeloma	6	6	\$45,851	\$55,811	\$9,959	\$59
5	6	Other	38	12	\$44,749	\$47,578	\$2,829	\$33
5	6	Ovarian	22	6	\$50,637	\$42,731	(\$7,906)	(\$47)
5	6	Pancreatic	10	8	\$45,843	\$70,484	\$24,641	\$197
5	6	Prostate	32	46	\$51,703	\$39,751	(\$11,952)	(\$549)
5	6	Secondary	6	7	\$44,761	\$56,170	\$11,409	\$79
5	6	Small Bowel	2	0	\$49,721			
5	6	Stomach	4	2	\$42,334	\$34,586	(\$7,748)	(\$15)
5	6	Thyroid	2	3	\$30,309	\$37,402	\$7,093	\$21
5	6	Uterine	15	9	\$64,645	\$48,351	(\$16,294)	(\$146)

Table 5-C: Scenario 3 — 254 Groupings Based on Status, Severity, and Most Dominant Cancer Type (3 of 5)

Status	SOI	Cancer Type	Patient Count		Average Costs		Potential Savings	
			Hospice	Non-Hospice	Hospice	Non-Hospice	Per Patient	Total (\$1,000's)
6	1	Breast	133	38	\$22,409	\$10,739	(\$11,669)	(\$443)
6	1	Colon	42	12	\$22,178	\$24,702	\$2,525	\$30
6	1	Genitourinary	171	29	\$23,647	\$24,867	\$1,220	\$35
6	1	Hematologic	73	19	\$26,416	\$30,460	\$4,044	\$76
6	1	Kidney	38	6	\$23,251	\$12,444	(\$10,806)	(\$64)
6	1	Lung	163	36	\$22,419	\$14,530	(\$7,889)	(\$284)
6	1	Melanoma	29	12	\$17,300	\$14,944	(\$2,355)	(\$28)
6	1	Other	1,181	189	\$24,073	\$24,554	\$481	\$90
6	1	Prostate	133	54	\$21,030	\$11,161	(\$9,869)	(\$532)
6	2	Breast	119	49	\$27,897	\$26,896	(\$1,001)	(\$49)
6	2	Colon	59	15	\$31,112	\$35,316	\$4,204	\$63
6	2	Genitourinary	139	36	\$34,553	\$30,322	(\$4,231)	(\$152)
6	2	Hematologic	123	43	\$33,995	\$28,774	(\$5,221)	(\$224)
6	2	Kidney	63	10	\$30,205	\$40,616	\$10,411	\$104
6	2	Lung	106	26	\$29,376	\$25,916	(\$3,460)	(\$89)
6	2	Melanoma	33	7	\$33,997	\$23,977	(\$10,020)	(\$70)
6	2	Other	954	231	\$32,302	\$34,346	\$2,044	\$472
6	2	Prostate	188	74	\$30,819	\$20,399	(\$10,420)	(\$771)
6	3	Breast	111	65	\$35,005	\$30,064	(\$4,941)	(\$321)
6	3	Colon	74	26	\$37,318	\$44,435	\$7,117	\$185
6	3	Genitourinary	162	66	\$42,443	\$40,031	(\$2,412)	(\$159)
6	3	Hematologic	161	92	\$33,365	\$46,675	\$13,309	\$1,224
6	3	Kidney	65	21	\$35,401	\$35,542	\$141	\$2
6	3	Lung	277	68	\$31,898	\$29,235	(\$2,663)	(\$181)
6	3	Melanoma	30	17	\$45,667	\$50,076	\$4,409	\$74
6	3	Other	802	328	\$40,326	\$45,090	\$4,764	\$1,562
6	3	Prostate	191	122	\$39,394	\$32,295	(\$7,099)	(\$866)
6	4	Breast	93	67	\$46,777	\$46,879	\$102	\$6
6	4	Colon	105	53	\$54,255	\$57,886	\$3,631	\$192
6	4	Genitourinary	125	86	\$49,462	\$43,687	(\$5,776)	(\$496)
6	4	Hematologic	151	86	\$41,377	\$47,984	\$6,607	\$568
6	4	Kidney	47	21	\$49,979	\$56,158	\$6,179	\$129
6	4	Lung	274	127	\$41,754	\$45,587	\$3,833	\$486
6	4	Melanoma	28	13	\$43,143	\$38,691	(\$4,452)	(\$57)
6	4	Other	572	285	\$52,533	\$57,564	\$5,031	\$1,433
6	4	Prostate	162	131	\$45,250	\$39,985	(\$5,265)	(\$689)
6	5	Breast	66	54	\$51,663	\$46,878	(\$4,785)	(\$258)
6	5	Colon	51	44	\$75,014	\$71,625	(\$3,389)	(\$149)
6	5	Genitourinary	113	74	\$66,403	\$67,688	\$1,286	\$95
6	5	Hematologic	126	102	\$65,695	\$60,994	(\$4,701)	(\$479)
6	5	Kidney	32	21	\$56,025	\$67,949	\$11,924	\$250
6	5	Lung	145	83	\$51,762	\$62,341	\$10,579	\$878
6	5	Melanoma	20	12	\$57,458	\$40,235	(\$17,223)	(\$206)
6	5	Other	443	222	\$61,636	\$71,500	\$9,865	\$2,189
6	5	Prostate	132	101	\$52,480	\$57,072	\$4,591	\$463
6	6	Breast	38	30	\$67,992	\$69,248	\$1,255	\$37
6	6	Colon	59	58	\$77,570	\$92,422	\$14,852	\$861
6	6	Genitourinary	56	43	\$80,509	\$90,279	\$9,770	\$420
6	6	Hematologic	87	76	\$70,646	\$73,834	\$3,188	\$242
6	6	Kidney	25	15	\$68,750	\$79,871	\$11,121	\$166
6	6	Lung	140	110	\$63,912	\$70,413	\$6,501	\$715
6	6	Melanoma	10	7	\$60,545	\$81,856	\$21,311	\$149
6	6	Other	155	125	\$71,592	\$87,576	\$15,984	\$1,998
6	6	Prostate	75	84	\$69,107	\$65,289	(\$3,818)	(\$320)

Table 5-C: Scenario 3 — 254 Groupings Based on Status, Severity, and Most Dominant Cancer Type (4 of 5)

