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November 7, 2017

Data analysis for PRT—AAHPM proposal, PACSSI model

## Medicare claims data analysis supporting the PTAC proposal review team for the American Academy of Hospice and Palliative Medicine (AAHPM) Patient and Caregiver Support for Serious Illness (PACSSI) Model

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This memorandum describes the data and methods used to develop supporting information for the American Academy of Hospice and Palliative Medicine (AAHPM) Patient and Caregiver Support for Serious Illness (PACSSI) Model proposal review team (PRT).

### Background

The PACSSI Model is intended for individuals who meet the criteria for serious illness with significant functional limitations and use of unscheduled health care services. Serious illness is defined according to meeting one or both of 2 lists of conditions—either a condition in the list #1 below or 3 or more serious conditions in list #2 below. Within the model, there are also two tiers based on complexity level with the high complexity patients having a higher level of functional limitations and a prognosis indicating a faster decline in health. The PRT thus requested an independent estimation of the potential numbers of Medicare beneficiaries who would be eligible for this model as a series of questions below. To answer these questions, we used data from 100 percent of Medicare fee-for-service claims, maintained by the Centers for Medicare & Medicaid Services Chronic Conditions Data Warehouse (CCW). Tabulations were made of data results as of November 2017.

1. The number and percent of the Medicare population (in 2014) with one or more of the following diagnoses:

- Metastatic Cancer
- Pancreatic, Gastrointestinal, Lung, Brain, or Hematologic cancers
- Heart Failure with Class III or IV level function under the New York Heart Association (NYHA) Functional Classification
- Heart Failure with a Left Ventricular Assist Device (LVAD)
- Advanced Pulmonary Disease (Pulmonary Hypertension, Chronic Obstructive Pulmonary Disease, Pulmonary Fibrosis)
- Advanced Dementia with stage 6 or 7 using the Functional Assessment Staging Tool (FAST) or = 2 ADLs \*
- Progressive Neurologic Disorder (e.g. Cerebrovascular Accident (CVA), Parkinson's Disease, Amyotrophic Lateral Sclerosis, Progressive Supranuclear Palsy)
- Hepatic Failure (Cirrhosis)
- End Stage (V) Renal Disease (excluding patients on dialysis)
- Protein-Calorie Malnutrition
- Cachexia
- Hip Fracture (with functional decline)

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2. The number and percent of the Medicare population (in 2014) with three or more of chronic conditions described in the Dartmouth Atlas (listed below) at:

[http://www.dartmouthatlas.org/downloads/methods/chronic\\_disease\\_codes\\_2008.pdf](http://www.dartmouthatlas.org/downloads/methods/chronic_disease_codes_2008.pdf) (See link for associated ICD codes):

- Malignant cancer, leukemia
- Chronic pulmonary disease
- Coronary artery disease
- Congestive heart failure
- Peripheral vascular disease
- Severe chronic liver disease
- Diabetes with end organ damage
- Renal failure
- Dementia

3. Number 1 and 2, combined, and the one-year cost of people who met these criteria, for both 1 and 2 separately and combined.

4. Number and percent of Medicare beneficiaries listed in Item 3 with an order for Durable Medical Equipment

5. Number and percent of Medicare beneficiaries listed in Item 4 with at least one ED visit, hospital observation stay, or inpatient hospitalization in the preceding 12 months.

6. Number and percent of Medicare beneficiaries listed in Item 5, who received hospice services within the year and the number of months preceding hospice services.

7. Number and percent of Medicare beneficiaries listed in Item 5, who died within the year and the number of months preceding death.

FOR HIGH COMPLEXITY ENROLLEES:

8. Number and percent of Medicare beneficiaries listed in Item 3, excluding dementia as the primary illness and the one-year cost of people who met these criteria.

9. Number and percent of Medicare beneficiaries listed in Item 8 with at least one ED visit, hospital observation stay, or inpatient hospitalization in the preceding 12 months.

10. Number and percent of Medicare beneficiaries listed in Item 8, who received hospice services within the year and the number of months preceding hospice services.

11. Number and percent of Medicare beneficiaries listed in Item 8 who died within the year and the number of months preceding death.

### Methods: Claims-based identification of selected conditions

As mentioned above, we used data from 100 percent of Medicare fee-for-service claims, maintained by the Centers for Medicare & Medicaid Services Chronic Conditions Data Warehouse (CCW). Tabulations were made of data as of November 2017.

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For these tabulations, we established CY2014 as the analytic base period, and used CY2013 and CY2014 fee-for-service (FFS) claims to identify beneficiaries with the selected conditions. We excluded people who had any Medicare Advantage enrollment in CY2014, as the absence of FFS claims would result in an underestimate of the proportion of the eligible population with a given condition.

The list of diagnosis codes used to identify a given condition is contained in Appendix A.

There are 3 deviations from the list of questions requested by the PRT based on the limitations of the dataset for these analyses:

- **Heart Failure with Class III or IV level function under the New York Heart Association (NYHA) Functional Classification.** Claims data do not allow the identification of functional level. As a result, any heart failure diagnosis was included.
- **Advanced Dementia with stage 6 or 7 using the Functional Assessment Staging Tool (FAST) or = 2 ADLs.** Claims data do not allow the identification of the functional assessment. We are exploring use of MDS (nursing home) and OASIS (home health) assessment tools for this purpose. In the interim, we have excluded this condition from the list: without the functional assessment, the results would essentially duplicate Dartmouth condition 9.
- **Hip Fracture (with functional decline).** Claims data do not allow identification of functional decline. Therefore, at present the condition extends to all beneficiaries with hip fracture.

Following a method developed by the Chronic Conditions Data Warehouse (CCW), a condition in the list was identified by the presence of a diagnosis code in one inpatient or SNF, or in two outpatient or carrier (physician) claims during CY2013 or CY2014. Presence of a ventricular assist device or of dialysis required a single diagnosis code during the period.

## Eligible population

To be included in the prevalence estimates in Tables 1 and 2, we used all people enrolled at any point during CY2014 who had no MA months during the year. To address questions 3 through 7, we restricted the population to those eligible for FFS Parts A and B in December 2014, who received no Medicare hospice services during CY2014, and who were not enrolled in MA during CY2015.

