Aetna Smart Compare™
Orthopedic Physician Hip and Knee Designation Measurement Methodology
2022

Contents

Background on orthopedic physician designations for hip and knee conditions
As one of the oldest and largest national insurers, Aetna® has a unique opportunity to help transform health care. We believe that a better care system is more transparent, consumer focused and recognizes physicians for their clinical quality and effective consumption of health care resources. We are developing provider designations to support this vision.

Orthopedic physician hip and knee designations help us identify those orthopedic providers that provide efficient high-quality care to commercial populations with hip and knee degeneration and derangement. We exclude practices where >50% of the hip and knee conditions managed are for members under the age of 18 years old, as they are most likely the pediatric-only orthopedic specialists. Orthopedic practices will be measured annually for hip and knee designations.

Aetna Smart Compare designations from commercial plans are limited to self-insured plans in California and Texas. Members excluded from the program will not see designations in Aetna's secure member portal, and they will not receive designations through other communication channels.

How we evaluate orthopedic physicians
The orthopedic specialist hip/knee designation is organized around two categories of measurement:

- **Effectiveness**, which measures the outcomes and efficiency of treatment decisions.
- **Clinical quality**, which measures the quality of facilities where orthopedic specialists perform hipand/or knee replacement procedures. This measure is affected by complication rates and compliance with clinical guidelines.

We measure these categories separately.
Summary designations are awarded by aggregating sub-category scores. An Orthopedic Hip and Knee surgery group is scored based on their performance on sub-categories of measures that reflect different patients' clinical needs:
Effectiveness — A summary designation for effectiveness is the aggregation of three sub-categories: one for hip episodes of care, one for knee episodes of care and one for Cotiviti's Network Intelligence Risk-Readiness®score.
Clinical quality — A summary designation for clinical quality is the aggregation of two sub-categories: one for CMS hospital compare and one for Joint Commission Advanced Hip and Knee Certification.

Table 1 illustrates the hierarchy between summary and detailed designations.

Table 1 – Full list of designation awards possible for an orthopedic practice

Commercial adults

Summary	Detailed
Effectiveness	Hip episodes of care
	Knee episodes of care
	Cotiviti score
Clinical quality	CMS Hospital Compare
	Joint Commission Advanced Hip and Knee Certification

- Detailed designations are aggregated into summary designations within eachcategory of measures (effectiveness, clinical quality).
- Only summary designations will be displayed through our digital searchtools.

How an Orthopedic Surgeon Hip and Knee Practice can earn summary designations

Summary designations are awarded using a **scoring system**:

- Each detailed "designation earned" outcome is worth +1 point.
- Each detailed "criteria not met" outcome is worth -1 point.
- Each detailed "insufficient information" outcome is worth 0 points.

Points are **summed for each measure category** (effectiveness, clinical quality).
Summarydesignations are awarded based on the sum of points:

- "Designation earned" if the sum is 1 or higher.
- "Criteria not met" if the sum is negative.
- "Insufficient information" if the sum is zero.

Table 2 provides an example to illustrate this logic. Please note that, like the rest of thismethodology, the sum is performed within each patient population.

Table 2 – Example of logic to determine whether an Orthopedic Hip and Knee practice earned effectiveness and clinical quality summary designations for commercial adults

Summary			**Detailed**		
Category	Results	Points	Sub-category	Results	Points
Effectiveness	Insufficient information	0	Hip episodes of care	Designation earned	1
			Knee episodes of care	Criteria not met	-1
			Cotiviti Score	Insufficient information	0
Clinical quality	Designation earned	1	CMS Hospital Compare quality	Designation earned	1
			Joint Commission Cert	Insufficient information	0

1. Effectiveness: Episode efficiency

1.1 Overview

"Episode of care" is a methodology to assist in understanding medical cost and utilization. An episode of care for a member represents diagnostic and treatment services over time for a specific health condition. All relevant costs and utilization of services for the specific condition are rolled up into a single entity for analysis. An episode of care spans services from the onset of symptoms until treatment is complete; for chronic conditions the episode lasts one year.

We use Optum Symmetry® Episode Treatment Groups® (ETG®) software version 9.4 illness classification system to build episodes of care data in the Aetna® Data Warehouse.

The ETG technology is a form of "grouper" software. The software accepts health care claims (service line detail) and returns the ETG value, along with other patient information. The grouper software combines all relevant doctor, hospital, pharmacy, and ancillary testing claims data together. It then creates episodes of illness or surgery that are clinically defined and identified by ETG codes for analytic purposes.

There are many variables that can affect the use of health care resources for a condition such as severity of illness, age, and comorbid conditions. To account for these variations in resource use, a case-mix-adjusted "expected allowedamount" is created for each member specific ETG that is attributed to a physician group. This case-mix-adjusted expected allowed amount is then compared to the actual allowed amount for that episode of care.

There can be variation in efficiency indexes over time for practices that have met the initial volume threshold but have relatively lower numbers. To avoid attributing random variation to a practice pattern the statistical significance of a provider group's efficiency score is evaluated at $p \leq .10$ significance level.

We evaluate the efficiency of orthopedic physicians using episode conditions of joint degeneration and joint derangement of the knee and hip, with or without surgery. Only ETG codes that had an episode count of 200 or more for that ETG code and business line combination between January 1, 2018, and December 31, 2019, and were managed by an orthopedic provider were included in the analysis. Orthopedic physicians are evaluated on episodes where they were the responsible provider on that episode. Orthopedic groups must have at least 11 episodes for each business line/knee condition or business line/hip condition combination to be evaluated on episodes efficiency for knee condition or hip condition respectively.

We attribute one responsible provider for each episode of care.

- If an episode contains a surgical procedure as defined by Symmetry and it is also a major surgery as defined by Aetna, the episode is attributed to the physician who performed that procedure.
    - If there are two major surgeries, then the episode is attributed to the physician with themost allowed amounts.
    - If there is not a major surgery in the episode, but a minor surgery is found, the episode isattributed to the physician who performed the minor surgery.
    - If there are two minor surgeries, the episode is attributed to the physician with the mostallowed amounts.
- If there is no surgery present, the episode is attributed to the physician with the highest number of visits based on management records as defined by Symmetry.
    - For physicians tied for highest number of visits, the episode is attributed to the physicianwith the most direct treatment provided.
    - If there is still more than one physician with the same number of visits and treatments, the episode is attributed to the physician with the highest allowed amount.

An ETG ends after there has been no treatment of the condition for an ETG specific number of days. This interval is called the "clean period.". For example, ETG condition 712203 (Joint degeneration, localized - thigh, hip & pelvis) has a 180-day clean period. This means that any claims related to that diagnosis that fall within a 180-day period will be considered a recurrence of the same condition. When an episode is started for this ETG, all clinically consistent claims activity for Joint degeneration, localized to the thigh, hip & pelvis group to this episode until the point where 180 days have passed without any corresponding clinically consistent treatment. If a claim for this condition is received after 180 days, a new episode is triggered. Only complete episodes are used in the evaluation. Complete episodes are those that met the clean periods before and after the measure or the episode was a chronic condition that lasted 365 days. There is a claims lag of three months used in the episodes of care measurement. We use 2 years of complete episodes to evaluate efficiency.