Status	SOI	Cancer Type	Patient Count		Average Costs		Potential Savings	
			Hospice	Non-Hospice	Hospice	Non-Hospice	Per Patient	Total (\$1,000's)
7	1	Other	50	19	\$32,058	\$29,705	(\$2,353)	(\$44)
7	2	Other	165	81	\$46,672	\$57,283	\$10,611	\$859
7	3	Other	67	52	\$66,341	\$56,886	(\$9,455)	(\$491)
7	4	Other	58	47	\$77,779	\$77,197	(\$582)	(\$27)
7	5	Other	41	65	\$81,470	\$91,128	\$9,658	\$627
7	6	Other	33	32	\$122,039	\$105,066	(\$16,974)	(\$543)
8	1	Bone	2	0	\$26,445			
8	1	Breast	43	10	\$36,901	\$34,544	(\$2,358)	(\$23)
8	1	Cervical	14	3	\$49,673	\$44,277	(\$5,395)	(\$16)
8	1	Colon	48	16	\$39,107	\$32,863	(\$6,244)	(\$99)
8	1	ENT	23	16	\$37,931	\$36,658	(\$1,273)	(\$20)
8	1	Genitourinary	23	9	\$57,689	\$62,302	\$4,613	\$41
8	1	Gynecological (except Uterine/Cervical/Ovarian)	19	3	\$63,305	\$45,965	(\$17,339)	(\$52)
8	1	Leukemia	8	3	\$23,301	\$26,691	\$3,390	\$10
8	1	Lymphoma (Hodgkins)	2	3	\$23,120	\$23,832	\$712	\$2
8	1	Lymphoma (Non-Hodgkins)	53	15	\$46,439	\$58,098	\$11,659	\$174
8	1	Melanoma	17	3	\$84,236	\$100,367	\$16,131	\$48
8	1	Myeloma	30	12	\$40,959	\$40,093	(\$866)	(\$10)
8	1	Other	3	0	\$35,096			
8	1	Prostate	8	5	\$29,988	\$18,263	(\$11,724)	(\$58)
8	1	Uterine	2	1	\$37,439	\$30,217	(\$7,221)	(\$7)
8	2	Bone	1	0	\$65,263			
8	2	Brain/CNS	35	0	\$53,791			
8	2	Breast	36	17	\$43,214	\$52,607	\$9,393	\$159
8	2	Cervical	19	3	\$50,947	\$61,577	\$10,631	\$31
8	2	Colon	87	35	\$49,895	\$59,834	\$9,939	\$347
8	2	ENT	49	21	\$44,348	\$58,733	\$14,385	\$302
8	2	Esophageal	22	7	\$47,749	\$44,647	(\$3,102)	(\$21)
8	2	Genitourinary	27	12	\$56,278	\$74,313	\$18,035	\$216
8	2	Gynecological (except Uterine/Cervical/Ovarian)	6	2	\$67,731	\$68,055	\$325	\$0
8	2	Kidney	4	4	\$49,706	\$38,604	(\$11,102)	(\$44)
8	2	Leukemia	21	19	\$58,768	\$59,273	\$505	\$9
8	2	Liver/Biliary	2	1	\$27,232	\$57,024	\$29,792	\$29
8	2	Lung	142	38	\$31,084	\$39,625	\$8,542	\$324
8	2	Lymphoma (Hodgkins)	3	0	\$68,705			
8	2	Lymphoma (Non-Hodgkins)	101	46	\$75,132	\$74,691	(\$441)	(\$20)
8	2	Melanoma	41	22	\$110,553	\$118,248	\$7,694	\$169
8	2	Myeloma	76	27	\$66,638	\$67,709	\$1,072	\$28
8	2	Other	2	2	\$81,317	\$39,743	(\$41,574)	(\$83)
8	2	Ovarian	20	3	\$43,617	\$45,986	\$2,369	\$7
8	2	Pancreatic	102	18	\$35,715	\$27,875	(\$7,840)	(\$141)
8	2	Prostate	33	18	\$52,594	\$58,064	\$5,471	\$98
8	2	Secondary	1	0	\$26,544			
8	2	Stomach	10	3	\$44,019	\$27,950	(\$16,069)	(\$48)
8	2	Thyroid	1	0	\$131,225			
8	2	Uterine	3	3	\$73,221	\$34,352	(\$38,869)	(\$116)

Table 5-C: Scenario 3 — 254 Groupings Based on Status, Severity, and Most Dominant Cancer Type (5 of 5)

Status	SOI	Cancer Type	Patient Count		Average Costs		Potential Savings	
			Hospice	Non-Hospice	Hospice	Non-Hospice	Per Patient	Total (\$1,000's)
8	3	Bone	11	1	\$62,952	\$88,173	\$25,221	\$25
8	3	Brain/CNS	37	15	\$71,929	\$89,572	\$17,644	\$264
8	3	Breast	203	77	\$54,257	\$66,257	\$12,001	\$924
8	3	Cervical	3	3	\$91,329	\$115,302	\$23,972	\$71
8	3	Colon	201	59	\$62,695	\$63,881	\$1,186	\$69
8	3	ENT	91	34	\$59,001	\$69,239	\$10,237	\$348
8	3	Esophageal	26	12	\$48,038	\$48,890	\$852	\$10
8	3	Genitourinary	8	6	\$68,792	\$93,618	\$24,827	\$148
8	3	Gynecological (except Uterine/Cervical/Ovarian)	5	2	\$65,349	\$175,718	\$110,369	\$220
8	3	Kidney	5	2	\$37,779	\$46,519	\$8,739	\$17
8	3	Leukemia	106	63	\$85,087	\$110,100	\$25,013	\$1,575
8	3	Liver/Biliary	3	1	\$58,826	\$79,645	\$20,819	\$20
8	3	Lung	240	99	\$47,336	\$54,317	\$6,981	\$691
8	3	Lymphoma (Non-Hodgkins)	95	81	\$88,664	\$99,732	\$11,069	\$896
8	3	Melanoma	4	15	\$51,404	\$152,096	\$100,692	\$1,510
8	3	Myeloma	80	35	\$73,250	\$84,069	\$10,819	\$378
8	3	Other	11	2	\$74,162	\$53,961	(\$20,201)	(\$40)
8	3	Ovarian	26	7	\$55,936	\$40,474	(\$15,463)	(\$108)
8	3	Pancreatic	133	34	\$48,052	\$60,061	\$12,008	\$408
8	3	Prostate	143	48	\$57,193	\$60,645	\$3,452	\$165
8	3	Secondary	7	7	\$46,288	\$44,401	(\$1,887)	(\$13)
8	3	Small Bowel	1	0	\$32,648			
8	3	Stomach	26	7	\$59,879	\$60,415	\$536	\$3
8	3	Uterine	2	1	\$65,167	\$62,101	(\$3,065)	(\$3)
8	4	Bone	3	1	\$118,624	\$110,890	(\$7,734)	(\$7)
8	4	Brain/CNS	16	5	\$77,672	\$91,667	\$13,996	\$69
8	4	Breast	77	65	\$66,456	\$68,168	\$1,712	\$111
8	4	Colon	48	47	\$78,077	\$85,034	\$6,958	\$327
8	4	ENT	35	52	\$72,779	\$88,081	\$15,302	\$795
8	4	Esophageal	78	28	\$60,199	\$71,259	\$11,060	\$309
8	4	Kaposi Sarcoma	1	0	\$43,211			
8	4	Kidney	34	7	\$56,076	\$101,299	\$45,223	\$316
8	4	Leukemia	57	57	\$105,916	\$146,582	\$40,666	\$2,317
8	4	Liver/Biliary	4	3	\$77,010	\$43,519	(\$33,491)	(\$100)
8	4	Lung	621	230	\$55,989	\$68,174	\$12,185	\$2,802
8	4	Lymphoma (Hodgkins)	1	4	\$45,944	\$113,552	\$67,608	\$270
8	4	Lymphoma (Non-Hodgkins)	60	98	\$91,336	\$112,323	\$20,987	\$2,056
8	4	Myeloma	38	57	\$87,666	\$96,469	\$8,803	\$501
8	4	Other	2	3	\$90,356	\$81,120	(\$9,236)	(\$27)
8	4	Ovarian	103	31	\$58,488	\$68,770	\$10,282	\$318
8	4	Pancreatic	250	54	\$54,631	\$67,215	\$12,584	\$679
8	4	Prostate	22	26	\$67,031	\$79,640	\$12,609	\$327
8	4	Secondary	3	0	\$87,770			
8	4	Stomach	51	16	\$59,750	\$76,827	\$17,077	\$273
8	5	Brain/CNS	26	5	\$108,436	\$195,707	\$87,270	\$436
8	5	Esophageal	26	41	\$74,413	\$91,875	\$17,463	\$715
8	5	Kidney	14	7	\$77,723	\$74,059	(\$3,664)	(\$25)
8	5	Leukemia	23	44	\$146,870	\$127,386	(\$19,485)	(\$857)
8	5	Liver/Biliary	1	1	\$63,545	\$23,962	(\$39,584)	(\$39)
8	5	Lung	239	254	\$69,574	\$78,819	\$9,245	\$2,348
8	5	Ovarian	47	30	\$64,403	\$82,661	\$18,258	\$547
8	5	Pancreatic	101	57	\$77,896	\$81,084	\$3,188	\$181
8	5	Stomach	24	15	\$70,567	\$80,286	\$9,719	\$145
5	Total		3,583	1,340				(\$3,003)
6-7	Total		9,364	4,117				\$8,688
8	Total		4,611	2,249				\$23,601
Grand Total			17,558	7,706	\$44,036	\$55,294	\$3,803	\$29,306

Table 5-D: Scenario 4 — 362 Groupings Based on Full QCRG Category (1 of 7)