At the time this analysis was prepared, we had not operationalized “dementia as the primary illness,” and questions 8 through 11 were not addressed.

## Hospice service dates and date of death

Hospice service dates were taken from the hospice claim; the earliest start date from claims with a through-date in 2015 were used. As a result, a very small number (11) of beneficiaries have start dates in CY2014 – an artifact of the way in which claims are maintained in the CCW. It is entirely probable that

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an (equally small) number of beneficiaries have unobserved start dates in the late months of 2015, as the claim through-date is in CY2016.

Death dates are taken from the CY2015 beneficiary summary file.

Summary of eligible enrollees and analytic populations, CY2014			
	Total	Hospice Care in 2014	
		No	Yes
Eligible enrollees	39,242,878	38,303,999	938,879
1. With conditions in Table 1	10,687,319	9,829,058	858,261
2. With conditions in Table 2	4,545,788	4,079,040	466,748
3a. With conditions in Table 1 or Table 2	11,191,750	10,329,904	861,846
3. Of population 3a, with FFS A&B in December 2014, no hospice in CY2014, and no MA in CY2015	9,031,408	9,031,408	0

Table 1. Proportion of the Medicare FFS Population With Selected Conditions, CY2014			
	Total	Hospice Care in 2014	
		No	Yes
Eligible enrollees	39,242,878	38,303,999	938,879
With any of the following conditions	10,687,319	9,829,058	858,261
(Percent of eligible enrollees)	27.2%	25.7%	91.4%
Metastatic Cancer	1.6%	1.2%	18.2%
Pancreatic Cancer	0.2%	0.1%	2.2%
Gastrointestinal Cancer	1.1%	1.0%	5.4%
Lung Cancer	1.0%	0.8%	9.1%
Brain Cancer	0.1%	0.1%	1.4%
Blood Cancer	0.5%	0.5%	1.7%
Heart Failure	9.5%	8.8%	39.1%
Heart Failure with LVAD	0.0%	0.0%	0.0%
Pulmonary Disease	11.0%	10.5%	32.7%
Progressive Neurologic Disorder	6.8%	5.8%	46.8%
Hepatic Failure	3.8%	3.5%	16.2%
Stage 5 Kidney Disease without Dialysis	1.9%	1.8%	4.9%
Protein-Calorie Malnutrition	2.4%	2.0%	20.0%
Cachexia	3.4%	3.0%	18.8%
Hip Fracture	1.5%	1.4%	7.7%

SOURCE: CCW VRDC

NOTES:

Eligible enrollees are those enrolled at any time during CY2014 and who had no MA enrollment during CY2014

See text for a definition of conditions

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**Table 2. Proportion of the Medicare FFS population with 3 or more selected chronic conditions, CY2014**

	Total	Hospice Care in 2014	
		No	Yes
Eligible enrollees	39,242,878	38,303,999	938,879
Any 2 or more of the following conditions	4,545,788	4,079,040	466,748
(Percent of eligible enrollees)	11.6%	10.6%	49.7%
Malignant Cancer, Leukemia	3.1%	2.6%	25.4%
Chronic Pulmonary Disease	16.1%	15.6%	38.2%
Coronary Artery Disease	19.3%	18.8%	41.3%
Congestive Heart Failure	9.7%	8.9%	39.3%
Peripheral Vascular Disease	11.2%	10.6%	33.5%
Severe Chronic Liver Disease	0.8%	0.7%	3.3%
Diabetes w/End Organ Damage	8.5%	8.4%	14.2%
Renal Failure	10.8%	10.3%	32.2%
Dementia	5.7%	4.9%	39.3%

SOURCE: CCW VRDC

NOTES:

Eligible enrollees are those enrolled at any time during CY2014 and who had no MA enrollment during the year

See text for a definition of conditions

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**Table 3. Medicare FFS population with selected conditions, December 2014**

	Enrollees	Month until selected event											
		1	2	3	4	5	6	7	8	9	10	11	12
3. With one or more conditions from Table 1 OR 2 or more conditions from Table 2*	9,031,408												
4. Of population 3, with selected DME in CY2014	1,401,603												
5. Of population 4, with at least one ED visit, hospital observation stay, or inpatient hospitalization during CY2014	988,359												
6. Of population 5, with hospice services during CY2015**	115,133	15,660	11,635	11,814	10,796	9,591	9,286	8,762	7,704	7,571	7,883	6,897	7,523
		13.6%	10.1%	10.3%	9.4%	8.3%	8.1%	7.6%	6.7%	6.6%	6.8%	6.0%	6.5%
7. Of population 5, with death during CY2015	193,260	21,822	19,258	19,826	17,365	16,511	15,041	14,722	13,776	13,334	13,944	13,501	14,160
		11.3%	10.0%	10.3%	9.0%	8.5%	7.8%	7.6%	7.1%	6.9%	7.2%	7.0%	7.3%

SOURCE: CCW VRDC

NOTES:

\* See text for a definition of conditions

\*\* Includes 11 enrollees whose hospice episode began during 2014 and ended in 2015

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**Table 4. Per capita Medicare payments and allowed charges for selected populations, CY2015**

<b>Population</b>	<b>Number of enrollees</b>	<b>Medicare payments</b>	<b>Medicare allowed charges</b>
3. With one or more conditions from Table 1 OR 2 or more conditions from Table 2*	9,031,408	\$19,350	\$27,440
Population eligible from Table 1	8,570,870	\$19,368	\$27,420
Population eligible from Table 2	3,436,619	\$27,163	\$37,692
Eligible on both counts	2,976,081	\$28,425	\$39,221
4. Of population 3, with selected DME in CY2014	1,401,603	\$28,232	\$39,210
5. Of population 4, with at least one ED visit, hospital observation stay, or inpatient hospitalization during	988,359	\$32,686	\$44,841
6. Of population 5, with hospice services during CY2015**	115,133	\$44,826	\$56,301
7. Of population 5, with death during CY2015	193,260	\$43,903	\$56,180

