2016 MEASURE INFORMATION ABOUT THE 30-DAY ALL-CAUSE HOSPITAL READMISSION MEASURE, CALCULATED FOR THE 2018 VALUE-BASED PAYMENT MODIFIER PROGRAM

A. Measure Name

30-day All-Cause Hospital Readmission measure

B. Measure Description

The 30-day All-Cause Hospital Readmission measure is a risk-standardized readmission rate for beneficiaries age 65 or older who were hospitalized at a short-stay acute-care hospital and experienced an unplanned readmission for any cause to an acute care hospital within 30 days of discharge. The measure applies to solo practitioners and groups, as identified by their Medicare Taxpayer Identification Number (TIN).

This TIN-level,[1] risk-standardized, all-cause unplanned readmission measure is adapted from a hospital-level quality measure developed for the Centers for Medicare & Medicaid Services (CMS) by the Yale School of Medicine Center for Outcomes Research & Evaluation (Yale/CORE) (Horwitz et al. 2011). This version of the measure is based on the measure updates developed for CMS by Yale/CORE in 2017 (Simoes et al. 2017) except that it uses the version 3.0 planned readmission algorithm, to align with calculations for the Medicare Shared Savings Program for the 2016 performance year.[2]

C. Rationale

Some readmissions are unavoidable, but they may also result from poor quality of care, inadequate coordination of care, or lack of effective discharge planning and transitional care. CMS is applying this measure to the Value Modifier because reducing avoidable readmissions is a key component in the effort to promote more efficient, high-quality care.

Information on TINs' performance on this measure is included in the Annual QRURs and used in the calculation of the Value Modifier.

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[1] For each TIN participating in a Medicare Shared Savings Program Accountable Care Organization (ACO), CMS will display the ACO's performance on this measure in the TIN's Annual QRUR and include the ACO's performance in the TIN's Quality Composite Score for the 2018 Value Modifier.

[2] See 2016 ACO-8 v2.1 documentation at https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/sharedsavingsprogram/Downloads/ACO-8.pdf.

D. Measure Outcome (Numerator)

The outcome[3] for this measure is any unplanned readmission to a non-federal, short-stay, acute-care or critical access hospital within 30 days of discharge from an index admission. The identification of planned readmissions is discussed in section H. Readmissions during the 30-day period that follow a planned readmission are not counted in the outcome. In the case of multiple readmissions during the 30-day period, the measure counts only one outcome. Readmissions to the same hospital on the same day for the same principal diagnosis are not counted in the outcome.

E. Population Measured (Denominator)

Eligible (index) admissions include acute care hospitalizations for Medicare Fee-for-Service (FFS) beneficiaries age 65 or older at non-federal, short-stay, acute-care or critical access hospitals that occurred during the performance period and are not excluded for the reasons listed in the next section. Admissions for all principal diagnoses are included unless identified as having an exclusion. A hospital stay that counts as a readmission for a prior stay also counts as a new index stay if it meets the criteria for an index stay.

For the purposes of measure calculation (described in section H), the eligible admissions are assigned to one of five specialty cohorts—surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology—based on diagnoses and procedure codes on the claim mapped to Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications Software (CCS); section I provides a link to methodology reports that contain the detailed CCS categories for each cohort.

F. Exclusions

Beneficiaries are excluded from the population measured if they:

- were enrolled in Medicare Part A only or Medicare Part B only for any month during the performance period
- were enrolled in a private Medicare health plan (for example, a Medicare Advantage HMO/PPO, or a Medicare private FFS plan) for any month during the performance period
- resided outside of the United States, its territories, and its possessions during the performance period

[3] This measure does not have a traditional numerator and denominator like a process of care measure; see risk adjustment and other resources below for more detail on measure construction.

In addition, hospitalizations are excluded from the denominator if the beneficiary:

- died during the admission
- was not continuously enrolled in Medicare Part A FFS for at least 30 days following discharge from the index admission
- lacked complete Medicare Part A FFS enrollment history for the 12 months prior to the index admission
- was discharged against medical advice
- was transferred from the admission to another acute care hospital
- was hospitalized in a prospective payment system-exempt cancer hospital
- was hospitalized for medical treatment of cancer[4]
- was hospitalized for a primary psychiatric disease[5]

G. Data Collection Approach and Measure Collection

This measure is calculated from Medicare FFS claims (Parts A and B) and Medicare beneficiary enrollment data; no additional data submission is required. The measure uses one year of inpatient claims to identify eligible admissions and readmissions, as well as up to one year prior of inpatient data to collect diagnoses for risk adjustment. The measure uses Part A and B paid claims from the performance period to attribute beneficiaries to TINs as described in the next section.

H. Methodological Information and Measure Construction

Attribution. For the 30-day All-Cause Hospital Readmission measure, beneficiaries are attributed to a single TIN in a two-step process that takes into account the level of primary care services received (as measured by Medicare-allowed charges during the performance period) and the provider specialties that performed these services. Only beneficiaries who received a primary care service during the performance period are considered in attribution. For more information on attribution, please see the document entitled "Two-step Attribution for Claims-based Quality Outcome Measures and Per Capita Cost Measures Included in the Value Modifier," available at the following URL: https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/PhysicianFeedbackProgram/Downloads/2016-03-25-Attribution-Fact-Sheet.pdf.