Status	SOI	QCRG Category Description	Patient Count		Average Costs		Potential Savings	
			Hospice	Non-Hospice	Hospice	Non-Hospice	Per Patient	Total (\$1,000's)
5	1	Bone Malignancy Level - 1	3	1	\$25,435	\$7,404	(\$18,032)	(\$18)
5	1	Brain and Central Nervous System Malignancies Level - 1	20	3	\$28,829	\$18,180	(\$10,649)	(\$31)
5	1	Breast Malignancy Level - 1	101	28	\$20,448	\$10,657	(\$9,791)	(\$274)
5	1	Cervical Malignancy Level - 1	12	0	\$23,903			
5	1	Colon Malignancy Level - 1	148	28	\$19,571	\$15,951	(\$3,620)	(\$101)
5	1	Ear, Nose, and Throat Malignancies Level - 1	53	16	\$19,023	\$13,084	(\$5,939)	(\$95)
5	1	Esophageal Malignancy Level - 1	41	9	\$18,431	\$17,749	(\$681)	(\$6)
5	1	Genitourinary Malignancy Level - 1	56	18	\$23,330	\$10,288	(\$13,042)	(\$234)
5	1	Gynecological Malignancies Except Uterine, Cervical, and Ovarian Level - 1	12	1	\$22,893	\$18,607	(\$4,286)	(\$4)
5	1	Hodgkin's Lymphoma Level - 1	4	1	\$14,642	\$20,276	\$5,634	\$5
5	1	Kidney Malignancy Level - 1	43	7	\$24,389	\$7,528	(\$16,861)	(\$118)
5	1	Liver and Biliary Malignancy Level - 1	54	12	\$19,454	\$22,334	\$2,880	\$34
5	1	Lung Malignancy Level - 1	301	71	\$20,430	\$10,790	(\$9,640)	(\$684)
5	1	Melanoma Level - 1	22	6	\$23,392	\$11,400	(\$11,991)	(\$71)
5	1	Myelodysplastic and Related Disorders Level - 1	16	15	\$22,074	\$15,432	(\$6,642)	(\$99)
5	1	Myelodysplastic and Related Disorders Level - 2	23	18	\$26,479	\$37,461	\$10,983	\$197
5	1	Non-Hodgkin's Lymphoma Level - 1	41	14	\$22,232	\$13,819	(\$8,413)	(\$117)
5	1	Other Malignancies Level - 1	26	7	\$19,567	\$9,659	(\$9,908)	(\$69)
5	1	Other Neoplasms of Uncertain Behavior Level - 1	90	24	\$21,638	\$28,439	\$6,801	\$163
5	1	Other Neoplasms of Uncertain Behavior Level - 2	4	2	\$36,766	\$40,262	\$3,495	\$6
5	1	Ovarian Malignancy Level - 1	28	11	\$25,603	\$18,938	(\$6,665)	(\$73)
5	1	Pancreatic Malignancy Level - 1	85	9	\$20,776	\$22,140	\$1,364	\$12
5	1	Prostate Malignancy Level - 1	101	47	\$19,724	\$6,031	(\$13,693)	(\$643)
5	1	Secondary Malignancy Level - 1	32	14	\$23,705	\$12,452	(\$11,254)	(\$157)
5	1	Stomach Malignancy Level - 1	27	5	\$25,673	\$10,104	(\$15,570)	(\$77)
5	1	Thyroid Malignancy Level - 1	2	0	\$8,007			
5	1	Uterine Malignancy Level - 1	27	5	\$17,782	\$18,139	\$357	\$1
5	2	Acute Non-Lymphoid Leukemia Level - 2	2	1	\$15,912	\$45,565	\$29,653	\$29
5	2	Bone Malignancy Level - 2	1	0	\$22,711			
5	2	Brain and Central Nervous System Malignancies Level - 2	9	3	\$40,380	\$21,134	(\$19,247)	(\$57)
5	2	Breast Malignancy Level - 2	24	17	\$29,805	\$24,301	(\$5,504)	(\$93)
5	2	Cervical Malignancy Level - 2	3	2	\$46,246	\$11,615	(\$34,631)	(\$69)
5	2	Chronic Lymphoid Leukemia Level - 2	0	1		\$50,475		
5	2	Colon Malignancy Level - 2	71	26	\$28,244	\$32,909	\$4,665	\$121
5	2	Ear, Nose, and Throat Malignancies Level - 2	18	7	\$23,915	\$25,692	\$1,776	\$12
5	2	Esophageal Malignancy Level - 2	7	5	\$20,465	\$35,470	\$15,005	\$75
5	2	Genitourinary Malignancy Level - 2	32	11	\$31,798	\$23,073	(\$8,725)	(\$95)
5	2	Gynecological Malignancies Except Uterine, Cervical, and Ovarian Level - 2	3	0	\$31,413			
5	2	Hodgkin's Lymphoma Level - 2	0	1		\$85,563		
5	2	Kidney Malignancy Level - 2	22	2	\$27,844	\$20,658	(\$7,186)	(\$14)
5	2	Liver and Biliary Malignancy Level - 2	20	5	\$36,242	\$46,757	\$10,516	\$52
5	2	Lung Malignancy Level - 2	91	29	\$24,006	\$22,809	(\$1,196)	(\$34)
5	2	Melanoma Level - 2	8	3	\$29,665	\$7,303	(\$22,362)	(\$67)
5	2	Myelodysplastic and Related Disorders Level - 3	21	18	\$33,860	\$39,247	\$5,386	\$96
5	2	Non-Hodgkin's Lymphoma Level - 2	17	11	\$24,520	\$28,274	\$3,754	\$41
5	2	Other Malignancies Level - 2	11	3	\$26,760	\$38,387	\$11,627	\$34
5	2	Other Neoplasms of Uncertain Behavior Level - 3	17	9	\$41,955	\$37,908	(\$4,047)	(\$36)
5	2	Ovarian Malignancy Level - 2	11	2	\$37,920	\$16,354	(\$21,566)	(\$43)
5	2	Pancreatic Malignancy Level - 2	32	3	\$28,509	\$28,284	(\$224)	\$0
5	2	Prostate Malignancy Level - 2	32	13	\$32,054	\$33,256	\$1,203	\$15
5	2	Secondary Malignancy Level - 2	19	7	\$29,590	\$29,586	(\$4)	\$0
5	2	Small Bowel Malignancy Level - 2	1	0	\$17,588			
5	2	Stomach Malignancy Level - 2	13	4	\$28,148	\$48,102	\$19,954	\$79
5	2	Uterine Malignancy Level - 2	11	6	\$27,967	\$42,689	\$14,723	\$88

Table 5-D: Scenario 4 — 362 Groupings Based on Full QCRG Category (2 of 7)