SOURCE: CCW VRDC

NOTES:

Eligible enrollees are the subset from Tables 1 and 2 who had FFS A&B enrollment in December 2014 and no MA enrollment in CY2015

\* See text for a definition of conditions

## Appendix A. Diagnostic codes indicative of selected conditions

<b>Metastatic cancer</b>	
1960	Secondary and unspecified malignant neoplasm of lymph nodes of head, face, and neck
1961	Secondary and unspecified malignant neoplasm of intrathoracic lymph nodes
1962	Secondary and unspecified malignant neoplasm of intra-abdominal lymph nodes
1963	Secondary and unspecified malignant neoplasm of lymph nodes of axilla and upper limb
1965	Secondary and unspecified malignant neoplasm of lymph nodes of inguinal region and lower limb
1966	Secondary and unspecified malignant neoplasm of intrapelvic lymph nodes
1968	Secondary and unspecified malignant neoplasm of lymph nodes of multiple sites
1969	Secondary and unspecified malignant neoplasm of lymph nodes, site unspecified
1970	Secondary malignant neoplasm of lung
1971	Secondary malignant neoplasm of mediastinum
1972	Secondary malignant neoplasm of pleura
1973	Secondary malignant neoplasm of other respiratory organs
1974	Secondary malignant neoplasm of small intestine including duodenum
1975	Secondary malignant neoplasm of large intestine and rectum
1976	Secondary malignant neoplasm of retroperitoneum and peritoneum
1977	Malignant neoplasm of liver, secondary
1978	Secondary malignant neoplasm of other digestive organs and spleen
1980	Secondary malignant neoplasm of kidney
1981	Secondary malignant neoplasm of other urinary organs
1982	Secondary malignant neoplasm of skin
1983	Secondary malignant neoplasm of brain and spinal cord
1984	Secondary malignant neoplasm of other parts of nervous system
1985	Secondary malignant neoplasm of bone and bone marrow
1986	Secondary malignant neoplasm of ovary
1987	Secondary malignant neoplasm of adrenal gland
1990	Disseminated malignant neoplasm without specification of site
1991	Other malignant neoplasm without specification of site
19881	Secondary malignant neoplasm of breast
19882	Secondary malignant neoplasm of genital organs
19889	Secondary malignant neoplasm of other specified sites

<b>Pancreatic cancer</b>	
157xx	Malignant neoplasm of pancreas

<b>Gastrointestinal cancer</b>	
150xx	Malignant neoplasm of esophagus
151xx	Malignant neoplasm of stomach

- 152xx Malignant neoplasm of small intestine, including duodenum
- 153xx Malignant neoplasm of colon
- 154xx Malignant neoplasm of rectum, rectosigmoid junction, and anus

**Lung cancer**

- 162xx Malignant neoplasm of trachea, bronchus, and lung

**Brain cancer**

- 191xx Malignant neoplasm of brain

**Hematologic cancer;**

- 204xx Lymphoid leukemia
- 205xx Myeloid leukemia
- 206xx Monocytic leukemia
- 207xx Other specified leukemia
- 208xx Leukemia of unspecified cell type

**Heart Failure**

- 4280 Congestive heart failure, unspecified
- 4281 Left heart failure
- 42820 Systolic heart failure, unspecified
- 42821 Acute systolic heart failure
- 42822 Chronic systolic heart failure
- 42823 Acute on chronic systolic heart failure
- 42830 Diastolic heart failure, unspecified
- 42831 Acute diastolic heart failure
- 42832 Chronic diastolic heart failure
- 42833 Acute on chronic diastolic heart failure
- 42840 Combined systolic and diastolic heart failure, unspecified
- 42841 Acute combined systolic and diastolic heart failure
- 42842 Chronic combined systolic and diastolic heart failure
- 42843 Acute on chronic combined systolic and diastolic heart failure
- 4289 Heart failure, unspecified

**Advanced Pulmonary Disease**

- 4160 Primary pulmonary hypertension
- 496 Chronic airway obstruction, not elsewhere classified
- 515 Postinflammatory pulmonary fibrosis

**Dementia (before application of advanced dementia criteria)**

- 2900 Senile dementia, uncomplicated
- 29010 Presenile dementia, uncomplicated
- 29011 Presenile dementia with delirium
- 29012 Presenile dementia with delusional features
- 29013 Presenile dementia with depressive features

- 29020 Senile dementia with delusional features
- 29021 Senile dementia with depressive features
- 2903 Senile dementia with delirium
- 29040 Vascular dementia, uncomplicated
- 29041 Vascular dementia, with delirium
- 29042 Vascular dementia, with delusions
- 29043 Vascular dementia, with depressed mood
- 2912 Alcohol-induced persisting dementia
- 29282 Drug-induced persisting dementia
- 29410 Dementia in conditions classified elsewhere without behavioral disturbance
- 29411 Dementia in conditions classified elsewhere with behavioral disturbance
- 29420 Dementia, unspecified, without behavioral disturbance
- 29421 Dementia, unspecified, with behavioral disturbance
- 3310 Alzheimer's disease
- 33111 Pick's disease
- 33119 Other frontotemporal dementia
- 3312 Senile degeneration of brain
- 33182 Dementia with lewy bodies
- 3319 Cerebral degeneration, unspecified

#### Progressive Neurologic Disorder

- 43491 Cerebral artery occlusion, unspecified with cerebral infarction
- 33520 Amyotrophic lateral sclerosis
- 3320 Paralysis agitans
- 3321 Secondary parkinsonism
- 3330 Other degenerative diseases of the basal ganglia

#### Hepatic Failure

- 570 Acute and subacute necrosis of liver
- 5710 Alcoholic fatty liver
- 5711 Acute alcoholic hepatitis
- 5712 Alcoholic cirrhosis of liver
- 5713 Alcoholic liver damage, unspecified
- 57140 Chronic hepatitis, unspecified
- 57141 Chronic persistent hepatitis
- 57142 Autoimmune hepatitis
- 57149 Other chronic hepatitis
- 5715 Cirrhosis of liver without mention of alcohol
- 5716 Biliary cirrhosis
- 5718 Other chronic nonalcoholic liver disease
- 5719 Unspecified chronic liver disease without mention of alcohol