[4] These are identified by AHRQ CCS categories; see Table 1 for a listing of CCS categories for cancer that are excluded from the set of eligible index admissions.

[5] See Table 2 for a listing of AHRQ CCS categories for psychiatric disease that are excluded from the set of eligible index admissions.

The following two steps are used to attribute beneficiaries to a TIN for the 30-day All-Cause Hospital Readmission measure:

a. A beneficiary is attributed to a TIN in the first step if the beneficiary received more primary care services (as defined in Table 3) from primary care physicians (PCPs), nurse practitioners (NPs), physician assistants (PAs), and clinical nurse specialists (CNSs) in that TIN than in any other TIN.

b. If a beneficiary did not receive a primary care service from any PCP, NP, PA, or CNS during the performance period, the beneficiary is attributed to a TIN in the second step if the beneficiary received more primary care services from specialist physicians within the TIN than in any other TIN.

Planned readmissions. This measure does not count hospitalizations that are considered planned in the outcome. Planned readmissions are identified based on the following three principles: (1) some types of care are always considered planned (obstetrical delivery, transplant surgery, maintenance chemotherapy, rehabilitation); (2) otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and (3) admissions for acute illness or for complications of care are never planned. Tables 4 and 5 present procedure and diagnosis categories that are always considered planned, identified by AHRQ CCS. Table 6 presents procedure codes that are considered planned as long as they are not accompanied by one of the acute diagnoses listed in Table 7.

Risk adjustment and measure construction. Risk-adjusted readmissions account for beneficiary-level age and clinical risk factors of the beneficiaries attributed to the TIN that can affect hospital readmissions, regardless of the care provided. Risk-adjusted readmissions also include a TIN-level effect that accounts for the underlying risk of readmission for that TIN. The measure reports a single composite risk-standardized rate derived from the volume-weighted results of hierarchical regression models for five specialty cohorts: surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology. For more detail on risk adjustment and measure construction, please see the technical reports referenced in Section I below.

Each specialty cohort model uses a fixed, common set of risk-adjustment variables summarized in Table 8. Diagnoses recorded in hospital claims during the year prior to hospitalization and secondary diagnoses from the index admission (that do not represent complications) are used in assigning risk-adjustment variables for each admission, grouped by selected condition categories. Diagnoses that are present on the index hospitalization claim but not in the prior year and which are considered complications of care are not included in the risk adjustment; see Table 9 for diagnosis categories considered to be complications of care.

A Hierarchical Generalized Linear Model (HGLM) logistic regression model is used to calculate a "standardized readmission ratio" (SRR) for each cohort. At the beneficiary level, HGLM models the log-odds of hospital readmission within 30 days of discharge using age, selected clinical covariates, and a TIN-specific intercept. At the TIN level, it models the TIN-specific intercepts as arising from a normal distribution. The TIN-level intercept represents the

underlying risk of a readmission for a TIN's beneficiaries, after accounting for beneficiary risk. The TIN-specific intercepts are given a distribution to account for the clustering (non-independence) of beneficiaries within the same TIN.

For each specialty cohort, the numerator of the SRR ("predicted") is the number of 30-day readmissions for beneficiaries within the specialty cohort predicted on the basis of the TIN's performance (accounting for its TIN-specific intercept) with its observed case mix; the denominator ("expected") is the number of readmissions expected for beneficiaries within the specialty cohort on the basis of the nation's performance with that TIN's case mix. If a TIN has an SRR > 1, this indicates higher than expected readmissions given the patient mix of its attributed beneficiaries; an SRR < 1 indicates lower than expected readmissions.

These SRRs are then pooled for each TIN to create a composite SRR. The composite SRR is the geometric mean of the specialty cohort SRRs, weighted by the number of admissions in the specialty cohort; the pooled SRR is then multiplied by the national observed readmission rate to produce the risk-standardized rate.

I. For Further Information

For the measure specifications and other information, please visit https://www.qualitynet.org and click on the "Hospitals-Inpatient" tab, scroll down to the "Claims-Based Measures" option, click on "Readmission Measures" and then select "Measure Methodology."

More information about the 2016 QRURs and 2018 Value Modifier is available at: https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/PhysicianFeedbackProgram/2016-QRUR.html.

J. References

Horwitz, L., Partovian C., Lin Z., et al. *Hospital-Wide All-Cause Risk-Standardized Readmission Measure: Measure Methodology Report*. Prepared for the Centers for Medicare and Medicaid Services. New Haven, CT: Yale New Haven Health Services Corporation/Center for Outcomes Research & Evaluation, 2011.

Simoes, J., Grady J., DeBuhr, J., et al. *2017 All-Cause Hospital-Wide Measure Updates and Specification Report: Hospital-Level 30-Day Risk-Standardized Readmission Measure–Version 6.0*. Prepared for the Centers for Medicare and Medicaid Services. New Haven, CT: Yale New Haven Health Services Corporation/Center for Outcomes Research & Evaluation, 2017.