Status	SOI	QCRG Category Description	Patient Count		Average Costs		Potential Savings	
			Hospice	Non-Hospice	Hospice	Non-Hospice	Per Patient	Total (\$1,000's)
5	5	Acute Lymphoid Leukemia Level - 3	22	3	\$30,872	\$17,975	(\$12,897)	(\$38)
5	5	Acute Non-Lymphoid Leukemia Level - 3	23	13	\$27,188	\$38,380	\$11,192	\$145
5	5	Bone Malignancy Level - 3	7	1	\$32,808	\$6,870	(\$25,939)	(\$25)
5	5	Brain and Central Nervous System Malignancies Level - 3	11	3	\$28,752	\$37,653	\$8,901	\$26
5	5	Breast Malignancy Level - 3	109	25	\$26,565	\$31,087	\$4,522	\$113
5	5	Cervical Malignancy Level - 3	1	0	\$28,514			
5	5	Chronic Lymphoid Leukemia Level - 3	25	15	\$25,502	\$20,738	(\$4,764)	(\$71)
5	5	Chronic Non-Lymphoid Leukemia Level - 3	9	5	\$28,095	\$23,763	(\$4,332)	(\$21)
5	5	Colon Malignancy Level - 3	147	46	\$35,905	\$34,666	(\$1,239)	(\$56)
5	5	Ear, Nose, and Throat Malignancies Level - 3	26	14	\$35,171	\$33,048	(\$2,123)	(\$29)
5	5	Esophageal Malignancy Level - 3	17	9	\$32,284	\$22,464	(\$9,820)	(\$88)
5	5	Genitourinary Malignancy Level - 3	72	19	\$32,968	\$27,920	(\$5,048)	(\$95)
5	5	Gynecological Malignancies Except Uterine, Cervical, and Ovarian Level - 3	1	0	\$41,233			
5	5	Hodgkin's Lymphoma Level - 3	1	1	\$46,016	\$96,963	\$50,946	\$50
5	5	Kaposi's Sarcoma Level - 3	0	1		\$1,409		
5	5	Kidney Malignancy Level - 3	38	6	\$34,909	\$24,212	(\$10,696)	(\$64)
5	5	Liver and Biliary Malignancy Level - 3	28	5	\$34,251	\$26,491	(\$7,760)	(\$38)
5	5	Lung Malignancy Level - 3	265	62	\$28,018	\$29,574	\$1,556	\$96
5	5	Melanoma Level - 3	32	14	\$29,799	\$50,099	\$20,300	\$284
5	5	Multiple Myeloma Level - 3	34	12	\$28,182	\$26,904	(\$1,277)	(\$15)
5	5	Myelodysplastic and Related Disorders Level - 4	16	20	\$70,828	\$44,793	(\$26,036)	(\$520)
5	5	Non-Hodgkin's Lymphoma Level - 3	31	15	\$36,963	\$46,996	\$10,033	\$150
5	5	Other Malignancies Level - 3	34	7	\$38,100	\$32,974	(\$5,126)	(\$35)
5	5	Other Neoplasms of Uncertain Behavior Level - 4	0	3		\$47,509		
5	5	Ovarian Malignancy Level - 3	50	9	\$34,380	\$40,029	\$5,649	\$50
5	5	Pancreatic Malignancy Level - 3	41	9	\$26,880	\$30,180	\$3,300	\$29
5	5	Prostate Malignancy Level - 3	124	51	\$27,777	\$29,047	\$1,270	\$64
5	5	Secondary Malignancy Level - 3	42	12	\$29,645	\$32,250	\$2,605	\$31
5	5	Small Bowel Malignancy Level - 3	4	0	\$42,794			
5	5	Stomach Malignancy Level - 3	17	4	\$39,238	\$69,698	\$30,460	\$121
5	5	Thyroid Malignancy Level - 3	4	2	\$25,654	\$22,172	(\$3,481)	(\$6)
5	5	Uterine Malignancy Level - 3	33	6	\$39,382	\$27,392	(\$11,990)	(\$71)
5	6	Acute Lymphoid Leukemia Level - 4	4	2	\$38,976	\$80,707	\$41,731	\$83
5	6	Acute Non-Lymphoid Leukemia Level - 4	13	12	\$43,002	\$61,322	\$18,320	\$219
5	6	Bone Malignancy Level - 4	1	0	\$122,808			
5	6	Brain and Central Nervous System Malignancies Level - 4	2	4	\$71,251	\$44,129	(\$27,122)	(\$108)
5	6	Breast Malignancy Level - 4	51	38	\$48,580	\$39,870	(\$8,710)	(\$330)
5	6	Chronic Lymphoid Leukemia Level - 4	3	8	\$61,865	\$43,573	(\$18,293)	(\$146)
5	6	Chronic Non-Lymphoid Leukemia Level - 4	7	5	\$61,395	\$54,599	(\$6,796)	(\$33)
5	6	Colon Malignancy Level - 4	58	49	\$50,150	\$57,462	\$7,311	\$358
5	6	Ear, Nose, and Throat Malignancies Level - 4	10	11	\$70,182	\$35,757	(\$34,426)	(\$378)
5	6	Esophageal Malignancy Level - 4	5	4	\$53,371	\$24,106	(\$29,264)	(\$117)
5	6	Genitourinary Malignancy Level - 4	33	20	\$55,879	\$58,897	\$3,018	\$60
5	6	Hodgkin's Lymphoma Level - 4	0	1		\$216,913		
5	6	Kidney Malignancy Level - 4	12	19	\$50,196	\$50,216	\$20	\$0
5	6	Liver and Biliary Malignancy Level - 4	7	11	\$33,620	\$35,210	\$1,590	\$17
5	6	Lung Malignancy Level - 4	88	77	\$43,908	\$48,228	\$4,320	\$332
5	6	Melanoma Level - 4	6	8	\$56,504	\$35,017	(\$21,488)	(\$171)
5	6	Multiple Myeloma Level - 4	6	6	\$45,851	\$55,811	\$9,959	\$59
5	6	Non-Hodgkin's Lymphoma Level - 4	14	19	\$69,736	\$58,242	(\$11,493)	(\$218)
5	6	Other Malignancies Level - 4	38	12	\$44,749	\$47,578	\$2,829	\$33
5	6	Ovarian Malignancy Level - 4	22	6	\$50,637	\$42,731	(\$7,906)	(\$47)
5	6	Pancreatic Malignancy Level - 4	10	8	\$45,843	\$70,484	\$24,641	\$197
5	6	Prostate Malignancy Level - 4	32	46	\$51,703	\$39,751	(\$11,952)	(\$549)
5	6	Secondary Malignancy Level - 4	6	7	\$44,761	\$56,170	\$11,409	\$79
5	6	Small Bowel Malignancy Level - 4	2	0	\$49,721			
5	6	Stomach Malignancy Level - 4	4	2	\$42,334	\$34,586	(\$7,748)	(\$15)
5	6	Thyroid Malignancy Level - 4	2	3	\$30,309	\$37,402	\$7,093	\$21
5	6	Uterine Malignancy Level - 4	15	9	\$64,645	\$48,351	(\$16,294)	(\$146)

Table 5-D: Scenario 4 — 362 Groupings Based on Full QCRG Category (3 of 7)