#### Stage 5 kidney disease (exclude if V4511 is found)

- 5855 Chronic kidney disease, Stage V
- V4511 Renal dialysis status

### Protein-Calorie Malnutrition

261	Nutritional marasmus
262	Other severe protein-calorie malnutrition
2630	Malnutrition of moderate degree
2631	Malnutrition of mild degree
2632	Arrested development following protein-calorie malnutrition
2638	Other protein-calorie malnutrition
2639	Unspecified protein-calorie malnutrition

### Cachexia

7994	Cachexia
7832	Abnormal loss of weight and underweight
78321	Loss of weight
78322	Underweight
V850	Body Mass Index less than 19, adult

### Hip Fracture

73314	Pathologic fracture of neck of femur
73315	Pathologic fracture of other specified part of femur
73396	Stress fracture of femoral neck
73397	Stress fracture of shaft of femur
73398	Stress fracture of pelvis
8080	Closed fracture of acetabulum
8081	Open fracture of acetabulum
8082	Closed fracture of pubis
8083	Open fracture of pubis
80841	Closed fracture of ilium
80842	Closed fracture of ischium
80843	Multiple closed pelvic fractures with disruption of pelvic circle
80844	Multiple closed pelvic fractures without disruption of pelvic circle
80849	Closed fracture of other specified part of pelvis
80851	Open fracture of ilium
80852	Open fracture of ischium
80853	Multiple open pelvic fractures with disruption of pelvic circle
80854	Multiple open pelvic fractures without disruption of pelvic circle
80859	Open fracture of other specified part of pelvis
8088	Closed unspecified fracture of pelvis
8089	Open unspecified fracture of pelvis
82000	Closed fracture of intracapsular section of neck of femur, unspecified
82001	Closed fracture of epiphysis (separation) (upper) of neck of femur
82002	Closed fracture of midcervical section of neck of femur
82003	Closed fracture of base of neck of femur
82009	Other closed transcervical fracture of neck of femur
82010	Open fracture of intracapsular section of neck of femur, unspecified

- 82011 Open fracture of epiphysis (separation) (upper) of neck of femur
- 82012 Open fracture of midcervical section of neck of femur
- 82013 Open fracture of base of neck of femur
- 82019 Other open transcervical fracture of neck of femur
- 82020 Closed fracture of trochanteric section of neck of femur
- 82021 Closed fracture of intertrochanteric section of neck of femur
- 82022 Closed fracture of subtrochanteric section of neck of femur
- 82030 Open fracture of trochanteric section of neck of femur, unspecified
- 82031 Open fracture of intertrochanteric section of neck of femur
- 82032 Open fracture of subtrochanteric section of neck of femur
- 8208 Closed fracture of unspecified part of neck of femur
- 8209 Open fracture of unspecified part of neck of femur

### Diagnostic codes indicative of selected chronic conditions

([http://www.dartmouthatlas.org/downloads/methods/chronic\\_disease\\_codes\\_2008.pdf](http://www.dartmouthatlas.org/downloads/methods/chronic_disease_codes_2008.pdf))

DARTMOUTH CATEGORY 1 = MALIGNANT CANCER, LEUKEMIA	
<b>Cancer with Poor Prognosis</b>	
1500	Malignant neoplasm of cervical esophagus
1501	Malignant neoplasm of thoracic esophagus
1502	Malignant neoplasm of abdominal esophagus
1503	Malignant neoplasm of upper third of esophagus
1504	Malignant neoplasm of middle third of esophagus
1505	Malignant neoplasm of lower third of esophagus
1508	Malignant neoplasm of other specified part
1509	Malignant neoplasm of esophagus, unspecified
1510	Malignant neoplasm of cardia
1511	Malignant neoplasm of pylorus
1512	Malignant neoplasm of pyloric antrum
1513	Malignant neoplasm of fundus of stomach
1514	Malignant neoplasm of body of stomach
1515	Malignant neoplasm of lesser curvature, unspecified
1516	Malignant neoplasm of greater curvature, unspecified
1518	Malignant neoplasm of other specified sites of stomach
1519	Malignant neoplasm of stomach, unspecified
1550	Malignant neoplasm of liver, primary
1551	Malignant neoplasm of intrahepatic bile ducts
1552	Malignant neoplasm of liver, not specified as primary or secondary
1570	Malignant neoplasm of head of pancreas
1571	Malignant neoplasm of body of pancreas
1572	Malignant neoplasm of tail of pancreas

<b>DARTMOUTH CATEGORY 1 = MALIGNANT CANCER, LEUKEMIA</b>	
1573	Malignant neoplasm of pancreatic duct
1574	Malignant neoplasm of islets of Langerhans
1578	Malignant neoplasm of other specified sites of pancreas
1579	Malignant neoplasm of pancreas, part unspecified
1580	Malignant neoplasm of retroperitoneum
1588	Malignant neoplasm of specified parts of peritoneum
1589	Malignant neoplasm of peritoneum, unspecified
1620	Malignant neoplasm of trachea
1622	Malignant neoplasm of main bronchus
1623	Malignant neoplasm of upper lobe, bronchus or lung
1624	Malignant neoplasm of middle lobe, bronchus or lung
1625	Malignant neoplasm of lower lobe, bronchus or lung
1628	Malignant neoplasm of other parts of bronchus or lung
1629	Malignant neoplasm of bronchus and lung, unspecified
1630	Malignant neoplasm of parietal pleura
1631	Malignant neoplasm of visceral pleura
1638	Malignant neoplasm of other specified sites of pleura
1639	Malignant neoplasm of pleura, unspecified
1830	Malignant neoplasm of ovary
1832	Malignant neoplasm of fallopian tube
1833	Malignant neoplasm of broad ligament
1834	Malignant neoplasm of parametrium
1835	Malignant neoplasm of round ligament
1838	Malignant neoplasm of other specified sites of uterine adnexa
1839	Malignant neoplasm of uterine adnexa, unspecified
1910	Malignant neoplasm of cerebrum, except lobes and ventricles
1911	Malignant neoplasm of frontal lobe
1912	Malignant neoplasm of temporal lobe
1913	Malignant neoplasm of parietal lobe
1914	Malignant neoplasm of occipital lobe
1915	Malignant neoplasm of ventricles
1916	Malignant neoplasm of cerebellum not otherwise specified
1917	Malignant neoplasm of brain stem
1918	Malignant neoplasm of other parts of brain
1919	Malignant neoplasm of brain, unspecified
20400	Acute lymphoid leukemia without mention of remission
20410	Chronic lymphoid leukemia without mention of remission
20420	Subacute lymphoid leukemia without mention of remission
20480	Other lymphoid leukemia without mention of remission
20490	Unspecified lymphoid leukemia without mention of remission
20500	Acute myeloid leukemia without mention of remission
20510	Chronic myeloid leukemia without mention of remission
20520	Subacute myeloid leukemia without mention of remission
20530	Myeloid sarcoma without mention of remission
20580	Other myeloid leukemia without mention of remission
20590	Unspecified myeloid leukemia without mention of remission
20600	Acute monocytic leukemia without mention of remission
20610	Chronic monocytic leukemia without mention of remission