K. Tables

Table 1. Cancer discharge diagnosis categories excluded from the measure for admissions not included in the surgical cohort

AHRQ CCS (ICD-10)	Brief description
11	Cancer of head and neck
12	Cancer of esophagus
13	Cancer of stomach
14	Cancer of colon
15	Cancer of rectum and anus
16	Cancer of liver and intrahepatic bile duct
17	Cancer of pancreas
18	Cancer of other GI organs, peritoneum
19	Cancer of bronchus, lung
20	Cancer, other respiratory and intrathoracic
21	Cancer of bone and connective tissue
22	Melanomas of skin
23	Other non-epithelial cancer of skin
24	Cancer of breast
25	Cancer of uterus
26	Cancer of cervix
27	Cancer of ovary
28	Cancer of other female genital organs
29	Cancer of prostate
30	Cancer of testis
31	Cancer of other male genital organs
32	Cancer of bladder
33	Cancer of kidney and renal pelvis
34	Cancer of other urinary organs
35	Cancer of brain and nervous system
36	Cancer of thyroid
37	Hodgkin`s disease
38	Non-Hodgkin`s lymphoma
39	Leukemias
40	Multiple myeloma
41	Cancer, other and unspecified primary
42	Secondary malignancies
43	Malignant neoplasm without specification of site
44	Neoplasms of unspecified nature or uncertain behavior
45	Maintenance chemotherapy, radiotherapy

Table 2. Psychiatric discharge condition categories excluded from eligible admissions

AHRQ CCS (ICD-10)	Brief description
650	Adjustment disorders
651	Anxiety disorders
652	Attention-deficit
654	Developmental disorders
655	Disorders usually diagnosed in infancy
656	Impulse control disorders
657	Mood disorders
658	Personality disorders
659	Schizophrenia and other psychotic disorders
662	Suicide and intentional self-inflicted injury
670	Miscellaneous disorders

Table 3. Healthcare Common Procedure Coding System (HCPCS) primary care service codes

HCPCS codes	Brief description
99201–99205	New patient, office, or other outpatient visit
99211–99215	Established patient, office, or other outpatient visit
99304–99306	New patient, nursing facility care
99307–99310	Established patient, nursing facility care
99315–99316	Established patient, discharge day management service
99318	New or established patient, other nursing facility service
99324–99328	New patient, domiciliary or rest home visit
99334–99337	Established patient, domiciliary or rest home visit
99339–99340	Established patient, physician supervision of patient (patient not present) in home, domiciliary, or rest home
99341–99345	New patient, home visit
99347–99350	Established patient, home visit
G0402	Initial Medicare visit
G0438	Annual wellness visit, initial
G0439	Annual wellness visit, subsequent
G0463	Hospital outpatient clinic visit (Electing Teaching Amendment hospitals only)

Note: Labels are approximate. For more details, see the American Medical Association's Current Procedural Terminology ® and the CMS website (http://www.cms.gov/Medicare/Coding/HCPCSReleaseCodeSets/HCPCS_Quarterly_Update.html).

Table 4. Procedure categories that are always considered planned (version 3.0)

AHRQ Procedure CCS (ICD-10)	Description
64	Bone marrow transplant
105	Kidney transplant
134	Cesarean section*
135	Forceps, vacuum, and breech delivery*
176	Other organ transplantation (other than bone marrow corneal or kidney)

* CCS to be included only in all-payer settings, not intended for inclusion in CMS's claims-based readmission measures for Medicare FFS beneficiaries age 65+ years.

Table 5. Diagnosis categories that are always considered planned (version 3.0)

AHRQ Procedure CCS (ICD-10)	Description
45	Maintenance chemotherapy
194	Forceps delivery*
196	Normal pregnancy and/or delivery*
254	Rehabilitation

* CCS to be included only in all-payer settings, not intended for inclusion in CMS's claims-based readmission measures for Medicare FFS beneficiaries age 65+ years.

Table 6. Potentially planned procedure codes (version 3.0)

ICD-10	Description
AHRQ Procedure CCS	**--**
3	Excision, destruction or resection of intervertebral disc
5	Insertion of catheter or spinal stimulator and injection into spinal
9	Other OR therapeutic nervous system procedures
10	Thyroidectomy; partial or complete
12	Therapeutic endocrine procedures
33	Other OR therapeutic procedures of mouth and throat
36	Lobectomy or pneumonectomy
38	Other diagnostic procedures on lung and bronchus
40	Other diagnostic procedures of respiratory tract and mediastinum
43	Heart valve procedures
44	Coronary artery bypass graft (CABG)
45	Percutaneous transluminal coronary angioplasty (PTCA) with or without stent
47	Diagnostic cardiac catheterization; coronary arteriography
48	Insertion; revision; replacement; removal of cardiac pacemaker or cardioverter/defibrillator
49	Other OR heart procedures
51	Endarterectomy; vessel of head and neck
52	Aortic resection; replacement or anastomosis
53	Varicose vein stripping; lower limb
55	Peripheral vascular bypass
56	Other vascular bypass and shunt; not heart
59	Other OR procedures on vessels of head and neck
62	Other diagnostic cardiovascular procedures
66	Procedures on spleen
67	Other therapeutic procedures; hemic and lymphatic system
74	Gastrectomy; partial and total
78	Colorectal resection
79	Excision of large intestine lesion (not endoscopic)
84	Cholecystectomy and common duct exploration
85	Inguinal and femoral hernia repair
86	Other hernia repair
99	Other OR gastrointestinal therapeutic procedures
104	Nephrectomy; partial or complete
106	Genitourinary incontinence procedures
107	Extracorporeal lithotripsy; urinary
109	Procedures on the urethra
112	Other OR therapeutic procedures of urinary tract
113	Transurethral resection of prostate (TURP)
114	Open prostatectomy
119	Oophorectomy; unilateral and bilateral
120	Other operations on ovary
124	Hysterectomy; abdominal and vaginal
129	Repair of cystocele and rectocele; obliteration of vaginal vault
132	Other OR therapeutic procedures; female organs
142	Partial excision bone
152	Arthroplasty knee