Status	SQI	QCRG Category Description	Patient Count		Average Costs		Potential Savings	
			Hospice	Non-Hospice	Hospice	Non-Hospice	Per Patient	Total (\$1,000's)
6	1	Breast Malignancy and Other Dominant Chronic Disease Level - 1	43	15	\$21,039	\$9,311	(\$11,728)	(\$175)
6	1	Breast Malignancy and Other Moderate Chronic Disease Level - 1	54	10	\$23,191	\$5,103	(\$18,087)	(\$180)
6	1	Breast Malignancy and Other Moderate Chronic Disease Level - 2	36	13	\$22,872	\$16,724	(\$6,149)	(\$79)
6	1	Colon Malignancy and Other Dominant Chronic Disease Level - 1	42	12	\$22,178	\$24,702	\$2,525	\$30
6	1	Hematologic Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 1	19	7	\$30,321	\$29,657	(\$664)	(\$4)
6	1	Hematologic Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 1	30	4	\$22,799	\$20,184	(\$2,615)	(\$10)
6	1	Hematologic Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 2	24	8	\$27,846	\$36,302	\$8,455	\$67
6	1	Kidney Malignancy and Other Dominant Chronic Disease Level - 1	7	2	\$22,921	\$6,420	(\$16,501)	(\$33)
6	1	Kidney Malignancy and Other Moderate Chronic Disease Level - 1	20	3	\$18,936	\$19,804	\$868	\$2
6	1	Kidney Malignancy and Other Moderate Chronic Disease Level - 2	11	1	\$31,306	\$2,415	(\$28,891)	(\$28)
6	1	Lung Malignancy and Other Dominant Chronic Disease Level - 1	163	36	\$22,419	\$14,530	(\$7,889)	(\$284)
6	1	Malignant Melanoma and Other Dominant Chronic Disease Level - 1	10	5	\$15,391	\$11,721	(\$3,669)	(\$18)
6	1	Malignant Melanoma and Other Moderate Chronic Disease Level - 1	12	2	\$15,026	\$17,087	\$2,061	\$4
6	1	Malignant Melanoma and Other Moderate Chronic Disease Level - 2	7	5	\$23,924	\$17,311	(\$6,613)	(\$33)
6	1	Moderate Chronic Malignancy and Other Moderate Chronic Disease Level - 1	61	6	\$22,072	\$26,808	\$4,736	\$28
6	1	Moderate Chronic Malignancy and Other Moderate Chronic Disease Level - 2	47	16	\$26,896	\$32,494	\$5,598	\$89
6	1	Other Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 1	145	37	\$25,058	\$23,863	(\$1,195)	(\$44)
6	1	Other Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 1	586	61	\$21,075	\$18,953	(\$2,122)	(\$129)
6	1	Other Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 2	342	69	\$28,763	\$27,839	(\$924)	(\$63)
6	1	Other Genitourinary Malignancy and Other Dominant Chronic Disease Level - 1	39	9	\$20,591	\$13,834	(\$6,757)	(\$60)
6	1	Other Genitourinary Malignancy and Other Moderate Chronic Disease Level - 1	72	8	\$22,168	\$20,339	(\$1,829)	(\$14)
6	1	Other Genitourinary Malignancy and Other Moderate Chronic Disease Level - 2	60	12	\$27,408	\$36,160	\$8,752	\$105
6	1	Prostate Malignancy and Other Dominant Chronic Disease Level - 1	49	27	\$20,513	\$9,244	(\$11,269)	(\$304)
6	1	Prostate Malignancy and Other Moderate Chronic Disease Level - 1	51	14	\$19,429	\$8,022	(\$11,407)	(\$159)
6	1	Prostate Malignancy and Other Moderate Chronic Disease Level - 2	33	13	\$24,272	\$18,523	(\$5,749)	(\$74)
6	2	Breast Malignancy and Other Dominant Chronic Disease Level - 2	40	25	\$28,219	\$23,283	(\$4,936)	(\$123)
6	2	Breast Malignancy and Other Moderate Chronic Disease Level - 3	79	24	\$27,733	\$30,659	\$2,926	\$70
6	2	Colon Malignancy and Other Dominant Chronic Disease Level - 2	59	15	\$31,112	\$35,316	\$4,204	\$63
6	2	Hematologic Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 2	23	6	\$31,847	\$16,934	(\$14,913)	(\$89)
6	2	Hematologic Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 3	100	37	\$34,489	\$30,693	(\$3,795)	(\$140)
6	2	Kidney Malignancy and Other Dominant Chronic Disease Level - 2	21	2	\$24,007	\$13,611	(\$10,396)	(\$20)
6	2	Kidney Malignancy and Other Moderate Chronic Disease Level - 3	42	8	\$33,304	\$47,367	\$14,063	\$112
6	2	Lung Malignancy and Other Dominant Chronic Disease Level - 2	106	26	\$29,376	\$25,916	(\$3,460)	(\$89)
6	2	Malignant Melanoma and Other Dominant Chronic Disease Level - 2	8	4	\$23,577	\$14,558	(\$9,020)	(\$36)
6	2	Malignant Melanoma and Other Moderate Chronic Disease Level - 3	25	3	\$37,331	\$36,536	(\$796)	(\$2)
6	2	Moderate Chronic Malignancy and Other Moderate Chronic Disease Level - 3	73	21	\$33,005	\$40,532	\$7,527	\$158
6	2	Other Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 2	174	43	\$28,438	\$32,827	\$4,389	\$188
6	2	Other Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 3	707	167	\$33,181	\$33,959	\$778	\$129
6	2	Other Genitourinary Malignancy and Other Dominant Chronic Disease Level - 2	40	20	\$30,948	\$25,902	(\$5,046)	(\$100)
6	2	Other Genitourinary Malignancy and Other Moderate Chronic Disease Level - 3	99	16	\$36,009	\$35,847	(\$162)	(\$2)
6	2	Prostate Malignancy and Other Dominant Chronic Disease Level - 2	53	29	\$27,533	\$17,904	(\$9,629)	(\$279)
6	2	Prostate Malignancy and Other Moderate Chronic Disease Level - 3	135	45	\$32,110	\$22,007	(\$10,103)	(\$454)
6	3	Breast Malignancy and Other Dominant Chronic Disease Level - 3	53	35	\$30,578	\$29,106	(\$1,471)	(\$51)
6	3	Breast Malignancy and Other Moderate Chronic Disease Level - 4	58	30	\$39,052	\$31,181	(\$7,870)	(\$236)
6	3	Colon Malignancy and Other Dominant Chronic Disease Level - 3	74	26	\$37,318	\$44,435	\$7,117	\$185
6	3	Hematologic Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 3	111	46	\$27,811	\$36,020	\$8,209	\$377
6	3	Hematologic Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 4	50	46	\$45,697	\$57,330	\$11,633	\$535
6	3	Kidney Malignancy and Other Dominant Chronic Disease Level - 3	38	10	\$30,610	\$34,966	\$4,356	\$43
6	3	Kidney Malignancy and Other Moderate Chronic Disease Level - 4	27	11	\$42,146	\$36,066	(\$6,080)	(\$66)
6	3	Lung Malignancy and Other Dominant Chronic Disease Level - 3	277	68	\$31,898	\$29,235	(\$2,663)	(\$181)
6	3	Malignant Melanoma and Other Dominant Chronic Disease Level - 3	20	9	\$47,923	\$42,981	(\$4,942)	(\$44)
6	3	Malignant Melanoma and Other Moderate Chronic Disease Level - 4	10	8	\$41,155	\$58,058	\$16,904	\$135
6	3	Moderate Chronic Malignancy and Other Moderate Chronic Disease Level - 4	57	26	\$49,816	\$45,435	(\$4,381)	(\$113)
6	3	Other Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 3	266	76	\$34,658	\$39,526	\$4,867	\$369
6	3	Other Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 4	479	226	\$42,345	\$46,922	\$4,577	\$1,034
6	3	Other Genitourinary Malignancy and Other Dominant Chronic Disease Level - 3	90	32	\$38,559	\$38,423	(\$136)	(\$4)
6	3	Other Genitourinary Malignancy and Other Moderate Chronic Disease Level - 4	72	34	\$47,298	\$41,545	(\$5,753)	(\$195)
6	3	Prostate Malignancy and Other Dominant Chronic Disease Level - 3	112	64	\$36,515	\$28,287	(\$8,228)	(\$526)
6	3	Prostate Malignancy and Other Moderate Chronic Disease Level - 4	79	58	\$43,474	\$36,717	(\$6,758)	(\$391)

Table 5-D: Scenario 4 — 362 Groupings Based on Full QCRG Category (4 of 7)