<b>DARTMOUTH CATEGORY 1 = MALIGNANT CANCER, LEUKEMIA</b>	
20620	Subacute monocytic leukemia without mention of remission
20680	Other monocytic leukemia without mention of remission
20690	Unspecified monocytic leukemia without mention of remission
20700	Acute erythremia and erythroleukemia without mention of remission
20710	Chronic erythremia without mention of remission
20720	Megakaryocytic leukemia without mention of remission
20780	Other specified leukemia without mention of remission
20800	Acute leukemia of unspecified cell type without mention of remission
20810	Chronic leukemia of unspecified cell type without mention of remission
20820	Subacute leukemia of unspecified cell type without mention of remission
20880	Other leukemia of unspecified cell type without mention of remission
20890	Unspecified leukemia without mention of remission
<b>Metastatic Cancer</b>	
1960	Secondary and unspecified malignant neoplasm of lymph nodes of head, face, and
1961	Secondary and unspecified malignant neoplasm of intrathoracic lymph nodes
1962	Secondary and unspecified malignant neoplasm of intra-abdominal lymph nodes
1963	Secondary and unspecified malignant neoplasm of lymph nodes of axilla and upper
1965	Secondary and unspecified malignant neoplasm of lymph nodes of inguinal region
1966	Secondary and unspecified malignant neoplasm of intrapelvic lymph nodes
1968	Secondary and unspecified malignant neoplasm of lymph nodes of multiple sites
1969	Secondary and unspecified malignant neoplasm of lymph nodes, site unspecified
1970	Secondary malignant neoplasm of lung
1971	Secondary malignant neoplasm of mediastinum
1972	Secondary malignant neoplasm of pleura
1973	Secondary malignant neoplasm of other respiratory organs
1974	Secondary malignant neoplasm of small intestine, including duodenum
1975	Secondary malignant neoplasm of large intestine and rectum
1976	Secondary malignant neoplasm of retroperitoneum and peritoneum
1977	Secondary malignant neoplasm of liver, specified as secondary
1978	Secondary malignant neoplasm of other digestive organs and spleen
1980	Secondary malignant neoplasm of kidney
1981	Secondary malignant neoplasm of other urinary organs
1982	Secondary malignant neoplasm of skin
1983	Secondary malignant neoplasm of brain and spinal cord
1984	Secondary malignant neoplasm of other parts of nervous system
1985	Secondary malignant neoplasm of bone and bone marrow
1986	Secondary malignant neoplasm of ovary
1987	Secondary malignant neoplasm of adrenal gland
19881	Secondary malignant neoplasm of breast
19882	Secondary malignant neoplasm of genital organs
19889	Secondary malignant neoplasm of other
1990	Malignant neoplasm without specification of site: disseminated
1991	Malignant neoplasm without specification of site: other

<b>DARTMOUTH CATEGORY 2 = CHRONIC PULMONARY DISEASE</b>	
<b>Chronic Pulmonary Disease</b>	
4911	Mucopurulent chronic bronchitis
49120	Obstructive chronic bronchitis without mention of acute exacerbation
49121	Obstructive chronic bronchitis with acute exacerbation
49122	Obstructive chronic bronchitis with acute bronchitis
4918	Other chronic bronchitis
4919	Unspecified chronic bronchitis
4920	Emphysematous bleb
4928	Other emphysema
49310	Intrinsic asthma without mention of status asthmaticus

<b>DARTMOUTH CATEGORY 2 = CHRONIC PULMONARY DISEASE</b>	
49311	Intrinsic asthma with status asthmaticus
49312	Intrinsic asthma, with exacerbation
49320	Chronic obstructive asthma unspecified
49321	Chronic obstructive asthma with status asthmaticus
49322	Chronic obstructive asthma with exacerbation
49390	Asthma, unspecified without mention of status asthmaticus
49391	Asthma, unspecified with status asthmaticus
49392	Asthma unspecified, with exacerbation
494	Bronchiectasis
4940	Bronchiectasis w/o acute exacerbation
4941	Bronchiectasis with acute exacerbation
496	Chronic airway obstruction, not elsewhere classified
501	Asbestosis
5064	Chronic respiratory conditions due to fumes and vapors
515	Pulmonary fibrosis

<b>DARTMOUTH CATEGORY 3 = CORONARY ARTERY DISEASE</b>	
<b>Coronary Artery Disease</b>	
4111	Intermediate coronary syndrome
4118	Other acute and subacute forms of ischemic heart disease
41181	Acute ischemic heart disease without myocardial infarction
41189	Coronary insufficiency, subendocardial ischemia
412	Old myocardial infarction
4130	Angina decubitus
4139	Other and unspecified angina pectoris
4140	Coronary atherosclerosis
41400	of unspecified type of vessel, native or graft
41401	of native coronary artery
41402	of autologous vein bypass graft
41403	of nonautologous biological bypass graft
41404	of artery bypass graft
41405	of unspecified type of bypass graft
41406	of native coronary artery of transplanted heart
41407	of bypass graft (artery) (vein) of transplanted heart
4148	Other specified forms of chronic ischemic heart disease
4149	Chronic ischemic heart disease, unspecified