ICD-10	Description
153	Hip replacement; total and partial
154	Arthroplasty other than hip or knee
157	Amputation of lower extremity
158	Spinal fusion
159	Other diagnostic procedures on musculoskeletal system
166	Lumpectomy; quadrantectomy of breast
167	Mastectomy
172	Skin graft
175	Other OR therapeutic procedures on skin subcutaneous tissue fascia and breast
ICD-10 Codes	**--**
0CBS0ZZ	Excision of Larynx, Open Approach
0CBS3ZZ	Excision of Larynx, Percutaneous Approach
0CBS4ZZ	Excision of Larynx, Percutaneous Endoscopic Approach
0CBS7ZZ	Excision of Larynx, Via Natural or Artificial Opening
0CBS8ZZ	Excision of Larynx, Via Natural or Artificial Opening Endoscopic
0B110F4	Bypass Trachea to Cutaneous with Tracheostomy Device, Open Approach
0B110Z4	Bypass Trachea to Cutaneous, Open Approach
0B113F4	Bypass Trachea to Cutaneous with Tracheostomy Device, Percutaneous Approach
0B113Z4	Bypass Trachea to Cutaneous, Percutaneous Approach
0B114F4	Bypass Trachea to Cutaneous with Tracheostomy Device, Percutaneous Endoscopic Approach
0B114Z4	Bypass Trachea to Cutaneous, Percutaneous Endoscopic Approach
0CTS0ZZ	Resection of Larynx, Open Approach
0CTS4ZZ	Resection of Larynx, Percutaneous Endoscopic Approach
0CTS7ZZ	Resection of Larynx, Via Natural or Artificial Opening
0CTS8ZZ	Resection of Larynx, Via Natural or Artificial Opening Endoscopic
0GTG0ZZ	Resection of Left Thyroid Gland Lobe, Open Approach
0GTG4ZZ	Resection of Left Thyroid Gland Lobe, Percutaneous Endoscopic Approach
0GTH0ZZ	Resection of Right Thyroid Gland Lobe, Open Approach
0GTH4ZZ	Resection of Right Thyroid Gland Lobe, Percutaneous Endoscopic Approach
0GTK0ZZ	Resection of Thyroid Gland, Open Approach
0GTK4ZZ	Resection of Thyroid Gland, Percutaneous Endoscopic Approach
0WB60ZZ	Excision of Neck, Open Approach
0WB63ZZ	Excision of Neck, Percutaneous Approach
0WB64ZZ	Excision of Neck, Percutaneous Endoscopic Approach
0WB6XZZ	Excision of Neck, External Approach
07T10ZZ	Resection of Right Neck Lymphatic, Open Approach
07T14ZZ	Resection of Right Neck Lymphatic, Perc Endo Approach
07T20ZZ	Resection of Left Neck Lymphatic, Open Approach
07T24ZZ	Resection of Left Neck Lymphatic, Perc Endo Approach
0BW10FZ	Revision of Tracheostomy Device in Trachea, Open Approach
0BW13FZ	Revision of Tracheostomy Device in Trachea, Percutaneous Approach
0BW14FZ	Revision of Tracheostomy Device in Trachea, Percutaneous Endoscopic Approach
0WB6XZ2	Excision of Neck, Stoma, External Approach
0WQ6XZ2	Repair Neck, Stoma, External Approach
0B5N0ZZ	Destruction of Right Pleura, Open Approach
0B5N3ZZ	Destruction of Right Pleura, Percutaneous Approach
0B5N4ZZ	Destruction of Right Pleura, Percutaneous Endoscopic Approach