Episode severity is a term used to describe the severity of a member's condition. ETG methodology takes advantage of the relevant complication and comorbidity factors (indicating a sicker member who may require more extensive treatment for a related condition) when determining an episode's severity. The result is a severity score and severity level for episodes. Typically, the higher the severity score, the more that condition is expected to cost than for other members with a lower severity score

for the same condition.

Severity-adjusting episodes provides a powerful unit of analysis for comparing provider performance when different providers care for members with the same condition and different severity levels.

When comparing the allowed cost to the expected cost of an episode, the expected value reflects the case-mix-adjusted value for the members' episodes. Outlier logic is applied at the case- mix category level. When case-mix categories are created, episodes are flagged as outliers if that episode is outside of two median absolute deviations away from the median allowed amounts for that case mix category. These outliers are excluded from the analysis.

1.2. Case mix variables

Variable within eachETG	
Hospital referral region (HRR)	HRR Num level (Appendix A)
ETG code	ETG code level (Appendix B)
Social determinants of health	Identifies variables that impact health care cost in a census tract area: income, poverty, diversity, disability, education, physical inactivity, marital status, public transportation. CDC and US census information used to identify SDOH.
Age	Age
Gender	Male or female
Year of episode	Two years January 1, 2018 – December 31, 2019
Severity level	As indicated on the episode based on Symmetry. (Values are 0 to 4)
Business line	Commercial vs Medicare
Pharmacy usage	Whether or not the member has a pharmacy plan
HPD conditions	All conditions (Appendix C)
Concurrent episodes	Episodes that overlap each other by ETG code
Timing of orthopedic physician entry into episode	% of allowed amount that occurred in the episode before Orthopedic physician first claim in episode
ICD 10 group codes	Frequency by which ICD10 group appears in that episode
ERG risk score	Optum Symmetry® Episode Risk Groups® (ERG®). Risk-adjusted episodes of care created by the ETG grouper. This allows for a seamlessdrill down from an ERG score into the episodes that are contributing to a patient's risk.
Episode days count	The length from the start of the episode to the end of the episode

1.3. Eligible populations

Business lines	Commercial
Ages	All
Continuous enrollment	Complete and full year episodes are included, which means the episode began and came to an end according to the rules of clean periods or were 12-month episodes. Episodes longer than 12 months for chronic conditions are not created by our warehouse to enable comparisons. For example, if a chronic episode for one person is only 12 months long it would not be comparable to an episode foranother person with the same condition that is 3 years long.
Measurement time frame	Two full years of episodes where the episode ends within the two-year time frame.
Benefit	Medical (pharmacy if available)
Provider specialty category	Orthopedic

Administrative specification	
Denominator	Denominator is the sum of the expected allowed amounts for the episodes being attributed to the group (Appendix B). The expected allowed amount is the case-mix-adjusted average for each ETG and its combination of variables as described above.
Total allowed $	Episodes must be greater than $0
Numerator	Numerator is the sum of the actual allowed amounts for the same episodes in the denominator being attributed to the group

1.4. Episode efficiency evaluation and scoring

Step 1: Aggregate episode level data for orthopedic practices.

a) Using episode data, identify all episodes for the measurement period. This data is evaluated at the individual episode level for each tax ID attributed to the episode.

Step 2: Determine benchmark.

a) Benchmark allowed per episode is calculated **using a decision tree machine learning model**. Model features include Optum Symmetry® Episode Risk Groups® (ERG®) retrospective risk score, concurrent episodes, member comorbidities and Social Determinants of Health. Model R-Squared is 0.84–0.85 excluding outliers.

Step 3: Determine orthopedic specialist performance evaluation result.

a) Calculate the episode-level performance index as total actual allowed amount/total benchmark allowed amount.

b) Calculate the market-adjusted episode level performance index as the episode level performance index/market level performance index for the market the practice being measured is a part of. The market and risk-level performance index is calculated as total actual episode allowed/total benchmark episode allowed with the following combinations of variables for different sub-populations:
    - *Commercial hip* - HRR market
    - *Commercial knee* - HRR market, TIN size category and TIN risk category
c) Calculate the overall weighted performance index for a practice by taking a weighted average of the market-adjusted episode level performance index scores for that practice weighted by the total benchmark allowed amount.
d) Conduct a two-sample weighted t-test comparing the practice's market-adjusted performance index weighted by the total benchmark allowed amount with the average market-adjusted performance index from the relevant decision tree node weighted by the total benchmark allowed amount. The t-test indicates whether there is a statistically significant difference between the actual and expected episode-level performance indices.
    - If the test has a p-value greater than or equal to 0.10, the practice results are not statistically significant, and the practice outcome will be "Insufficient information."
    - If the T-statistic <0 and p-value <.1, then the practice market-adjusted performance index is statistically significantly less than the average market-adjusted performance index and the practice will receive a designation of "Designation earned."
    - If the T-statistic >=0 and p-value <.1, then the practice's market-adjusted performance index is statistically significantly greater than the average market-adjusted performance index , the practice outcome will be "Criteria not met"

Note: The weights used in the test are transformed with a degree of freedom correction. Using raw expected amount values for weights makes the tails of the t-test distribution very thin, leading to most test results having statistical significance. The correction standardizes the weights by their mean so that the sum of the weights equals the number of observations and creates a higher bar for statistical significance.

A full calculation example can be found in Appendix D.

2. Cotiviti Risk-Readiness® efficiency

2.1. Overview

Cotiviti efficiency is based on Cotiviti's Risk-Readiness® tool and benchmarks. The Risk-Readiness® tool provides insights to identify and quantify sources of low value care. Low value care is defined as health care services that increase medical spend and don't improve patient outcomes on a population health level. Cotiviti Risk-Readiness® benchmarks are developed based on provider geography and peer types and are based on leading industry research and guidelines that are well respected by the medical community.

2.2. Methodology

Cotiviti Risk-Readiness® helps health plans identify low-value care from inefficient and unnecessary services.

Low-value care is unnecessary healthcare services—diagnostics, procedures, prescriptions and more—that do not improve patient outcomes.

Cotiviti's Risk-Readiness® benchmarks are based on leading industry research, including the Dartmouth Atlas for Unwarranted Variation, the American Board of Internal Medicine (ABIM)'s

Choosing Wisely initiative, and other proprietary clinical analyses.
Cotiviti applies its clinical methodology to robust public data to create actionable benchmarks. The Benchmarks identify outliers in practice pattern variation among a cohort of physician's peers and indicate where a provider group may deliver more or less of the care known to be influenced primarily by physician preference.

- Cotiviti utilizes 6 years of Medicare parts A, B, and D claims data to provide a large, multi-year, normalized dataset on 90%+ of all physicians.
- Proprietary algorithms identify provider sub-specialties and create peer cohorts in each geography. Hospital Referral Regions (HRRs) are used to define peer cohort geography.
- Evidence from academic research, Choosing Wisely, etc. are used to assess clinical quality and medical economics.
- Measures are risk-adjusted based on the provider's patient panel using Medicare HCC risk-adjustment methodologies.
- Providers are scored in each measure based on their relative performance within their peer cohorts and placed into quintiles based on the relative intensity of visits, services, prescriptions, and referrals they provide
- Measure sets are specialty specific (see Appendix E for the list of Orthopedic measures)

2.3. Cotiviti efficiency evaluation and scoring

Cotiviti's Risk-Readiness® tool evaluates provider groups on 4 domains and a score is created for each domain.