<b>DARTMOUTH CATEGORY 4 = CONGESTIVE HEART FAILURE</b>	
<b>Congestive Heart Failure</b>	
4280	Congestive heart failure
4281	Left heart failure
4282	Systolic heart failure
42820	Unspecified
42821	Acute
42822	Chronic
42823	Acute on chronic
4283	Diastolic heart failure
42830	Unspecified
42831	Acute
42832	Chronic
42833	Acute on chronic
4284	Combined systolic and diastolic heart failure
42840	Unspecified
42841	Acute
42842	Chronic
42843	Acute on chronic
4289	Heart failure, unspecified
40201	Malignant hypertensive heart disease with CHF

<b>DARTMOUTH CATEGORY 4 = CONGESTIVE HEART FAILURE</b>	
40211	Benign hypertensive heart disease with CHF
40291	Unspecified hypertensive heart disease with CHF
39891	Rheumatic heart failure (congestive)
40401	Malignant hypertensive heart and renal disease with CHF
40403	Malignant hypertensive heart disease & renal disease w. CHF + renal failure
40411	Benign hypertensive heart and renal disease with CHF
40413	Benign hypertensive heart and renal disease with CHF and renal failure
40491	Unspecified hypertensive heart and renal disease with CHF
40493	Unspecified hypertensive heart and renal disease with CHF and renal failure

<b>CATEGORY 5 = PERIPHERAL VASCULAR DISEASE</b>	
<b>Peripheral Vascular Disease</b>	
4400	Atherosclerosis of aorta
4401	Atherosclerosis of renal artery
44020	Atherosclerosis of arteries of the extremities, unspecified
44021	Atherosclerosis of arteries of the extremities with intermittent claudication
44022	Atherosclerosis of arteries of the extremities with rest pain
44023	Atherosclerosis of arteries of the extremities with ulceration
44024	Atherosclerosis of arteries of the extremities with gangrene
44029	Atherosclerosis of arteries of the extremities, other
4403	Atherosclerosis of bypass graft of extremities
44030	of unspecified graft
44031	of autologous vein bypass graft
44032	of nonautologous biological bypass graft
4408	Atherosclerosis of other specified arteries
4409	Generalized and unspecified atherosclerosis
4410	Dissection of aorta
44100	Unspecified site
44101	Thoracic
44102	Abdominal
44103	Thoracoabdominal
4411	Thoracic aortic aneurysm, ruptured
4412	Thoracic aortic aneurysm without mention of rupture
4413	Abdominal aortic aneurysm, ruptured
4414	Abdominal aortic aneurysm without mention of rupture
4415	Aortic aneurysm of unspecified site, ruptured
4416	Thoracoabdominal aneurysm, ruptured
4417	Thoracoabdominal aneurysm, w/o mention of rupture
4419	Aortic aneurysm of unspecified site without mention of rupture
4439	Peripheral vascular disease, unspecified

<b>DARTMOUTH CATEGORY 6 = SEVERE CHRONIC LIVER DISEASE</b>	
<b>Severe Chronic Liver Disease</b>	
5712	Alcoholic cirrhosis of liver
5715	Cirrhosis of liver without mention of alcohol
5716	Biliary cirrhosis
5723	Portal hypertension

<b>DARTMOUTH CATEGORY 7 = DIABETES w/END ORGAN DAMAGE</b>	
<b>Diabetes with End Organ Damage</b>	

<b>DARTMOUTH CATEGORY 7 = DIABETES w/END ORGAN DAMAGE</b>	
The following fifth-digit subclassification is for use with category 250:	
0: Type II [Non-insulin dependent type][NIDDM type][Adult-onset type] or unspecified type, not stated as uncontrolled	
1: Type I [Insulin dependent type][IDDM type][Juvenile type], not stated as uncontrolled	
2: Type II [Non-insulin dependent type][NIDDM type][Adult-onset type], or unspecified type, uncontrolled	
3: Type I [Insulin dependent type][IDDM type][Juvenile type], uncontrolled	
2504(0,1,2,3)	Diabetes with renal manifestations
2505(0,1,2,3)	Diabetes with ophthalmic manifestations
2506(0,1,2,3)	Diabetes with neurological manifestations
2507(0,1,2,3)	Diabetes with peripheral circulatory disorders
2509(0,1,2,3)	Diabetes with unspecified complication
3572	Polyneuropathy in diabetes
36641	Diabetic cataract
36201	Background diabetic retinopathy
36202	Proliferative diabetic retinopathy

<b>DARTMOUTH CATEGORY 8 = RENAL FAILURE</b>	
<b>Chronic Renal Failure</b>	
40301	Malignant hypertensive renal disease with renal failure
40311	Benign hypertensive renal disease with renal failure
40391	Unspecified hypertensive renal disease with renal failure
585	Chronic renal failure
5851	Chronic kidney disease Stage I
5852	Chronic kidney disease Stage II (mild)
5853	Chronic kidney disease Stage III (moderate)
5854	Chronic kidney disease Stage IV (severe)
5855	Chronic kidney disease Stage V
5856	End State Renal Disease
5859	Chronic kidney disease unspecified
V451	Renal dialysis status
V560	Aftercare involving intermittent extracorporeal dialysis
V568	Aftercare involving intermittent other dialysis

<b>DARTMOUTH CATEGORY 9 = DEMENTIA</b>	
<b>Dementia</b>	
2900	Senile dementia, uncomplicated
29010	Presenile dementia, uncomplicated
29011	Presenile dementia with delirium
29012	Presenile dementia with delusional features
29013	Presenile dementia with depressive features
29020	Senile dementia with delusional features
29021	Senile dementia with depressive features
2903	Senile dementia with delirium
29040	Arteriosclerotic dementia, uncomplicated
29041	Arteriosclerotic dementia with delirium
29042	Arteriosclerotic dementia with delusional features
29043	Arteriosclerotic dementia with depressive features
2908	Other specified senile psychotic conditions
2909	Unspecified senile psychotic condition