Status	SQI	QCRG Category Description	Patient Count		Average Costs		Potential Savings	
			Hospice	Non-Hospice	Hospice	Non-Hospice	Per Patient	Total (\$1,000's)
6	4	Breast Malignancy and Other Dominant Chronic Disease Level - 4	78	55	\$46,215	\$42,301	(\$3,914)	(\$215)
6	4	Breast Malignancy and Other Moderate Chronic Disease Level - 5	15	12	\$49,697	\$67,863	\$18,165	\$217
6	4	Colon Malignancy and Other Dominant Chronic Disease Level - 4	105	53	\$54,255	\$57,886	\$3,631	\$192
6	4	Hematologic Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 4	118	69	\$41,527	\$43,139	\$1,612	\$111
6	4	Hematologic Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 5	33	17	\$40,841	\$67,652	\$26,810	\$455
6	4	Kidney Malignancy and Other Dominant Chronic Disease Level - 4	30	17	\$46,189	\$46,272	\$83	\$1
6	4	Kidney Malignancy and Other Moderate Chronic Disease Level - 5	17	4	\$56,667	\$98,171	\$41,504	\$166
6	4	Lung Malignancy and Other Dominant Chronic Disease Level - 4	274	127	\$41,754	\$45,587	\$3,833	\$486
6	4	Malignant Melanoma and Other Dominant Chronic Disease Level - 4	19	8	\$45,467	\$38,510	(\$6,957)	(\$55)
6	4	Malignant Melanoma and Other Moderate Chronic Disease Level - 5	9	5	\$38,238	\$38,980	\$743	\$3
6	4	Moderate Chronic Malignancy and Other Moderate Chronic Disease Level - 5	24	22	\$62,024	\$69,883	\$7,858	\$172
6	4	Moderate Chronic Malignancy and Other Moderate Chronic Disease Level - 6	26	22	\$75,550	\$75,125	(\$425)	(\$9)
6	4	Other Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 4	295	144	\$46,011	\$54,599	\$8,588	\$1,236
6	4	Other Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 5	227	97	\$57,368	\$55,188	(\$2,180)	(\$211)
6	4	Other Genitourinary Malignancy and Other Dominant Chronic Disease Level - 4	83	65	\$45,729	\$40,003	(\$5,726)	(\$372)
6	4	Other Genitourinary Malignancy and Other Moderate Chronic Disease Level - 5	42	21	\$56,839	\$55,087	(\$1,752)	(\$36)
6	4	Prostate Malignancy and Other Dominant Chronic Disease Level - 4	133	103	\$43,712	\$36,766	(\$6,946)	(\$715)
6	4	Prostate Malignancy and Other Moderate Chronic Disease Level - 5	29	28	\$52,305	\$51,826	(\$479)	(\$13)
6	5	Breast Malignancy and Other Dominant Chronic Disease Level - 5	51	39	\$48,391	\$47,653	(\$738)	(\$28)
6	5	Breast Malignancy and Other Moderate Chronic Disease Level - 6	15	15	\$62,787	\$44,864	(\$17,923)	(\$268)
6	5	Colon Malignancy and Other Dominant Chronic Disease Level - 5	51	44	\$75,014	\$71,625	(\$3,389)	(\$149)
6	5	Hematologic Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 5	94	64	\$63,851	\$49,257	(\$14,594)	(\$934)
6	5	Hematologic Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 6	32	38	\$71,111	\$80,762	\$9,651	\$366
6	5	Kidney Malignancy and Other Dominant Chronic Disease Level - 5	19	15	\$48,562	\$63,293	\$14,730	\$220
6	5	Kidney Malignancy and Other Moderate Chronic Disease Level - 6	13	6	\$66,932	\$79,589	\$12,656	\$75
6	5	Lung Malignancy and Other Dominant Chronic Disease Level - 5	145	83	\$51,762	\$62,341	\$10,579	\$878
6	5	Malignant Melanoma and Other Dominant Chronic Disease Level - 5	16	9	\$50,961	\$36,885	(\$14,077)	(\$126)
6	5	Malignant Melanoma and Other Moderate Chronic Disease Level - 6	4	3	\$83,444	\$50,286	(\$33,157)	(\$99)
6	5	Other Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 5	212	95	\$54,779	\$65,340	\$10,561	\$1,003
6	5	Other Dominant Chronic Malignancy and Other Moderate Chronic Disease Level - 6	231	127	\$67,928	\$76,109	\$8,180	\$1,038
6	5	Other Genitourinary Malignancy and Other Dominant Chronic Disease Level - 5	65	41	\$63,534	\$55,747	(\$7,786)	(\$319)
6	5	Other Genitourinary Malignancy and Other Moderate Chronic Disease Level - 6	48	33	\$70,288	\$82,524	\$12,236	\$403
6	5	Prostate Malignancy and Other Dominant Chronic Disease Level - 5	84	66	\$49,914	\$52,860	\$2,947	\$194
6	5	Prostate Malignancy and Other Moderate Chronic Disease Level - 6	48	35	\$56,972	\$65,013	\$8,041	\$281
6	6	Breast Malignancy and Other Dominant Chronic Disease Level - 6	38	30	\$67,992	\$69,248	\$1,255	\$37
6	6	Colon Malignancy and Other Dominant Chronic Disease Level - 6	59	58	\$77,570	\$92,422	\$14,852	\$861
6	6	Hematologic Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 6	87	76	\$70,646	\$73,834	\$3,188	\$242
6	6	Kidney Malignancy and Other Dominant Chronic Disease Level - 6	25	15	\$68,750	\$79,871	\$11,121	\$166
6	6	Lung Malignancy and Other Dominant Chronic Disease Level - 6	140	110	\$63,912	\$70,413	\$6,501	\$715
6	6	Malignant Melanoma and Other Dominant Chronic Disease Level - 6	10	7	\$60,545	\$81,856	\$21,311	\$149
6	6	Other Dominant Chronic Malignancy and Other Dominant Chronic Disease Level - 6	155	125	\$71,592	\$87,576	\$15,984	\$1,998
6	6	Other Genitourinary Malignancy and Other Dominant Chronic Disease Level - 6	56	43	\$80,509	\$90,279	\$9,770	\$420
6	6	Prostate Malignancy and Other Dominant Chronic Disease Level - 6	75	84	\$69,107	\$65,289	(\$3,818)	(\$320)
7	1	Dominant Malignancy - 2 or More Other Dominant Chronic Diseases Level - 1	28	10	\$34,754	\$33,862	(\$892)	(\$8)
7	1	Dominant Malignancy - Diabetes - Congestive Heart Failure Level - 1	22	9	\$28,627	\$25,086	(\$3,540)	(\$31)
7	2	Dominant Malignancy - 2 or More Other Dominant Chronic Diseases Level - 2	68	32	\$52,098	\$75,189	\$23,091	\$738
7	2	Dominant Malignancy - Diabetes - Congestive Heart Failure Level - 2	97	49	\$42,868	\$45,590	\$2,722	\$133
7	3	Dominant Malignancy - 2 or More Other Dominant Chronic Diseases Level - 3	25	16	\$80,399	\$77,986	(\$2,413)	(\$38)
7	3	Dominant Malignancy - Diabetes - Congestive Heart Failure Level - 3	42	36	\$57,973	\$47,509	(\$10,465)	(\$376)
7	4	Dominant Malignancy - 2 or More Other Dominant Chronic Diseases Level - 4	17	11	\$95,575	\$91,646	(\$3,928)	(\$43)
7	4	Dominant Malignancy - Diabetes - Congestive Heart Failure Level - 4	41	36	\$70,401	\$72,782	\$2,381	\$85
7	5	Dominant Malignancy - 2 or More Other Dominant Chronic Diseases Level - 5	11	15	\$124,786	\$113,463	(\$11,323)	(\$169)
7	5	Dominant Malignancy - Diabetes - Congestive Heart Failure Level - 5	30	50	\$65,587	\$84,428	\$18,840	\$942
7	6	Dominant Malignancy - 2 or More Other Dominant Chronic Diseases Level - 6	10	5	\$197,137	\$119,236	(\$77,901)	(\$389)
7	6	Dominant Malignancy - Diabetes - Congestive Heart Failure Level - 6	23	27	\$89,388	\$102,442	\$13,054	\$352

Table 5-D: Scenario 4 — 362 Groupings Based on Full QCRG Category (5 of 7)