ICD-10	Description
0B5P0ZZ	Destruction of Left Pleura, Open Approach
0B5P3ZZ	Destruction of Left Pleura, Percutaneous Approach
0B5P4ZZ	Destruction of Left Pleura, Percutaneous Endoscopic Approach
04CK0ZZ	Extirpation of Matter from Right Femoral Artery, Open Approach
04CK3ZZ	Extirpation of Matter from Right Femoral Artery, Percutaneous Approach
04CK4ZZ	Extirpation of Matter from Right Femoral Artery, Percutaneous Endoscopic Approach
04CL0ZZ	Extirpation of Matter from Left Femoral Artery, Open Approach
04CL3ZZ	Extirpation of Matter from Left Femoral Artery, Percutaneous Approach
04CL4ZZ	Extirpation of Matter from Left Femoral Artery, Percutaneous Endoscopic Approach
04CM0ZZ	Extirpation of Matter from Right Popliteal Artery, Open Approach
04CM3ZZ	Extirpation of Matter from Right Popliteal Artery, Percutaneous Approach
04CM4ZZ	Extirpation of Matter from Right Popliteal Artery, Percutaneous Endoscopic Approach
04CN0ZZ	Extirpation of Matter from Left Popliteal Artery, Open Approach
04CN3ZZ	Extirpation of Matter from Left Popliteal Artery, Percutaneous Approach
04CN4ZZ	Extirpation of Matter from Left Popliteal Artery, Percutaneous Endoscopic Approach
04CP0ZZ	Extirpation of Matter from Right Anterior Tibial Artery, Open Approach
04CP3ZZ	Extirpation of Matter from Right Anterior Tibial Artery, Percutaneous Approach
04CP4ZZ	Extirpation of Matter from Right Anterior Tibial Artery, Percutaneous Endoscopic Approach
04CQ0ZZ	Extirpation of Matter from Left Anterior Tibial Artery, Open Approach
04CQ3ZZ	Extirpation of Matter from Left Anterior Tibial Artery, Percutaneous Approach
04CQ4ZZ	Extirpation of Matter from Left Anterior Tibial Artery, Percutaneous Endoscopic Approach
04CR0ZZ	Extirpation of Matter from Right Posterior Tibial Artery, Open Approach
04CR3ZZ	Extirpation of Matter from Right Posterior Tibial Artery, Percutaneous Approach
04CR4ZZ	Extirpation of Matter from Right Posterior Tibial Artery, Percutaneous Endoscopic Approach
04CS0ZZ	Extirpation of Matter from Left Posterior Tibial Artery, Open Approach
04CS3ZZ	Extirpation of Matter from Left Posterior Tibial Artery, Percutaneous Approach
04CS4ZZ	Extirpation of Matter from Left Posterior Tibial Artery, Percutaneous Endoscopic Approach
04CT0ZZ	Extirpation of Matter from Right Peroneal Artery, Open Approach
04CT3ZZ	Extirpation of Matter from Right Peroneal Artery, Percutaneous Approach
04CT4ZZ	Extirpation of Matter from Right Peroneal Artery, Percutaneous Endoscopic Approach
04CU0ZZ	Extirpation of Matter from Left Peroneal Artery, Open Approach
04CU3ZZ	Extirpation of Matter from Left Peroneal Artery, Percutaneous Approach
04CU4ZZ	Extirpation of Matter from Left Peroneal Artery, Percutaneous Endoscopic Approach
04CV0ZZ	Extirpation of Matter from Right Foot Artery, Open Approach
04CV3ZZ	Extirpation of Matter from Right Foot Artery, Percutaneous Approach
04CV4ZZ	Extirpation of Matter from Right Foot Artery, Percutaneous Endoscopic Approach
04CW0ZZ	Extirpation of Matter from Left Foot Artery, Open Approach
04CW3ZZ	Extirpation of Matter from Left Foot Artery, Percutaneous Approach
04CW4ZZ	Extirpation of Matter from Left Foot Artery, Percutaneous Endoscopic Approach
04CY0ZZ	Extirpation of Matter from Lower Artery, Open Approach
04CY3ZZ	Extirpation of Matter from Lower Artery, Percutaneous Approach
04CY4ZZ	Extirpation of Matter from Lower Artery, Percutaneous Endoscopic Approach
0T9030Z	Drainage of Right Kidney with Drainage Device, Percutaneous Approach
0T9040Z	Drainage of Right Kidney with Drainage Device, Percutaneous Endoscopic Approach
0T9130Z	Drainage of Left Kidney with Drainage Device, Percutaneous Approach
0T9140Z	Drainage of Left Kidney with Drainage Device, Percutaneous Endoscopic Approach
0TC03ZZ	Extirpation of Matter from Right Kidney, Percutaneous Approach

ICD-10	Description
0TC04ZZ	Extirpation of Matter from Right Kidney, Percutaneous Endoscopic Approach
0TC13ZZ	Extirpation of Matter from Left Kidney, Percutaneous Approach
0TC14ZZ	Extirpation of Matter from Left Kidney, Percutaneous Endoscopic Approach
0TC33ZZ	Extirpation of Matter from R Kidney Pelvis, Perc Approach
0TC34ZZ	Extirpate of Matter from R Kidney Pelvis, Perc Endo Approach
0TC43ZZ	Extirpation of Matter from Left Kidney Pelvis, Perc Approach
0TC44ZZ	Extirpate of Matter from L Kidney Pelvis, Perc Endo Approach
0TF33ZZ	Fragmentation in Right Kidney Pelvis, Percutaneous Approach
0TF34ZZ	Fragmentation in Right Kidney Pelvis, Percutaneous Endoscopic Approach
0TF43ZZ	Fragmentation in Left Kidney Pelvis, Percutaneous Approach
0TF44ZZ	Fragmentation in Left Kidney Pelvis, Percutaneous Endoscopic Approach
GZB0ZZZ	Electroconvulsive Therapy, Unilateral-Single Seizure
GZB1ZZZ	Electroconvulsive Therapy, Unilateral-Multiple Seizure
GZB2ZZZ	Electroconvulsive Therapy, Bilateral-Single Seizure
GZB3ZZZ	Electroconvulsive Therapy, Bilateral-Multiple Seizure
GZB4ZZZ	Other Electroconvulsive Therapy

Table 7. Acute diagnosis codes (version 3.0)