<b>DARTMOUTH CATEGORY 9 = DEMENTIA</b>	
2940	Other organic psychotic conditions (chronic)
2941	Dementia in conditions classified elsewhere
29410	w/o behavioral disturbance
29411	with behavioral disturbance
2948	Other specified organic brain syndromes (chronic)
2949	Unspecified organic brain syndrome (chronic)
3310	Alzheimer's disease
3312	Senile degeneration of brain
797	Senility without mention of psychosis

<b>Table #</b>	<b>Title</b>
1.	Number of Hospital Admissions, 2015
2.	Number of Observation Stays, 2015
3.	Number of Hospital Admissions and Observation Stays, 2015
4.	Number of Emergency Department Visits, 2015
5.	Number of Skilled Nursing Facility Admissions, 2015
6.	Number Using Home Health Services, 2015
7.	Total Beneficiaries, Hospital Admissions and Lengths of Stay, 2015

**Table 1. Number of Hospital Admissions, 2015**

<b>Stays</b>	<b>Number</b>	<b>Percent of total</b>	<b>Cumulative percent of total</b>
<b>Group I - Beneficiaries with cancer diagnosis for the Medicare population</b>			
Total	1,010,292	100.0%	
0	654,205	64.8%	64.8%
1	194,303	19.2%	84.0%
2	83,924	8.3%	92.3%
3 or more	77,860	7.7%	100.0%
<b>Group II - Beneficiaries with diagnosis other than cancer for the Medicare population</b>			
Total	7,989,244	100.0%	
0	5,247,609	65.7%	65.7%
1	1,514,282	19.0%	84.6%
2	633,565	7.9%	92.6%
3 or more	593,788	7.4%	100.0%
<b>Group III - Total beneficiaries with cancer and non-cancer diagnoses</b>			
Total	8,999,536	100.0%	
0	5,901,814	65.6%	65.6%
1	1,708,585	19.0%	84.6%
2	717,489	8.0%	92.5%
3 or more	671,648	7.5%	100.0%

SOURCE: Calendar-year 2014-2015 Medicare Fee-for-Service claims data, accessed through the CCW VRDC

NOTES:

Group I consists of beneficiaries eligible for Medicare as of December 2014 who had no Medicare Advantage enrollment during CY2014-2015, who did not receive Medicare hospice benefits in CY2014, and who had claims in calendar year 2014 with one of the following diagnoses:

- Metastatic Cancer
- Pancreatic, Gastrointestinal, Lung, Brain, or Hematologic cancers

AND who did not have a diagnosis for Dartmouth Atlas chronic condition category 1 (malignant cancer, leukemia)

Group II consists of beneficiaries eligible for Medicare as of December 2014 who had no Medicare Advantage enrollment during CY2014-2015, who did not receive Medicare hospice benefits in CY2014, who were not in Group I, who did not have a diagnosis for Dartmouth Atlas chronic condition category 1 (malignant cancer, leukemia), and who had EITHER one or more claim in calendar year 2014 with one of the following diagnoses:

- Heart Failure
- Heart Failure with a Left Ventricular Assist Device (LVAD)
- Advanced Pulmonary Disease (Pulmonary Hypertension, Chronic Obstructive Pulmonary Disease, Pulmonary Fibrosis)
- Progressive Neurologic Disorder (e.g. Cerebrovascular Accident (CVA), Parkinson's Disease, Amyotrophic Lateral Sclerosis, Progressive Supranuclear Palsy)
- Hepatic Failure (Cirrhosis)
- End Stage (V) Renal Disease (excluding patients on dialysis)
- Protein-Calorie Malnutrition
- Cachexia
- Hip Fracture (with functional decline)

OR who had diagnoses indicating three or more of chronic conditions described in the Dartmouth Atlas:

- Chronic pulmonary disease
- Coronary artery disease
- Congestive heart failure
- Peripheral vascular disease
- Severe chronic liver disease
- Diabetes with end organ damage
- Renal failure
- Dementia

Dartmouth Atlas chronic conditions are described in more detail at:

[http://www.dartmouthatlas.org/downloads/methods/chronic\\_disease\\_codes\\_2008.pdf](http://www.dartmouthatlas.org/downloads/methods/chronic_disease_codes_2008.pdf)

Group III consists of beneficiaries in either Group I or Group II.

**Table 2. Number of Observation Stays, 2015**

Stays	Number	Percent of total	Cumulative percent of total
<b>Group I - Beneficiaries with cancer diagnosis for the Medicare population</b>			
Total	1,010,292	100.0%	
0	926,572	91.7%	91.7%
1	71,373	7.1%	98.8%
2 or more	12,347	1.2%	100.0%
<b>Group II - Beneficiaries with diagnosis other than cancer for the Medicare population</b>			
Total	7,989,244	100.0%	
0	7,231,804	90.5%	90.5%
1	631,851	7.9%	98.4%
2 or more	125,589	1.6%	100.0%
<b>Group III - Total beneficiaries with cancer and non-cancer diagnoses</b>			
Total	8,999,536	100.0%	
0	8,158,376	90.7%	90.7%
1	703,224	7.8%	98.5%
2 or more	137,936	1.5%	100.0%

[same notes as for Table 1]

**Table 3. Number of Hospital Admissions and Observation Stays, 2015**

Stays	Number	Percent of total	Cumulative percent of total
<b>Group I - Beneficiaries with cancer diagnosis for the Medicare population</b>			
Total	1,010,292	100.0%	
0	620,171	61.4%	61.4%
1	204,640	20.3%	81.6%
2	92,067	9.1%	90.8%
3	44,214	4.4%	95.1%
4 or more	49,200	4.9%	100.0%
<b>Group II - Beneficiaries with diagnosis other than cancer for the Medicare population</b>			
Total	7,989,244	100.0%	
0	4,921,589	61.6%	61.6%
1	1,622,268	20.3%	81.9%
2	714,246	8.9%	90.8%
3	336,976	4.2%	95.1%
4 or more	394,165	4.9%	100.0%
<b>Group III - Total beneficiaries with cancer and non-cancer diagnoses</b>			
Total	8,999,536	100.0%	
0	5,541,760	61.6%	61.6%
1	1,826,908	20.3%	81.9%
2	806,313	9.0%	90.8%
3	381,190	4.2%	95.1%
4 or more	443,365	4.9%	100.0%