- Visit score: Measures how quickly provider visits escalate compared to peers
- Procedure score: Measures how intensely a provider practices medicine compared to peers
- Pharmacy score: Measures how a provider prescribes medications compared to peers
- Referral score: Measures performance and appropriateness in a provider's value chain compared to peers

The 4 domain scores are aggregated to a composite score, known as the "Overall Value Score." Provider groups with an overall value score in the top 20% have practice patterns aligned with high value care delivery and receive a result of "Designation earned." Provider groups that remain receive a result of "Insufficient information."

3. Clinical quality

3.1. Overview

The clinical quality category looks at the quality of facilities where orthopedic specialists perform hip or knee replacement procedures. Complication rates and compliance with clinical guidelines affect this measure.

The clinical quality designation is awarded based on publicly available external data on facilities where the orthopedic practice performs hip or knee procedures:

- **Two measures from Centers for Medicare & Medicaid Services (CMS) Hospital Compare:**
  - 30-day readmission rate following elective hip or knee arthroplasty
  - Hospital risk adjusted complication rate following elective hip or knee arthroplasty
- **Joint Commission Advanced Total Hip and Knee Replacement Certification or DNV Healthcare Total Hip and Knee Replacement Certification**, which is availableto hospitals, critical access hospitals and ambulatory surgical centers. The **Joint Commission Certification** is based on outcomes that include surgical site infections, fall rates, improvement in patient education prior to

discharge, length of stay, early ambulation and pain management. To be eligible for the certification, a facility must have served a minimum of 10 patients. The **DNV Healthcare** Hip & Knee Replacement Program Certification (HKRPC) integrates requirements related to the CMS Conditions of Participation for hospitals. HKRPCs are designed to recognize excellence in orthopedic surgery within the scope of Hip and Knee Replacement and related procedures. The certification will mean that a hospital has demonstrated compliance with the DNV Healthcare standard and adherence to guidelines of the American Academy of Orthopedic Surgeons.

We only measure orthopedic practices with at least three complete non-outlier episodes of care across commercial and Medicare between January 1, 2018, and December 31, 2019. The purpose of setting a low threshold is to be as inclusive as possible, while excluding orthopedic practices with no Aetna® experience in treating hip or knee replacement conditions.

3.2. Clinical quality evaluation and scoring

Step 1: Orthopedic practices are linked to facilities using our claims data
Orthopedic practices are linked to facilities where they performed at least one hip or knee replacement procedure in 2019, across commercial and Medicare lines of business. If an orthopedic practice performs cases at more than one facility, we use a weighted average score based on Aetna case count to determine practice-level performance.

Step 2: Evaluate CMS Hospital Compare-based outcomes
CMS Hospital Compare provides actual facility performance and expected facility performance for both quality measures (that is, 30-day readmission rate and hospital complication rate following an elective hip or knee arthroplasty).

a) Calculate performance index as ratio between actual and expected facility performance for each measure. Measures are scored independently, with the following potential outcomes:
    - Positive performance if practice performance is lower than index average minus 0.5 standard deviations.
    - Negative performance if practice performance is higher than index average plus 0.5 standard deviations.
    - Neutral performance otherwise.
b) Combine individual CMS measure scores into an overall CMS Hospital compare score by selecting the result that is most favorable to the practice, as shown in Table 1. Scoring outcomes include:
    - Positive performance if practice earned a positive performance score on either measure (that is, 30-day readmission rate *or* complication rate).
    - Negative performance if practice earned a negative performance score on both measures (that is, 30-day readmission rate *and* complication rate).
    - Neutral performance otherwise.

Table 1 – Logic to combined measure-level scores into an overall CMS Hospital Compare score

Hospital risk-adjusted complication rate following elective

		hip or knee arthroplasty		
		Positive performance	*Neutral performance*	*Negative performance*
30-day readmission following elective hip or knee arthroplasty	*Positive performance*	Positive performance	Positive performance	Positive performance
	Neutral performance	Positive performance	Neutral performance	Neutral performance
	Negative performance	Positive performance	Neutral performance	Negative performance

Step 3: Evaluate CNV Healthcare and Joint Commission Advanced Total Hip and Knee Replacement Certification-based outcomes

The Joint Commission and CNV Healthcare Certification category has two possible outcomes:

- Positive performance if the orthopedic practice performed more than 25 percent of its hip/kneeprocedures at Joint Commission or CNV Healthcare Certified facilities. Volume threshold is based on 2019 Aetna data across commercial and Medicare.
- Neutral performance otherwise.

Step 4: Calculate overall clinical quality designation

The two categories (that is, CMS Hospital Compare and Joint Commission or DNV Healthcare Certification), are aggregated into a clinical quality designation using the following rules:

- Designation earned: orthopedic practice has positive performance on CMS Hospital Comparemeasures *or* Joint Commission or DNV Healthcare Certification
- Criteria not met: orthopedic practice has negative performance on CMS Hospital Comparemeasures *and* neutral performance for Joint Commission or DNV Healthcare Certification
- Insufficient information: orthopedic practice has neutral performance on CMS Hospital Comparemeasures *and* neutral performance for Joint Commission or DNV Healthcare Certification.

Table 2 illustrates this logic. We use CMS Hospital Compare data as of July 2020.

Table 2 – Logic to determine whether an orthopedic practice earned a clinical quality designation

		CMS Hospital Compare		
		Positive performance	Neutral performance	Negative performance
Joint Commission Certification or DNV Healthcare	Positive performance	Designation earned	Designation earned	Designation earned
	Neutral performance	Designation earned	Insufficient information	Criteria not met

To be eligible for a clinical quality designation, an orthopedic practice must have:

- Majority of their 2019 surgery spend at facilities are in-network with Aetna
- No 2019 cases at a facility with confirmed fraud cases

Orthopedic practices that do not meet both criteria cannot earn a clinical quality designation. Thesepractices receive an insufficient information designation for clinical quality.

3.3. CMS Hospital Compare measure specifications

Hospital-level risk-standardized complication rate following elective primary THA and/or TKA	
Measure steward *CMS*	**Measure category:** *Outcome measures*
Description: The measure estimates a hospital-level risk-standardized complication rate associated with elective primary total hip arthroplasty (THA) and total knee arthroplasty (TKA) in Medicare Fee-For-Service beneficiaries who are 65 years and older. The outcome (complication) is defined as any one of the specified complications occurring from the date of index admission to 90 days post-date of the index admission (the admission included in the measure cohort). ***Note:*** *A lower rate indicates better performance*	

Denominator	The target population for the publicly reported measure includes admissions for Medicare FFS beneficiaries who are at least 65 years of age undergoing elective primary THA and/or TKA procedures. ***Denominator exclusion*** This measure excludes index admissions for patients: • Without at least 90 days post-discharge enrollment in FFS Medicare • Who were discharged against medical advice (AMA) • Who had more than two THA/TKA procedure codes during the index hospitalization • Fracture of the pelvis or lower limbs coded in the principal or secondary discharge diagnosis fields on the index admission claim (Note: Periprosthetic fractures must be additionally coded as present on admission [POA] in order to disqualify a THA/TKA from cohort inclusion, unless exempt from POA reporting) • A concurrent partial hip or knee arthroplasty procedure • A concurrent revision, resurfacing, or implanted device/prosthesis removal procedure • Mechanical complication coded in the principal discharge diagnosis field on the index admission claim • Malignant neoplasm of the pelvis, sacrum, coccyx, lower limbs, or bone/bone marrow or a disseminated malignant neoplasm coded in the principal discharge diagnosis field on the index admission claim • Transfer from another acute care facility for the THA/TKA