Status	SQI	QCRG Category Description	Patient Count		Average Costs		Potential Savings	
			Hospice	Non-Hospice	Hospice	Non-Hospice	Per Patient	Total (\$1,000's)
8	1	Bone Malignancy - Under Active Treatment Level - 1	2	0	\$26,445			
8	1	Breast Malignancy - Under Active Treatment Level - 1	43	10	\$36,901	\$34,544	(\$2,358)	(\$23)
8	1	Cervical Malignancy - Under Active Treatment Level - 1	6	0	\$37,984			
8	1	Cervical Malignancy - Under Active Treatment Level - 2	8	3	\$58,440	\$44,277	(\$14,162)	(\$42)
8	1	Chronic Lymphoid Leukemia - Under Active Treatment Level - 1	8	3	\$23,301	\$26,691	\$3,390	\$10
8	1	Colon Malignancy - Under Active Treatment Level - 1	48	16	\$39,107	\$32,863	(\$6,244)	(\$99)
8	1	Ear, Nose, and Throat Malignancies - Under Active Treatment Level - 1	23	16	\$37,931	\$36,658	(\$1,273)	(\$20)
8	1	Genitourinary Malignancy - Under Active Treatment Level - 1	5	2	\$34,659	\$44,161	\$9,502	\$19
8	1	Genitourinary Malignancy - Under Active Treatment Level - 2	18	7	\$64,086	\$67,485	\$3,399	\$23
8	1	Gynecological Malignancies Except Uterine, Cervical, and Ovarian - Under Active Treatment Level - 1	6	0	\$43,432			
8	1	Gynecological Malignancies Except Uterine, Cervical, and Ovarian - Under Active Treatment Level - 2	13	3	\$72,477	\$45,965	(\$26,511)	(\$79)
8	1	Hodgkins Lymphoma - Under Active Treatment Level - 1	2	3	\$23,120	\$23,832	\$712	\$2
8	1	Melanoma - Under Active Treatment Level - 1	8	1	\$79,907	\$89,472	\$9,566	\$9
8	1	Melanoma - Under Active Treatment Level - 2	9	2	\$88,085	\$105,815	\$17,730	\$35
8	1	Multiple Myeloma - Under Active Treatment Level - 1	30	12	\$40,959	\$40,093	(\$866)	(\$10)
8	1	Non-Hodgkins Lymphoma - Under Active Treatment Level - 1	53	15	\$46,439	\$58,098	\$11,659	\$174
8	1	Other Malignancies - Under Active Treatment Level - 1	3	0	\$35,096			
8	1	Prostate Malignancy - Under Active Treatment Level - 1	8	5	\$29,988	\$18,263	(\$11,724)	(\$58)
8	1	Uterine Malignancy - Under Active Treatment Level - 1	1	0	\$43,915			
8	1	Uterine Malignancy - Under Active Treatment Level - 2	1	1	\$30,962	\$30,217	(\$745)	\$0
8	2	Acute Lymphoid Leukemia - Under Active Treatment Level - 1	1	1	\$30,488	\$802	(\$29,686)	(\$29)
8	2	Acute Non-Lymphoid Leukemia - Under Active Treatment Level - 1	16	7	\$54,528	\$58,219	\$3,691	\$25
8	2	Bone Malignancy - Under Active Treatment Level - 2	1	0	\$65,263			
8	2	Brain and Central Nervous System Malignancies - Under Active Treatment Level - 1	35	0	\$53,791			
8	2	Breast Malignancy - Under Active Treatment Level - 2	36	17	\$43,214	\$52,607	\$9,393	\$159
8	2	Cervical Malignancy - Under Active Treatment Level - 3	19	3	\$50,947	\$61,577	\$10,631	\$31
8	2	Chronic Lymphoid Leukemia - Under Active Treatment Level - 2	4	10	\$82,797	\$59,852	(\$22,945)	(\$229)
8	2	Chronic Non-Lymphoid Leukemia - Under Active Treatment Level - 2	0	1		\$119,325		
8	2	Colon Malignancy - Under Active Treatment Level - 2	87	35	\$49,895	\$59,834	\$9,939	\$347
8	2	Ear, Nose, and Throat Malignancies - Under Active Treatment Level - 2	49	21	\$44,348	\$58,733	\$14,385	\$302
8	2	Esophageal Malignancy - Under Active Treatment Level - 1	22	7	\$47,749	\$44,647	(\$3,102)	(\$21)
8	2	Genitourinary Malignancy - Under Active Treatment Level - 3	27	12	\$56,278	\$74,313	\$18,035	\$216
8	2	Gynecological Malignancies Except Uterine, Cervical, and Ovarian - Under Active Treatment Level - 3	6	2	\$67,731	\$68,055	\$325	\$0
8	2	Hodgkins Lymphoma - Under Active Treatment Level - 2	3	0	\$68,705			
8	2	Kidney Malignancy - Under Active Treatment Level - 1	4	4	\$49,706	\$38,604	(\$11,102)	(\$44)
8	2	Liver and Biliary Malignancy - Under Active Treatment Level - 1	2	1	\$27,232	\$57,024	\$29,792	\$29
8	2	Lung Malignancy - Under Active Treatment Level - 1	142	38	\$31,084	\$39,625	\$8,542	\$324
8	2	Melanoma - Under Active Treatment Level - 3	41	22	\$110,553	\$118,248	\$7,694	\$169
8	2	Multiple Myeloma - Under Active Treatment Level - 2	76	27	\$66,638	\$67,709	\$1,072	\$28
8	2	Non-Hodgkins Lymphoma - Under Active Treatment Level - 2	101	46	\$75,132	\$74,691	(\$441)	(\$20)
8	2	Other Malignancies - Under Active Treatment Level - 2	2	2	\$81,317	\$39,743	(\$41,574)	(\$83)
8	2	Ovarian Malignancy - Under Active Treatment Level - 1	20	3	\$43,617	\$45,986	\$2,369	\$7
8	2	Pancreatic Malignancy - Under Active Treatment Level - 1	102	18	\$35,715	\$27,875	(\$7,840)	(\$141)
8	2	Prostate Malignancy - Under Active Treatment Level - 2	33	18	\$52,594	\$58,064	\$5,471	\$98
8	2	Secondary Malignancy - Under Active Treatment Level - 2	1	0	\$26,544			
8	2	Stomach Malignancy - Under Active Treatment Level - 1	10	3	\$44,019	\$27,950	(\$16,069)	(\$48)
8	2	Thyroid Malignancy - Under Active Treatment Level - 3	1	0	\$131,225			
8	2	Uterine Malignancy - Under Active Treatment Level - 3	3	3	\$73,221	\$34,352	(\$38,869)	(\$116)

Table 5-D: Scenario 4 — 362 Groupings Based on Full QCRG Category (6 of 7)