[same notes as for Table 1]

**Table 4. Number of Emergency Department Visits, 2015**

Stays	Number	Percent of total	Cumulative percent of total
<b>Group I - Beneficiaries with cancer diagnosis for the Medicare population</b>			
Total	1,010,292	100.0%	
0	668,169	66.1%	66.1%
1	204,416	20.2%	86.4%
2	74,542	7.4%	93.7%
3 or more	63,165	6.3%	100.0%
<b>Group II - Beneficiaries with diagnosis other than cancer for the Medicare population</b>			
Total	7,989,244	100.0%	
0	4,896,165	61.3%	61.3%
1	1,714,855	21.5%	82.7%
2	687,277	8.6%	91.4%
3 or more	690,947	8.6%	100.0%
<b>Group III - Total beneficiaries with cancer and non-cancer diagnoses</b>			
Total	8,999,536	100.0%	
0	5,564,334	61.8%	61.8%
1	1,919,271	21.3%	83.2%
2	761,819	8.5%	91.6%
3 or more	754,112	8.4%	100.0%

[same notes as for Table 1]

**Table 5. Number of Skilled Nursing Facility Admissions, 2015**

Stays	Number	Percent of total	Cumulative percent of total
<b>Group I - Beneficiaries with cancer diagnosis for the Medicare population</b>			
Total	1,010,292	100.0%	
0	906,375	89.7%	89.7%
1	71,661	7.1%	96.8%
2 or more	32,256	3.2%	100.0%
<b>Group II - Beneficiaries with diagnosis other than cancer for the Medicare population</b>			
Total	7,989,244	100.0%	
0	6,945,398	86.9%	86.9%
1	699,529	8.8%	95.7%
2 or more	344,317	4.3%	100.0%
<b>Group III - Total beneficiaries with cancer and non-cancer diagnoses</b>			
Total	8,999,536	100.0%	
0	7,851,773	87.2%	87.2%
1	771,190	8.6%	95.8%
2 or more	376,573	4.2%	100.0%

[same notes as for Table 1]

**Table 6. Number Using Home Health Services, 2015**

<b>Home Health Use</b>	<b>Number</b>	<b>Percent of total</b>
<b>Group I - Beneficiaries with cancer diagnosis for the Medicare population</b>		
Total	1,010,292	100.0%
No	805,789	79.8%
Yes	204,503	20.2%
<b>Group II - Beneficiaries with diagnosis other than cancer for the Medicare population</b>		
Total	7,989,244	100.0%
No	6,220,752	77.9%
Yes	1,768,492	22.1%
<b>Group III - Total beneficiaries with cancer and non-cancer diagnoses</b>		
Total	8,999,536	100.0%
No	7,026,541	78.1%
Yes	1,972,995	21.9%

[same notes as for Table 1]

**Table 7. Total Beneficiaries, Hospital Admissions and Lengths of Stay, 2015**

Group	Number of Beneficiaries	Number of Inpatient Users	Number of Inpatient Stays	Number of Inpatient Days	User Rate	Admissions per 1000 Beneficiaries	Average LOS
IV	3,097,722	3,097,722	5,975,185	41,740,694	100.0%	1,928.9	7.0
V	841,160	481,106	1,195,000	7,785,335	57.2%	1,420.7	6.5
VI	3,435,202	1,701,758	3,696,325	25,404,334	49.5%	1,076.0	6.9
VII	1,147,763	1,035,179	2,439,123	19,460,990	90.2%	2,125.1	8.0

SOURCE: Calendar-year 2014-2015 Medicare Fee-for-Service claims data

NOTES:

Group III consists of beneficiaries eligible for Medicare as of December 2014 who had no Medicare Advantage enrollment during CY2014-2015, who did not receive Medicare hospice benefits in CY2014, and who had claims in calendar year 2014 EITHER with one of the following diagnoses:

- Metastatic Cancer
- Pancreatic, Gastrointestinal, Lung, Brain, or Hematologic cancers
- Heart Failure
- Heart Failure with a Left Ventricular Assist Device (LVAD)
- Advanced Pulmonary Disease (Pulmonary Hypertension, Chronic Obstructive Pulmonary Disease, Pulmonary Fibrosis)
- Progressive Neurologic Disorder (e.g. Cerebrovascular Accident (CVA), Parkinson’s Disease, Amyotrophic Lateral Sclerosis, Progressive Supranuclear Palsy)
- Hepatic Failure (Cirrhosis)
- End Stage (V) Renal Disease (excluding patients on dialysis)
- Protein-Calorie Malnutrition
- Cachexia
- Hip Fracture (with functional decline)

OR with diagnoses indicating three or more of chronic conditions described in the Dartmouth Atlas:

- Chronic pulmonary disease
- Coronary artery disease
- Congestive heart failure
- Peripheral vascular disease
- Severe chronic liver disease
- Diabetes with end organ damage
- Renal failure
- Dementia

AND who did not have a diagnosis for Dartmouth Atlas chronic condition category 1 (malignant cancer, leukemia).

Dartmouth Atlas chronic conditions are described in more detail at:  
[http://www.dartmouthatlas.org/downloads/methods/chronic\\_disease\\_codes\\_2008.pdf](http://www.dartmouthatlas.org/downloads/methods/chronic_disease_codes_2008.pdf)

Group IV consists of Group III beneficiaries who had with hospital admissions in CY2015

Group V consists of Group III beneficiaries who had observation stays in CY2015.

Group VI consists of Group III beneficiaries who had emergency department visits in CY2015.

Group VII consists of Group III beneficiaries who used skilled nursing facility services in CY2015.