Numerator	The outcome for this measure is any complication occurring during the index admission (not coded present on arrival) to 90 days post-date of the index admission. Complications are counted in the measure only if they occur during the index hospital admission or during a readmission. The complication outcome is a dichotomous (yes/no) outcome. If a patient experiences one or more of these complications in the applicable period, the complication outcome for that patient is counted in the measure as a yes. Complications measured:

Complication	**Follow-up period in days**
Acute MI	During index admission or within
Pneumonia	During index admission or within
Sepsis/ septicemia/ shock	During index admission or within
Surgical site bleeding	During index admission or within date
Pulmonary embolism	During index admission or within date
Death	During index admission or within date
Mechanical complications	During index admission or within date
Periprosthetic joint infection / wound infection	During index admission or within date

Product lines & benefit	Medicare Medical during the measurement year.
Continuous enrollment & allowable gap	Enrolled in Medicare fee-for-service (FFS) Part A and Part B for the 12 months prior to the date of admission; and enrolled in Part A during the index admission;

Risk adjustment: Statistical risk model
Managing provider attribution Hospital facility
Data collection approach: Medicare FFS

Hospital-level 30-day risk-standardized readmission rate following elective primary THA and/or TKA	
Measure steward: *CMS*	**Measure category**: *Outcome measure*

<table>
<tr><td colspan="2">Description:
The measure estimates a hospital-level risk-standardized readmission rate following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA) in Medicare Fee-For-Service (FFS) beneficiaries who are 65 years and older. The outcome (readmission) is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission (the admission included in the measure cohort).
Note: A lower rate indicates better performance</td></tr>
<tr><td>Denominator</td><td>The target population for the publicly reported measure includes admissions for Medicare FFS beneficiaries who are at least 65 years of age undergoing elective primary THA and/or TKA procedures.

Denominator exclusions:
Without at least 30 days post-discharge enrollment in FFS Medicare
Who were discharged against medical advice (AMA)
Admitted for the index procedure and subsequently transferred to another acute care facility
Who had more than two THA/TKA procedure codes during the index hospitalization</td></tr>
</table>

	• Who had THA/TKA admissions within 30 days of a prior THA/TKA index admission
Numerator	The outcome for this measure is 30-day readmissions. We define readmissions as inpatient admissions for any cause, except for certain planned readmissions, within 30 days from the date of discharge of the index hospitalization. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission, because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission ***Numerator exclusions planned readmissions***: 1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, and rehabilitation) 2. Non-acute readmission for a scheduled procedure
Product lines & benefit	Medicare
Continuous enrollment & allowable gap	Enrolled in Medicare fee-for-service (FFS) Part A and Part B for the 12 months prior to the date of admission; and enrolled in Part A during the index admission

Risk adjustment: Statistical risk model
Managing provider attribution Hospital facility
Data collection approach: Medicare FFS

Appendix A: Hospital referral regions (HRRs)

HRR Nbr	HRR City	HRR State
1	Birmingham	AL
2	Dothan	AL
5	Huntsville	AL
6	Mobile	AL
7	Montgomery	AL
9	Tuscaloosa	AL
10	Anchorage	AK
11	Mesa	AZ
12	Phoenix	AZ
14	Sun City	AZ
15	Tucson	AZ
16	Fort Smith	AR
18	Jonesboro	AR
19	Little Rock	AR
21	Springdale	AR
22	Texarkana	AR
23	Orange County	CA
25	Bakersfield	CA
31	Chico	CA
33	Contra Costa County	CA
43	Fresno	CA
56	Los Angeles	CA
58	Modesto	CA
62	Napa	CA
65	Alameda County	CA
69	Palm Springs/Rancho Mira	CA
73	Redding	CA
77	Sacramento	CA
78	Salinas	CA
79	San Bernardino	CA
80	San Diego	CA
81	San Francisco	CA
82	San Jose	CA
83	San Luis Obispo	CA
85	San Mateo County	CA
86	Santa Barbara	CA
87	Santa Cruz	CA

89	Santa Rosa	CA
91	Stockton	CA
96	Ventura	CA
101	Boulder	CO
102	Colorado Springs	CO
103	Denver	CO
104	Fort Collins	CO
105	Grand Junction	CO
106	Greeley	CO
107	Pueblo	CO
109	Bridgeport	CT
110	Hartford	CT
111	New Haven	CT
112	Wilmington	DE
113	Washington	DC
115	Bradenton	FL
116	Clearwater	FL
118	Fort Lauderdale	FL
119	Fort Myers	FL
120	Gainesville	FL
122	Hudson	FL
123	Jacksonville	FL
124	Lakeland	FL
127	Miami	FL
129	Ocala	FL
130	Orlando	FL
131	Ormond Beach	FL
133	Panama City	FL
134	Pensacola	FL
137	Sarasota	FL
139	St. Petersburg	FL
140	Tallahassee	FL
141	Tampa	FL
142	Albany	GA
144	Atlanta	GA
145	Augusta	GA
146	Columbus	GA
147	Macon	GA
148	Rome	GA
149	Savannah	GA
150	Honolulu	HI

151	Boise	ID
152	Idaho Falls	ID
154	Aurora	IL
155	Blue Island	IL
156	Chicago	IL
158	Elgin	IL
161	Evanston	IL
163	Hinsdale	IL
164	Joliet	IL
166	Melrose Park	IL
170	Peoria	IL
171	Rockford	IL
172	Springfield	IL
173	Urbana	IL
175	Bloomington	IL
179	Evansville	IN
180	Fort Wayne	IN
181	Gary	IN
183	Indianapolis	IN
184	Lafayette	IN
185	Muncie	IN
186	Munster	IN
187	South Bend	IN
188	Terre Haute	IN
190	Cedar Rapids	IA
191	Davenport	IA
192	Des Moines	IA
193	Dubuque	IA
194	Iowa City	IA
195	Mason City	IA
196	Sioux City	IA
197	Waterloo	IA
200	Topeka	KS
201	Wichita	KS
203	Covington	KY
204	Lexington	KY
205	Louisville	KY
207	Owensboro	KY
208	Paducah	KY
209	Alexandria	LA
210	Baton Rouge	LA

212	Houma	LA
213	Lafayette	LA
214	Lake Charles	LA
216	Metairie	LA
217	Monroe	LA
218	New Orleans	LA
219	Shreveport	LA
220	Slidell	LA
221	Bangor	ME
222	Portland	ME
223	Baltimore	MD
225	Salisbury	MD
226	Takoma Park	MD
227	Boston	MA
230	Springfield	MA
231	Worcester	MA
232	Ann Arbor	MI
233	Dearborn	MI
234	Detroit	MI
235	Flint	MI
236	Grand Rapids	MI
238	Kalamazoo	MI
239	Lansing	MI
240	Marquette	MI
242	Muskegon	MI
243	Petoskey	MI
244	Pontiac	MI
245	Royal Oak	MI
246	Saginaw	MI
248	St. Joseph	MI
249	Traverse City	MI
250	Duluth	MN
251	Minneapolis	MN
253	Rochester	MN
254	St. Cloud	MN
256	St. Paul	MN
257	Gulfport	MS
258	Hattiesburg	MS
259	Jackson	MS
260	Meridian	MS
261	Oxford	MS