Status	SOI	QCRG Category Description	Patient Count		Average Costs		Potential Savings	
			Hospice	Non-Hospice	Hospice	Non-Hospice	Per Patient	Total (\$1,000's)
8	3	Acute Lymphoid Leukemia - Under Active Treatment Level - 2	12	3	\$96,251	\$103,394	\$7,143	\$21
8	3	Acute Non-Lymphoid Leukemia - Under Active Treatment Level - 2	85	51	\$82,611	\$114,433	\$31,822	\$1,622
8	3	Bone Malignancy - Under Active Treatment Level - 3	11	1	\$62,952	\$88,173	\$25,221	\$25
8	3	Brain and Central Nervous System Malignancies - Under Active Treatment Level - 2	37	15	\$71,929	\$89,572	\$17,644	\$264
8	3	Breast Malignancy - Under Active Treatment Level - 3	203	77	\$54,257	\$66,257	\$12,001	\$924
8	3	Cervical Malignancy - Under Active Treatment Level - 4	3	3	\$91,329	\$115,302	\$23,972	\$71
8	3	Chronic Lymphoid Leukemia - Under Active Treatment Level - 3	9	7	\$93,590	\$79,770	(\$13,821)	(\$96)
8	3	Chronic Non-Lymphoid Leukemia - Under Active Treatment Level - 3	0	2		\$115,832		
8	3	Colon Malignancy - Under Active Treatment Level - 3	201	59	\$62,695	\$63,881	\$1,186	\$69
8	3	Ear, Nose, and Throat Malignancies - Under Active Treatment Level - 3	91	34	\$59,001	\$69,239	\$10,237	\$348
8	3	Esophageal Malignancy - Under Active Treatment Level - 2	26	12	\$48,038	\$48,890	\$852	\$10
8	3	Genitourinary Malignancy - Under Active Treatment Level - 4	8	6	\$68,792	\$93,618	\$24,827	\$148
8	3	Gynecological Malignancies Except Uterine, Cervical, and Ovarian - Under Active Treatment Level - 4	5	2	\$65,349	\$175,718	\$110,369	\$220
8	3	Kidney Malignancy - Under Active Treatment Level - 2	5	2	\$37,779	\$46,519	\$8,739	\$17
8	3	Liver and Biliary Malignancy - Under Active Treatment Level - 2	3	1	\$58,826	\$79,645	\$20,819	\$20
8	3	Lung Malignancy - Under Active Treatment Level - 2	240	99	\$47,336	\$54,317	\$6,981	\$691
8	3	Melanoma - Under Active Treatment Level - 4	4	15	\$51,404	\$152,096	\$100,692	\$1,510
8	3	Multiple Myeloma - Under Active Treatment Level - 3	80	35	\$73,250	\$84,069	\$10,819	\$378
8	3	Non-Hodgkins Lymphoma - Under Active Treatment Level - 3	95	81	\$88,664	\$99,732	\$11,069	\$896
8	3	Other Malignancies - Under Active Treatment Level - 3	11	2	\$74,162	\$53,961	(\$20,201)	(\$40)
8	3	Ovarian Malignancy - Under Active Treatment Level - 2	26	7	\$55,936	\$40,474	(\$15,463)	(\$108)
8	3	Pancreatic Malignancy - Under Active Treatment Level - 2	133	34	\$48,052	\$60,061	\$12,008	\$408
8	3	Prostate Malignancy - Under Active Treatment Level - 3	143	48	\$57,193	\$60,645	\$3,452	\$165
8	3	Secondary Malignancy - Under Active Treatment Level - 3	7	7	\$46,288	\$44,401	(\$1,887)	(\$13)
8	3	Small Bowel Malignancy - Under Active Treatment Level - 2	1	0	\$32,648			
8	3	Stomach Malignancy - Under Active Treatment Level - 2	26	7	\$59,879	\$60,415	\$536	\$3
8	3	Uterine Malignancy - Under Active Treatment Level - 4	2	1	\$65,167	\$62,101	(\$3,065)	(\$3)
8	4	Acute Lymphoid Leukemia - Under Active Treatment Level - 3	6	0	\$136,080			
8	4	Acute Non-Lymphoid Leukemia - Under Active Treatment Level - 3	47	46	\$101,919	\$161,846	\$59,927	\$2,756
8	4	Bone Malignancy - Under Active Treatment Level - 4	3	1	\$118,624	\$110,890	(\$7,734)	(\$7)
8	4	Brain and Central Nervous System Malignancies - Under Active Treatment Level - 3	16	5	\$77,672	\$91,667	\$13,996	\$69
8	4	Breast Malignancy - Under Active Treatment Level - 4	77	65	\$66,456	\$68,168	\$1,712	\$111
8	4	Chronic Lymphoid Leukemia - Under Active Treatment Level - 4	4	10	\$107,630	\$81,816	(\$25,814)	(\$258)
8	4	Chronic Non-Lymphoid Leukemia - Under Active Treatment Level - 4	0	1		\$92,109		
8	4	Colon Malignancy - Under Active Treatment Level - 4	48	47	\$78,077	\$85,034	\$6,958	\$327
8	4	Ear, Nose, and Throat Malignancies - Under Active Treatment Level - 4	35	52	\$72,779	\$88,081	\$15,302	\$795
8	4	Esophageal Malignancy - Under Active Treatment Level - 3	78	28	\$60,199	\$71,259	\$11,060	\$309
8	4	Hodgkins Lymphoma - Under Active Treatment Level - 4	1	4	\$45,944	\$113,552	\$67,608	\$270
8	4	Kaposi's Sarcoma - Under Active Treatment Level - 4	1	0	\$43,211			
8	4	Kidney Malignancy - Under Active Treatment Level - 3	34	7	\$56,076	\$101,299	\$45,223	\$316
8	4	Liver and Biliary Malignancy - Under Active Treatment Level - 3	4	3	\$77,010	\$43,519	(\$33,491)	(\$100)
8	4	Lung Malignancy - Under Active Treatment Level - 3	621	230	\$55,989	\$68,174	\$12,185	\$2,802
8	4	Multiple Myeloma - Under Active Treatment Level - 4	38	57	\$87,666	\$96,469	\$8,803	\$501
8	4	Non-Hodgkins Lymphoma - Under Active Treatment Level - 4	60	98	\$91,336	\$112,323	\$20,987	\$2,056
8	4	Other Malignancies - Under Active Treatment Level - 4	2	3	\$90,356	\$81,120	(\$9,236)	(\$27)
8	4	Ovarian Malignancy - Under Active Treatment Level - 3	103	31	\$58,488	\$68,770	\$10,282	\$318
8	4	Pancreatic Malignancy - Under Active Treatment Level - 3	250	54	\$54,631	\$67,215	\$12,584	\$679
8	4	Prostate Malignancy - Under Active Treatment Level - 4	22	26	\$67,031	\$79,640	\$12,609	\$327
8	4	Secondary Malignancy - Under Active Treatment Level - 4	3	0	\$87,770			
8	4	Stomach Malignancy - Under Active Treatment Level - 3	51	16	\$59,750	\$76,827	\$17,077	\$273

Table 5-D: Scenario 4 – 362 Groupings Based on Full QCRG Category (7 of 7)

Status	SOI	QCRG Category Description	Patient Count		Average Costs		Potential Savings	
			Hospice	Non-Hospice	Hospice	Non-Hospice	Per Patient	Total (\$1,000's)
8	5	Acute Lymphoid Leukemia - Under Active Treatment Level - 4	7	5	\$146,404	\$94,918	(\$51,486)	(\$257)
8	5	Acute Non-Lymphoid Leukemia - Under Active Treatment Level - 4	16	39	\$147,074	\$131,548	(\$15,526)	(\$605)
8	5	Brain and Central Nervous System Malignancies - Under Active Treatment Level - 4	26	5	\$108,436	\$195,707	\$87,270	\$436
8	5	Esophageal Malignancy - Under Active Treatment Level - 4	26	41	\$74,413	\$91,875	\$17,463	\$715
8	5	Kidney Malignancy - Under Active Treatment Level - 4	14	7	\$77,723	\$74,059	(\$3,664)	(\$25)
8	5	Liver and Biliary Malignancy - Under Active Treatment Level - 4	1	1	\$63,545	\$23,962	(\$39,584)	(\$39)
8	5	Lung Malignancy - Under Active Treatment Level - 4	239	254	\$69,574	\$78,819	\$9,245	\$2,348
8	5	Ovarian Malignancy - Under Active Treatment Level - 4	47	30	\$64,403	\$82,661	\$18,258	\$547
8	5	Pancreatic Malignancy - Under Active Treatment Level - 4	101	57	\$77,896	\$81,084	\$3,188	\$181
8	5	Stomach Malignancy - Under Active Treatment Level - 4	24	15	\$70,567	\$80,286	\$9,719	\$145
5	Total		3,583	1,340				(\$3,132)
6-7	Total		9,364	4,117				\$8,303
8	Total		4,611	2,249				\$23,458
Grand Total			17,558	7,706	\$44,036	\$55,294	\$3,716	\$28,632

Appendix D: Potential Follow-up Studies

This research has provided many insights but also opened up many new questions and potential areas for additional research. Below is a list of potential follow-up studies:

- **Cost Comparison by Site of Death:** We can split the patients into groups based on whether they died in the hospital, in a skilled nursing facility (SNF) or at home.
- **More Refined Regional Analysis:** There was substantial variance between states within the same CMS region. Perform a deeper analysis at the state and metropolitan area levels for each of the CMS regions.
- **More Focused Regional Analysis:** Focus on regions concluded to have the most potential for savings (i.e., New York and/or California) and attempt to explain what is driving the low hospice participation in New York and the high treatment costs in California. Perhaps look at demographic or socioeconomic variables such as age, gender and race distribution, or identify hospitals or medical groups that contribute the most to high costs of treatment.
- **Deeper Analysis into Malignancies under Active Treatment:** Most of the potential savings were for patients who had Malignancies under Active Treatment, with lung cancer having the most potential savings. We can analyze the complicated lung malignancy group in greater detail, track the progression of the malignancy over the last six months of life, identify patterns in care and find systemic differences between hospice and non-hospice enrollees.
- **End-of-Life Analysis for Non-Malignant Conditions:** Only about 20% of the elderly deceased patients in our data source were categorized in Malignancy CRG categories. We could repeat a similar analysis for some groups of non-malignant patients. We can repeat a similar analysis but focus on other clinical groups such as dialysis, chronic triplets (e.g., CHF + Diabetes + COPD), some of more common chronic pairs (e.g., CHF + 1 other chronic) or dementing diseases.
- **Logistic Modeling of EOL Costs:** Fit a logistic regression model to estimate the cost impact of variables related to clinical status, region and hospice enrollment duration.

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