ICD-10	Description
AHRQ Diagnosis CCS	**--**
1	Tuberculosis
2	Septicemia (except in labor)
3	Bacterial infection; unspecified site
4	Mycoses
5	HIV infection
7	Viral infection
8	Other infections; including parasitic
9	Sexually transmitted infections (not HIV or hepatitis)
54	Gout and other crystal arthropathies
55	Fluid and electrolyte disorders
60	Acute posthemorrhagic anemia
61	Sickle cell anemia
63	Diseases of white blood cells
76	Meningitis (except that caused by tuberculosis or sexually transmitted disease)
77	Encephalitis (except that caused by tuberculosis or sexually transmitted disease)
78	Other CNS infection and poliomyelitis
82	Paralysis
83	Epilepsy; convulsions
84	Headache; including migraine
85	Coma; stupor; and brain damage
87	Retinal detachments; defects; vascular occlusion; and retinopathy
89	Blindness and vision defects
90	Inflammation; infection of eye (except that caused by tuberculosis or sexually transmitted disease)
91	Other eye disorders
92	Otitis media and related conditions

ICD-10	Description
93	Conditions associated with dizziness or vertigo
99	Hypertension with complications and secondary hypertension
102	Nonspecific chest pain
104	Other and ill-defined heart disease
107	Cardiac arrest and ventricular fibrillation
109	Acute cerebrovascular disease
112	Transient cerebral ischemia
116	Aortic and peripheral arterial embolism or thrombosis
118	Phlebitis; thrombophlebitis and thromboembolism
120	Hemorrhoids
122	Pneumonia (except that caused by TB or sexually transmitted disease)
123	Influenza
124	Acute and chronic tonsillitis
125	Acute bronchitis
126	Other upper respiratory infections
127	Chronic obstructive pulmonary disease and bronchiectasis
128	Asthma
129	Aspiration pneumonitis; food/vomitus
130	Pleurisy; pneumothorax; pulmonary collapse
131	Respiratory failure; insufficiency; arrest (adult)
135	Intestinal infection
137	Diseases of mouth; excluding dental
139	Gastroduodenal ulcer (except hemorrhage)
140	Gastritis and duodenitis
142	Appendicitis and other appendiceal conditions
145	Intestinal obstruction without hernia
146	Diverticulosis and diverticulitis
148	Peritonitis and intestinal abscess
153	Gastrointestinal hemorrhage
154	Noninfectious gastroenteritis
157	Acute and unspecified renal failure
159	Urinary tract infections
165	Inflammatory conditions of male genital organs
168	Inflammatory diseases of female pelvic organs
172	Ovarian cyst
197	Skin and subcutaneous tissue infections
198	Other inflammatory condition of skin
225	Joint disorders and dislocations; trauma-related
226	Fracture of neck of femur (hip)
227	Spinal cord injury
228	Skull and face fractures
229	Fracture of upper limb
230	Fracture of lower limb
232	Sprains and strains
233	Intracranial injury
234	Crushing injury or internal injury
235	Open wounds of head; neck; and trunk

ICD-10	Description
237	Complication of device; implant or graft
238	Complications of surgical procedures or medical care
239	Superficial injury; contusion
240	Burns
241	Poisoning by psychotropic agents
242	Poisoning by other medications and drugs
243	Poisoning by nonmedicinal substances
244	Other injuries and conditions due to external causes
245	Syncope
246	Fever of unknown origin
247	Lymphadenitis
249	Shock
250	Nausea and vomiting
251	Abdominal pain
252	Malaise and fatigue
253	Allergic reactions
259	Residual codes; unclassified
650	Adjustment disorders
651	Anxiety disorders
652	Attention-deficit
653	Delirium
656	Impulse control disorders
658	Personality disorders
660	Alcohol-related disorders
661	Substance-related disorders
662	Suicide and intentional self-inflicted injury
663	Screening and history of mental health and substance abuse codes
670	Miscellaneous disorders
ICD-10 codes	**--**
Acute ICD-10 codes within Dx CCS 97	**Peri-; endo-; and myocarditis; cardiomyopathy**
A3681	Diphtheritic cardiomyopathy
A3950	Meningococcal carditis, unspecified
A3953	Meningococcal pericarditis
A3951	Meningococcal endocarditis
A3952	Meningococcal myocarditis
B3320	Viral carditis, unspecified
B3323	Viral pericarditis
B3321	Viral endocarditis
B3322	Viral myocarditis
B376	Candidal endocarditis
I32	Pericarditis in diseases classified* elsewhere
I39	Endocarditis and heart valve disorders in* diseases classified elsewhere
B395	Histoplasmosis duboisii*
B399	Histoplasmosis, unspecified*
B5881	Toxoplasma myocarditis
I010	Acute rheumatic pericarditis