262	Tupelo	MS
263	Cape Girardeau	MO
264	Columbia	MO
267	Joplin	MO
268	Kansas City	MO
270	Springfield	MO
273	St. Louis	MO
274	Billings	MT
275	Great Falls	MT
276	Missoula	MT
277	Lincoln	NE
278	Omaha	NE
279	Las Vegas	NV
280	Reno	NV
281	Lebanon	NH
282	Manchester	NH
283	Camden	NJ
284	Hackensack	NJ
285	Morristown	NJ
288	New Brunswick	NJ
289	Newark	NJ
291	Paterson	NJ
292	Ridgewood	NJ
293	Albuquerque	NM
295	Albany	NY
296	Binghamton	NY
297	Bronx	NY
299	Buffalo	NY
300	Elmira	NY
301	East Long Island	NY
303	Manhattan	NY
304	Rochester	NY
307	Syracuse	NY
308	White Plains	NY
309	Asheville	NC
311	Charlotte	NC
312	Durham	NC
313	Greensboro	NC
314	Greenville	NC
315	Hickory	NC
318	Raleigh	NC

319	Wilmington	NC
320	Winston-Salem	NC
321	Bismarck	ND
322	Fargo/Moorhead MN	ND
323	Grand Forks	ND
324	Minot	ND
325	Akron	OH
326	Canton	OH
327	Cincinnati	OH
328	Cleveland	OH
329	Columbus	OH
330	Dayton	OH
331	Elyria	OH
332	Kettering	OH
334	Toledo	OH
335	Youngstown	OH
336	Lawton	OK
339	Oklahoma City	OK
340	Tulsa	OK
341	Bend	OR
342	Eugene	OR
343	Medford	OR
344	Portland	OR
345	Salem	OR
346	Allentown	PA
347	Altoona	PA
350	Danville	PA
351	Erie	PA
352	Harrisburg	PA
354	Johnstown	PA
355	Lancaster	PA
356	Philadelphia	PA
357	Pittsburgh	PA
358	Reading	PA
359	Sayre	PA
360	Scranton	PA
362	Wilkes-Barre	PA
363	York	PA
364	Providence	RI
365	Charleston	SC
366	Columbia	SC

367	Florence	SC
368	Greenville	SC
369	Spartanburg	SC
370	Rapid City	SD
371	Sioux Falls	SD
373	Chattanooga	TN
374	Jackson	TN
375	Johnson City	TN
376	Kingsport	TN
377	Knoxville	TN
379	Memphis	TN
380	Nashville	TN
382	Abilene	TX
383	Amarillo	TX
385	Austin	TX
386	Beaumont	TX
388	Bryan	TX
390	Corpus Christi	TX
391	Dallas	TX
393	El Paso	TX
394	Fort Worth	TX
396	Harlingen	TX
397	Houston	TX
399	Longview	TX
400	Lubbock	TX
402	McAllen	TX
406	Odessa	TX
411	San Angelo	TX
412	San Antonio	TX
413	Temple	TX
416	Tyler	TX
417	Victoria	TX
418	Waco	TX
420	Wichita Falls	TX
421	Ogden	UT
422	Provo	UT
423	Salt Lake City	UT
424	Burlington	VT
426	Arlington	VA
427	Charlottesville	VA
428	Lynchburg	VA

429	Newport News	VA
430	Norfolk	VA
431	Richmond	VA
432	Roanoke	VA
435	Winchester	VA
437	Everett	WA
438	Olympia	WA
439	Seattle	WA
440	Spokane	WA
441	Tacoma	WA
442	Yakima	WA
443	Charleston	WV
444	Huntington	WV
445	Morgantown	WV
446	Appleton	WI
447	Green Bay	WI
448	La Crosse	WI
449	Madison	WI
450	Marshfield	WI
451	Milwaukee	WI
452	Neenah	WI
456	Wausau	WI
457	Casper	WY

Appendix B: ETG code list with condition category

etg_cd	description	body part
712203011	Joint degeneration, localized - thigh, hip & pelvis, w/o complication, with comorbidity, with surgery	hip
712203000	Joint degeneration, localized - thigh, hip & pelvis, w/o complication, w/o comorbidity, w/o surgery	hip
712203001	Joint degeneration, localized - thigh, hip & pelvis, w/o complication, w/o comorbidity, with surgery	hip
712203010	Joint degeneration, localized - thigh, hip & pelvis, w/o complication, with comorbidity, w/o surgery	hip
714303000	Joint derangement - thigh, hip & pelvis, w/o surgery	hip
714303001	Joint derangement - thigh, hip & pelvis, with surgery	hip
712202000	Joint degeneration, localized - knee & L leg, w/o complication, w/o comorbidity, w/o surgery	knee
712202001	Joint degeneration, localized - knee & L leg, w/o complication, w/o comorbidity, with surgery	knee
712202010	Joint degeneration, localized - knee & L leg, w/o complication, with comorbidity, w/o surgery	knee
712202011	Joint degeneration, localized - knee & L leg, w/o complication, with comorbidity, with surgery	knee
712202100	Joint degeneration, localized - knee & L leg, with complication, w/o comorbidity, w/o surgery	knee
712202101	Joint degeneration, localized - knee & L leg, with complication, w/o comorbidity, with surgery	knee
712202110	Joint degeneration, localized - knee & L leg, with complication, with comorbidity, w/o surgery	knee
712202111	Joint degeneration, localized - knee & L leg, with complication, with comorbidity, with surgery	knee

Appendix C: Health profile database (HPD) conditions

Health Profile Monitor Disease Code List
ADHD and other Childhood Disruptive Disorders
Alcoholism
Allergy
Anxiety
Asthma
Atrial Fibrillation
Attention Deficit Disorder
Autism
Benign Prostatic Hypertrophy
Bipolar
Bladder Cancer
Brain Cancer
Breast Cancer
Cataract
Cerebrovascular Disease
Cervical Cancer
Cholelithiasis/Cholecystitis
Chronic Fatigue Syndrome
Chronic Obstructive Pulmonary Disease
Chronic Renal Failure
Chronic Thyroid Disorders
Colorectal Cancer
Congenital Heart Disease
Cystic Fibrosis
Dementia
Depression
Diabetes Mellitus
Diverticular Disease
Down's Syndrome
Eating Disorders
Endometrial Cancer
Endometriosis
Epilepsy
Esophageal Cancer
Female Infertility
Fibromyalgia
Glaucoma
Head/Neck Cancer
Heart Failure
Hemophilia/Congenital Coagulopathies
Hepatitis
HIV/AIDS

Hodgkin's Disease/Lymphoma
Hypercoagulable Syndrome
Hyperlipidemia
Hypertension
Inflammatory Bowel Disease
Iron Deficiency Anemia
Ischemic Heart Disease
Kidney Stones
Leukemia/Myeloma
Low Back Pain
Low Vision and Blindness
Lung Cancer
Lyme Disease
Malignant Melanoma
Maternal Hist of Low Birth Weight or Preterm Birth
Menopause
Metabolic Syndrome
Migraine and Other Headaches
Multiple Sclerosis
Neurosis
Nonspecific Gastritis/Dyspepsia
Obesity
Oral Cancer
Osteoarthritis
Osteoporosis
Other Cancer
Otitis Media
Ovarian Cancer
Pancreatic Cancer
Pancreatitis
Parkinson's Disease
Peptic Ulcer Disease
Periodontal Disease
Peripheral Artery Disease
Post-Partum BH Disorder
Prostate Cancer
Psychiatric Disorders related to Med Conditions
Psychoses
Rheumatoid Arthritis
Sickle Cell Anemia
Skin Cancer
Stomach Cancer
Substances Related Disorders

Systemic Lupus Erythematosus
Ventricular Arrhythmia

Appendix D: Orthopedic specialist effectiveness (episode) performance evaluation example

This provides an example of the evaluation of practice performance for the episode-based effectiveness metric.

Below is a fictional example for ABC Medical Group to illustrate how the calculation works. Thisexample will walk through the scoring process for ABC Medical Group's commercial adult population.

Table 1 – ABC Medical Group commercial adult episode data

		A	B	C	D	E
Row number	ETG code	HRR market	Total actual allowed amount	Total benchmark allowed amount	Episode-level performance index	Market-adjusted episode-level performance index
1	164800000	119	$360	$383	0.94	0.94
2	164800000	119	$82	$153	0.54	0.54
3	164800000	119	$82	$165	0.50	0.50
4	164800000	119	$227	$165	1.37	1.37
5	164800000	119	$223	$230	0.97	0.97
6	164800000	119	$82	$230	0.36	0.36
7	164800000	119	$332	$327	1.02	1.01
8	164800000	119	$239	$327	0.73	0.73
9	164800000	119	$292	$327	0.89	0.89
10	164800000	119	$101	$327	0.31	0.31
11	164800000	119	$221	$327	0.68	0.68
12	164800000	119	$468	$333	1.40	1.40
13	164800100	119	$297	$313	0.95	0.94
14	164800100	119	$309	$435	0.71	0.71
15	164800100	119	$122	$435	0.28	0.28
16	164800100	119	$302	$390	0.78	0.77
17	164800100	119	$250	$390	0.64	0.64
18	164800100	119	$277	$390	0.71	0.71
19	164800100	119	$528	$390	1.35	1.35
20	164800100	119	$366	$390	0.94	0.93
21	164800100	119	$893	$603	1.48	1.48
22	164800100	119	$942	$470	2.00	2.00
23	164800100	119	$414	$529	0.78	0.78
24	164800100	119	$108	$803	0.13	0.13
25	164800100	119	$594	$348	1.70	1.70
26	239800100	119	$178	$209	0.85	0.85
27	387400110	119	$1,465	$854	1.72	1.71
28	388100010	119	$261	$266	0.98	0.98

29	388100010	119	$158	$290	0.54	0.54
30	388100010	119	$336	$512	0.66	0.65
31	388100010	119	$312	$283	1.10	1.10

Table 2 – Market reference data

HRR Market	Market-level performance index
119	1.24

Step 1: Aggregate episode level data for orthopedic practices.

a) Using episode data, identify all episodes for the measurement period. This data is evaluated at the individual episode level for each tax ID attributed to the episode. **For ABC Medical Group, this data is represented in Table 1. Each row signifies a distinct episode attributedto the practice. In this example, there were a total of 31 unique episodes adding up to $10,820 in total actual allowed (Column B).**

Step 2: Determine benchmark.

a) Benchmark allowed per episode is calculated **using a decision tree machine learning model**. Model features include Optum Symmetry® Episode Risk Groups® (ERG®) retrospectiverisk score, concurrent episodes, member comorbidities and Social Determinants of Health. Model R-Squared is 0.70–0.79 excluding outliers. **In this example the benchmark used for ABC Medical Group can be found in Column C in Table 1.**

Step 3: Determine orthopedic specialist performance evaluation result.

e) Calculate the episode-level performance index as total actual allowed amount/total benchmark allowed amount. **For ABC Medical Group, this is represented as B/C and the result is found in Column D. For example, the episode-level performance index for Episode 1 is ($360/$383) = 9399 (~.94).**

f) Calculate the market adjusted episode level performance index as the episode level performance index/market level performance index for the market the practice being measured is a part of. The market and risk-level performance index is calculated as total actualepisode allowed/total benchmark episode allowed with the following combinations of variables for different sub-populations:

- *Commercial hip* - HRR market
- *Commercial kne*e - HRR market, TIN size category and TIN risk category

ABC Medical Group is in HRR 119. The market-level performance index for HRR 119 is 1.0024 in Table 2. The market-adjusted episode-level performance index is calculated a D/1.0024 and the results are found in Column E of Table 1. In this example, the market- adjusted episode-level performance index for Episode 1 is .94/1.0024 = .937 (~.94).

Calculate the overall weighted performance index for a practice by taking a weighted average of the market adjusted episode level performance index scores for that practice weighted by the total benchmark allowed amount. **For ABC Medical Group this would be the sum product of Column C and Column E in Table 1. ABC Medical Group's overall performance index is 0.93.**

g) Conduct a two-sample weighted t-test comparing the practice's market-adjusted performance index weighted by the total benchmark allowed amount with the average

market-adjusted performance index from the relevant decision tree node weighted by the total benchmark allowed amount. The t-test indicates whether there is a statistically significant difference between the actual and expected episode-level performance indices.

- If the test has a p-value greater than or equal to 0.10, the practice results are not statistically significant, and the practice outcome will be "Insufficient information."
- If the T-statistic <0 and p-value <.1, then the practice market-adjusted performance index is statistically significantly less than the average market-adjusted performance index and the practice will receive a designation of "Designation earned."
- If the T-statistic >=0 and p-value <.1, then the practice's market-adjusted performance index is statistically significantly greater than the average market-adjusted performance index , the practice outcome will be "Criteria not met"

Note: The weights used in the test are transformed with a degree of freedom correction. Using raw expected amount values for weights makes the tails of the t-test distribution very thin, leading to most test results having statistical significance. The correction standardizes the weights by their mean so that the sum of the weights equals the number of observations and creates a higher bar for statistical significance.

Using this methodology and assuming that the average of the relevant market-adjusted performance index values are 1, the p-value of ABC Medical Group is 0.44. Thus, the practice is designated as NSS.