ICD-10	Description
I011	Acute rheumatic endocarditis
I012	Acute rheumatic myocarditis
I018	Other acute rheumatic heart disease
I019	Acute rheumatic heart disease, unspecified
I020	Rheumatic chorea with heart involvement
I090	Rheumatic myocarditis
I099	Rheumatic heart disease, unspecified
I0989	Other specified rheumatic heart diseases
M3212	Pericarditis in systemic lupus erythematosus
I309	Acute pericarditis, unspecified
I301	Infective pericarditis
I300	Acute nonspecific idiopathic pericarditis
I308	Other forms of acute pericarditis
I330	Acute and subacute infective endocarditis
I339	Acute and subacute endocarditis, unspecified
I41	Myocarditis in diseases classified elsewhere
I409	Acute myocarditis, unspecified
I400	Infective myocarditis
I401	Isolated myocarditis
I408	Other acute myocarditis
I312	Hemopericardium, not elsewhere classified
I310	Chronic adhesive pericarditis
I311	Chronic constrictive pericarditis
I314	Cardiac tamponade
I514	Myocarditis, unspecified
Acute ICD-10 codes within Dx CCS 100	**Acute myocardial infarction (without subsequent MI)**
I2109	ST elevation (STEMI) myocardial infarction involving other coronary artery of anterior wall
I2101	ST elevation (STEMI) myocardial infarction involving left main coronary artery
I2102	ST elevation (STEMI) myocardial infarction involving left anterior descending coronary artery
I2119	ST elevation (STEMI) myocardial infarction involving other coronary artery of inferior wall
I2111	ST elevation (STEMI) myocardial infarction involving right coronary artery
I2129	ST elevation (STEMI) myocardial infarction involving other sites
I214	Non-ST elevation (NSTEMI) myocardial infarction
I2121	ST elevation (STEMI) myocardial infarction involving left circumflex coronary artery
I213	ST elevation (STEMI) myocardial infarction of unspecified site
Acute ICD-10 codes within Dx CCS 105	**Conduction disorders**
I442	Atrioventricular block, complete
I4430	Unspecified atrioventricular block
I440	Atrioventricular block, first degree
I441	Atrioventricular block, second degree
I4469	Other fascicular block
I444	Left anterior fascicular block
I445	Left posterior fascicular block
I4460	Unspecified fascicular block
I447	Left bundle-branch block, unspecified

ICD-10	Description
I4510	Unspecified right bundle-branch block
I450	Right fascicular block
I4519	Other right bundle-branch block
I4430	Unspecified atrioventricular block
I4439	Other atrioventricular block
I454	Nonspecific intraventricular block
I452	Bifascicular block
I453	Trifascicular block
I455	Other specified heart block
I456	Pre-excitation syndrome
I4581	Long QT syndrome
I459	Conduction disorder, unspecified
Acute ICD-10 codes within Dx CCS 106	**Dysrhythmia**
I479	Paroxysmal tachycardia, unspecified
R000	Tachycardia, unspecified
I498	Other specified cardiac arrhythmias
R001	Bradycardia, unspecified
I499	Cardiac arrhythmia, unspecified
I4949	Other premature depolarization
I493	Ventricular premature depolarization
Acute ICD-10 codes within Dx CCS 108	**Congestive heart failure; nonhypertensive**
I0981	Rheumatic heart failure
I509	Heart failure, unspecified
I5020	Unspecified systolic (congestive) heart failure
I5021	Acute systolic (congestive) heart failure
I5022	Chronic systolic (congestive) heart failure
I5023	Acute on chronic systolic (congestive) heart failure
I5030	Unspecified diastolic (congestive) heart failure
I5031	Acute diastolic (congestive) heart failure
I5032	Chronic diastolic (congestive) heart failure
I5033	Acute on chronic diastolic (congestive) heart failure
I5040	Unsp combined systolic and diastolic (congestive) hrt fail
I5041	Acute combined systolic and diastolic (congestive) hrt fail
I5042	Chronic combined systolic and diastolic hrt fail
I5043	Acute on chronic combined systolic and diastolic hrt fail
I501	Left ventricular failure
Acute ICD-10 codes within Dx CCS 149	**Biliary tract disease**
K8000	Calculus of gallbladder w acute cholecyst w/o obstruction
K8012	Calculus of GB w acute and chronic cholecyst w/o obstruction
K8001	Calculus of gallbladder w acute cholecystitis w obstruction
K8013	Calculus of GB w acute and chronic cholecyst w obstruction
K8042	Calculus of bile duct w acute cholecystitis w/o obstruction
K8046	Calculus of bile duct w acute and chronic cholecyst w/o obst
K8043	Calculus of bile duct w acute cholecystitis with obstruction
K8047	Calculus of bile duct w acute and chronic cholecyst w obst

ICD-10	Description
K8062	Calculus of GB and bile duct w acute cholecyst w/o obst
K8063	Calculus of GB and bile duct w acute cholecyst w obstruction
K8066	Calculus of GB and bile duct w ac and chr cholecyst w/o obst
K8067	Calculus of GB and bile duct w ac and chr cholecyst w obst
K810	Acute cholecystitis
K812	Acute cholecystitis with chronic cholecystitis
K830	Cholangitis
K8030	Calculus of bile duct w cholangitis, unsp, w/o obstruction
K8031	Calculus of bile duct w cholangitis, unsp, with obstruction
K8032	Calculus of bile duct with acute cholangitis w/o obstruction
K8033	Calculus of bile duct w acute cholangitis with obstruction
K8034	Calculus of bile duct w chronic cholangitis w/o obstruction
K8035	Calculus of bile duct w chronic cholangitis with obstruction
K8036	Calculus of bile duct w acute and chr cholangitis w/o obst
K8037	Calculus of bile duct w acute and chronic cholangitis w obst
Acute ICD-10 codes within Dx CCS 152	**Pancreatic disorders**
K859	Acute pancreatitis, unspecified
B252	Cytomegaloviral pancreatitis
K850	Idiopathic acute pancreatitis
K851	Biliary acute pancreatitis
K852	Alcohol induced acute pancreatitis
K853	Drug induced acute pancreatitis
K858	Other acute pancreatitis