Appendix E: Cotiviti Risk-Readiness® Measures

node domain	node level	name	clinical interpretation
OVERALL VALUE SCORE	1	Overall Value Score	This is your overall efficiency score, which reflects how you compare to peers in your specialty and geographic cohort across 4 domains: visits, procedures, pharmacy and referrals. This is not a report card. It is a value analysis that shows your readiness to take on the financial risk that will be needed to succeed over the next 10 years. High scores (which appear as red) mean that your current practice patterns are optimized for a Fee-For-Service payment model. Low scores (which appear as green) mean that your current practice patterns are aligned to take on risk, and make you more likely to perform well in a Pay-For-Value payment model.
PHARMACY	2	Pharmacy Score	This score represents the efficiency of your prescribing patterns compared to peers. A good score shows that you prescribe generic drugs when appropriate, choose lower-cost alternatives where clinically equivalent, and are less likely to prescribe drugs that may result in harm for older persons. A poor score reflects an opportunity to prescribe more appropriate, less costly alternatives, or to consider medication review for your patients.
PHARMACY	3	Cost Effectiveness - Pharmacy	As rising drug costs continue to take a toll, cost effectiveness metrics are a great way to ensure quality treatment of disease states. Expensive drugs also contribute as barriers to access and affordability for patients. Appropriate use of prescription drugs is a powerful way to manage beneficiaries health while restraining costs. This metric shows your cost efficiency when prescribing medications. It is based on your average prescription cost and the percentage of your pharmacy cost that is for brand name drugs. A good score shows that you prescribe generic drugs when appropriate and where they are most cost-efficient. Reviewing your preferred medications and possible alternatives that are more cost-effective on a per dose or patient adherence and persistence basis will help you improve this score.
PHARMACY	3	Polypharmacy	Polypharmacy is the effect of concurrently taking multiple medications to manage coexisting health problems. This metric reflects your pharmacy efficiency based on the number of filled prescription claims per patient. A poor score indicates a higher number of prescriptions per patient. From a safety perspective, managing multiple medications may put your patients at a higher risk for adverse side effects. This is especially a common problem among the older Medicare- eligible population: currently, 44% of men and 57% of women age 65 and over take 5 or more medications per week; about 12% of both men and women in this age bracket take 10 or more medications per week. Generally, the more drugs a person takes, the greater the risk of adverse reactions and drug interactions as well as nonadherence to the medication regimen.
PHARMACY	3	Harm Reduction	In the US, 3-7% of all hospitalizations are due to adverse drug reactions. Because all drugs have the potential for adverse drug reactions, risk-benefit analysis is necessary whenever a drug is prescribed. Harm Reduction metrics aim to reduce the negative consequences associated with medications by reducing ADR-prone medications use when alternatives are available. This metric shows how often you prescribe medications that are shown to have a high probability of adverse effects especially in the elderly. A good score indicates that your rates of prescribing these medications is low compared to peers.
PHARMACY	4	Prescription cost per patient	This measures the average pharmacy cost that you are paid for your patients. A poor score indicates higher average cost compared to peers, which could be due to higher prescription rates or higher use of brand name medications.
PHARMACY	4	Percent brand cost	This measure looks at the proportion of medication cost for brand name drugs. A poor score means more of your cost comes from brand name drugs, and may indicate an opportunity to prescribe less expensive alternatives when available and appropriate.
PHARMACY	4	Prescriptions per patient	This measures the average number of filled prescriptions (normalized for 30 days' supply) per patient. A poor score indicates a high rate of prescribing multiple medications. Polypharmacy can lead to difficulties managing multiple prescriptions.

PHARMACY	4	Ratio of opioid per non-opioid prescriptions	This measure shows ratio of filled prescriptions for opioids to filled prescriptions for non-opioids. A poor score indicates that you prescribe more opioids that were filled compared to non-opioids that were filled compared to peers.
PHARMACY	4	Muscle relaxants per patient	This measures the average number of filled prescriptions of muscle relaxants per patient. A poor score indicates that you prescribe more muscle relaxants per patient that were filled compared to your peers.
PHARMACY	4	Ratio of NSAIDs to proton pump inhibitor prescriptions	This measure shows your relative rate of prescribing NSAIDs to proton pump inhibitors as a measure of gastroprotection. NSAIDs are preferred to narcotics for pain management especially in the elderly, but have the downside of causing gastric bleeding. When managing pain with NSAIDs, it is recommended to prescribe PPIs to protect the stomach from this adverse effect.
PHARMACY	4	Opioids prescribed per orthopedic admission	This measures your relative rate of prescribing opioids to orthopedic admissions in order to control for opioids prescribed for surgery. Non-opioids are preferred for pain management whenever possible due to dangerous side effects of opioids and their potential for addiction or abuse. A poor score means you treat more heavily with opioids than non-opioids compared to your peers.
PHARMACY	4	Average days' supply of opioids per prescription	This measure shows the average days' supply duration for filled opioid prescriptions. A high ratio compared to peers means that you tend to prescribe opioids for a longer duration per filled prescription, which is a low-value prescribing pattern. Opioid duration should be as short as possible to treat pain because of potential for addiction and abuse.
PROCEDURE	2	Procedure Score	This score shows the efficiency of your procedures compared to peers. A poor score may mean that you perform more procedures per patient, more costly procedures, or procedures that are less likely to provide long-term value from a population perspective. It can also indicate that you perform procedures with a risk of harmful outcomes more often than your peers. A good score indicates that you spend your time doing higher-value procedures in a cost-sensitive way and that your patients experience better outcomes.
PROCEDURE	3	Value Intensity	A component of procedure score, this metric is based on how many procedures you perform per patient and how many are considered low-value and high-value from a population health perspective. A poor score in this area may indicate that you perform more procedures per patient than your peers, or that they are more likely to be low-value procedures.
PROCEDURE	3	Cost Effectiveness - Procedures	A component of procedure score, this is a price-adjusted look at your average professional and outpatient facility costs, with a focus on diagnostic and therapeutic services where low-value care is most likely to be found. A poor score indicates that you represent a greater financial risk than your peers, making you appear less cost-efficient.
PROCEDURE	3	Inpatient	A component of procedure score, this looks at your rates of inpatient complications, readmissions and length of stay. Higher scores indicate higher rates of complications, readmissions and longer lengths of stay, as well as higher associated costs compared to your peers. Having higher complication rates and readmission rates than peers will be seen as a higher financial risk to yourself, practices, and potential partners in a value-based care arrangement.
PROCEDURE	4	Professional services per patient	This measure shows the average number of professional services per patient billed with non-visit, non-medication or material-related procedure codes. Broadly, it includes all diagnostics and procedures you provide per patient. A poor score means your utilization is high compared to your peers.
PROCEDURE	4	Percent of procedures that are low-value	The procedures we have rated as low-value have been shown in the evidence to have no significant longer-term value proposition on population-level outcomes. Reducing these will prepare you to take on more financial risk. A large volume of these procedures means that you will have to replace a lot of activity in your practice with other, higher-value procedures.
PROCEDURE	4	Orthopedic acute hospital inpatient complication rate	This measures the percentage of your Orthopedic discharges for hip, knee and back procedures that resulted in a complication. Complications are counted for index and readmissions â€“ either during the index, or within 7, 30, or 90 days of discharge, depending on the complication. Criteria is based on Yale CORE methodology and includes the following complications: Acute myocardial infarction, pneumonia, sepsis/septicemia/shock, surgical site bleeding, pulmonary embolism, mechanical complications, periprosthetic joint infection/wound infection. Higher rates compared to peers indicate worse patient outcomes and higher financial risk.