Table 8. Comorbid risk variables common to all specialty cohorts

Variable Name	Description	CMS CCs v22
Age_65	Age (-65)	n/a
HxInfection	Severe infection	1, 3-6
OtherInfectious	Other infectious disease & pneumonias	7, 114-116
MetaCancer	Metastatic cancer/acute leukemia	8
SevereCancer	Severe cancer	9, 10
OtherCancer	Other cancers	11-14
Diabetes	Diabetes mellitus (DM) or DM complications	17-19, 122, 123
Malnutrition	Protein-calorie malnutrition	21
LiverDisease	End-stage liver disease; cirrhosis of liver	27, 28
Hematological	Severe hematological disorders	46
Alcohol	Drug/alcohol psychosis or dependence	54, 55
Psychological	Psychiatric comorbidity	57-59, 61, 63
MotorDisfunction	Hemiplegia, paraplegia, paralysis, functional disability	70, 71, 73, 74, 103, 104, 189, 190
Seizure	Seizure disorders and convulsions	79
CHF	Congestive heart failure	85
CADCVD	Coronary atherosclerosis or angina, cerebrovascular disease	86-89, 102, 105-109
Arryhthmias	Specified arrhythmias	96, 97

Variable Name	Description	CMS CCs v22
COPD	Chronic obstructive pulmonary disease	111
LungDisorder	Fibrosis of lung or other chronic lung disorders	112
OnDialysis	Dialysis Status	134
Ulcers	Decubitus ulcer or chronic skin ulcer	157-161
Septicemia	Septicemia, sepsis, systemic inflammatory response syndrome/shock	2
MetabolicDisorder	Disorders of fluid, electrolyte, acid-base	23, 24
IronDeficiency	Iron deficiency or other unspecified anemias and blood disease	49
CardioRespiratory	Cardio-respiratory failure or cardio-respiratory shock	84
RenalFailure	Renal failure	135-140
PancreaticDisease	Pancreatic disease, peptic ulcer, hemorrhage, other specified gastrointestinal disorders	34, 36
Arthritis	Rheumatoid arthritis and inflammatory connective tissue disease	40
RespiratorDependence	Respirator dependence/tracheostomy status	82
Transplants	Transplants	132, 186
Coagulopathy	Coagulation defects and other specified hematological disorders	48
HipFracture	Hip fracture/dislocation	170

Note: The Yale 2017 report adds codes R09.01 and R09.02 to CC 84 for discharges on or after October 1, 2015 and codes 799.01 and 799.02, for discharges before October 1, 2015. However, these codes were not added for the 2016 calculations to align with calculations for the Shared Savings Program.

Table 9. Complication of Care

CMS CCs v22	Description
2	Septicemia, Sepsis, Systemic Inflammatory Response Syndrome/Shock
7	Other Infectious Diseases
17	Diabetes with Acute Complications
24	Disorders of Fluid/Electrolyte/Acid-Base Balance
30	Acute Liver Failure/Disease
33	Intestinal Obstruction/Perforation
36	Peptic Ulcer, Hemorrhage, Other Specified Gastrointestinal Disorders
48	Severe Hematological Disorders
50	Delirium and Encephalopathy
80	Coma, Brain Compression/Anoxic Damage
82	Respirator Dependence/Tracheostomy Status
83	Respiratory Arrest
84	Cardio-Respiratory Failure and Shock
85	Congestive Heart Failure
86	Acute Myocardial Infarction
87	Unstable Angina and Other Acute Ischemic Heart Disease
96	Specified Heart Arrhythmias
97	Other Heart Rhythm and Conduction Disorders
99	Cerebral Hemorrhage
100	Ischemic or Unspecified Stroke
101	Precerebral Arterial Occlusion and Transient Cerebral Ischemia
103	Hemiplegia/Hemiparesis
104	Monoplegia, Other Paralytic Syndromes
106	Atherosclerosis of the Extremities with Ulceration or Gangrene
107	Vascular Disease with Complications
108	Vascular Disease
109	Other Circulatory Disease
114	Aspiration and Specified Bacterial Pneumonias
115	Pneumococcal Pneumonia, Empyema, Lung Abscess
117	Pleural Effusion/Pneumothorax
134	Dialysis Status
135	Acute Renal Failure
140	Unspecified Renal Failure
141	Nephritis
142	Urinary Obstruction and Retention
144	Urinary Tract Infection
157	Pressure Ulcer of Skin with Necrosis Through to Muscle, Tendon, or Bone
158	Pressure Ulcer of Skin with Full Thickness Skin Loss
159	Pressure Ulcer of Skin with Partial Thickness Skin Loss
160	Pressure Pre-Ulcer Skin Changes or Unspecified Stage
164	Cellulitis, Local Skin Infection
166	Severe Head Injury
167	Major Head Injury
168	Concussion or Unspecified Head Injury
170	Hip Fracture/Dislocation
171	Major Fracture, Except of Skull, Vertebrae, or Hip

CMS CCs v22	Description
175	Poisonings and Allergic and Inflammatory Reactions
173	Traumatic Amputations and Complications
176	Complications of Specified Implanted Device or Graft
177	Other Complications of Medical Care
186	Major Organ Transplant or Replacement Status
187	Other Organ Transplant Status/Replacement
188	Artificial Openings for Feeding or Elimination
189	Amputation Status, Lower Limb/Amputation Complications
190	Amputation Status, Upper Limb
191	Post-Surgical States/Aftercare/Elective