PROCEDURE	4	Orthopedic acute hospital readmission rate	This measures the percentage of elective hip, knee and spine admissions that resulted in an unplanned readmission within 30 days of discharge. Criteria is based on Yale CORE methodology. A higher readmission rate can stem from many causes: inappropriate patient selection criteria, problems during the procedure or ensuing hospitalization, or poor discharge instructions and transitional care. If your patients are more likely to have a readmission compared to your peers, you will be seen as a higher financial risk â€“ to yourself, practices, and insurance plans. A poor score indicates higher readmission rates for orthopedic surgeries.
PROCEDURE	4	Procedure cost per patient	This measure shows your standardized non-visit professional service cost (adjusted for resource use and setting) per beneficiary compared to your peers. Non-visit procedures broadly include all procedures, diagnostics, rehabilitation services, medications, and materials. A good score indicates lower overall cost/resource use per patient than your peers. A poor score indicates higher overall cost/resource use per patient than your peers.
PROCEDURE	4	Cost per procedure	This measure shows your standardized cost (adjusted for resource use and setting) per non-visit professional services compared to peers. All non-visit costs are included. (Medications and material costs are included in the numerator, but not counted as procedures in the denominator.) A good score indicates lower overall cost/resource use than your peers. A poor score indicates higher overall cost/resource use than your peers.
PROCEDURE	4	Percent of procedures that are high-value	The procedures we have rated as high-value have been shown in the evidence to have significant longer-term impact/value proposition on outcomes on a population basis. Increasing these will prepare you to take on more financial risk. The higher the proportion of revenue you receive from these procedures, the more ready you are to enter into value-based contracts.
PROCEDURE	4	Percent of procedure cost that is low-value	The procedures we have rated as low-value have not been shown in the evidence to lead to better population-level outcomes than lower intensity, lower cost, similarly effective alternatives, or may lead to harm. Deriving a large proportion of your revenue from these procedures will make value-based contracts a high risk for you. Reducing the revenue you receive from these procedures will prepare you to take on more financial risk.
PROCEDURE	4	Diagnostic cost per patient	This measure shows your standardized professional cost (adjusted for resource use and setting) per diagnostic service compared to peers. A good score indicates lower overall cost/resource use than peers. A poor score indicates higher overall cost/resource use than peers, and may indicate that you perform more frequent or expensive diagnostic tests and procedures than others.
PROCEDURE	4	Therapeutic procedure cost per patient	This measure shows your standardized professional fees for therapeutic procedures per patient when compared to your peers. A low number indicates lower professional fees per patient and a better score.
PROCEDURE	4	Ratio of care coordination to inpatient admissions	This measure shows how often you provide discharge planning and care coordination to patients that have been discharged from an inpatient facility. A high rate means that you often provide these high-value services.
PROCEDURE	4	OP facility cost per procedure	This measure shows the standardized and HCC risk score adjusted cost for the outpatient facility component for your non-visit professional services compared to peers. All costs for non-visit-related HCPCS are included. (Medications and material costs are included in the numerator, but not counted as procedures in the denominator.) A good score indicates lower overall cost/resource use than your peers. A poor score indicates higher overall cost/resource use than your peers which may be a result of performing procedures in a more expensive setting.
PROCEDURE	4	OP facility procedure cost per patient	This measure shows the standardized and HCC risk score adjusted cost for the outpatient facility component for your non-visit professional services per beneficiary compared to your peers. All costs for non-visit-related HCPCS are included. (Medications and material costs are included in the numerator, but not counted as procedures in the denominator.) A good score indicates lower overall cost/resource use per patient than your peers. A poor score indicates higher overall cost/resource use than your peers which may be a result of performing procedures in a more expensive setting.
PROCEDURE	4	Average inpatient hospital length of stay	This measure shows the average length of stay for all inpatient admissions where you are listed on the claim as the operating or attending physician, adjusted by panel risk adjustment. Higher length of stays are associated with

			higher costs and infection risks. A poor score means your patients stay in the hospital longer compared to your peers.
PROCEDURE	4	Inpatient acute hospital complications rate	This measure shows the rate of serious and hospital-acquired complications for inpatient admissions where you were listed as the operating or attending physician on the claim. A higher score indicates higher rates of complication for your patients and higher financial risk. Complication rates are adjusted by panel risk adjustment. A poor score means you have a higher complication rate compared to peers.
PROCEDURE	4	Percent of acute inpatient costs for complications	This measure shows the average percentage of standardized cost for serious and hospital-acquired complications for inpatient admissions where you were listed as the operating or attending physician. Rates are risk adjusted. A higher percentage compared to peers means poorer performance and that more of your fees will be at risk in a value-based care arrangement. In addition, you will be seen as a higher financial risk to potential partners.
PROCEDURE	4	Low-value services per patient	Performance of services classified as potentially low-value, when performed at a higher rate than your peers, may reflect a low-value practice pattern.
REFERRAL	2	Referral Score	This score shows how often your patients see other providers within the reporting period, based on shared transaction data. In general, a poor score means that you refer patients more often than your peers, which may indicate inefficient or uncoordinated care. However, the score also accounts for high-value referral patterns, where high rates of onward referral add value to outcomes for patients.
REFERRAL	3	Referral Rate	A component of referral score, this metric is based on your overall referral rate as well as referrals to diagnostic radiologists and pathologists. A poor score means that your rate is high compared to peers, which may indicate that you send your patients on for more intense care at a faster pace, or that you are more likely to order potentially unnecessary tests and imaging, areas where low value care is most likely to be found.
REFERRAL	3	Specialty Referrals	A component of referral score, this metric reflects the quality of your referrals. Specific measures highlight high and low value practice patterns for your specialty.
REFERRAL	3	Optimal Hospital	A component of referral score, this metric shows whether the hospitals where your patients are admitted provide optimal care. This score is based on unplanned readmission rates, complication rates, average length of stay, and admission and complication costs. A poor score compared to peers suggests an opportunity to partner with alternate providers who would offer lower risk in a value-based care arrangement.
REFERRAL	3	Optimal SNF	A component of referral score, this metric shows whether the skilled nursing facilities that serve your patients provide optimal care. This score is based on average admission cost and length of stay. A poor score compared to peers suggests an opportunity to partner with alternate providers who would offer lower risk in a value-based care arrangement.
REFERRAL	3	Optimal HHA	A component of referral score, this metric shows whether the home health agencies that serve your patients provide optimal care. This score is based on average admission cost and length of stay. A poor score compared to peers suggests an opportunity to partner with alternate providers who would offer lower risk in a value-based care arrangement.
REFERRAL	4	Referrals per patient	This measures how often you refer patients for additional care. It is measured by the number of times your patients saw another provider after an encounter with you. A poor score means your rate is high compared to peers, which can escalate to unnecessary care.
REFERRAL	4	Referrals to physical therapy per patient	This measures how often your patients are referred to a physical therapist after an encounter with you. A poor score means that you have a lower referral rate to physical therapy than your peers. This is important because physical therapy is a less intensive way to reduce pain and can slow the progression to surgery.
REFERRAL	4	Referrals to physical medicine and rehabilitation per patient	This measures how often your patients are referred to a physical medicine and rehabilitation (PMR) physician after an encounter with you. A poor score means you have a lower referral rate to this specialty than your peers. This is important because physical medicine and rehabilitation are less intensive ways to reduce pain and can slow the progression to surgery.

REFERRAL	4	Average orthopedic readmission rate of your referral hospitals	This measure shows the readmission rate for elective Orthopedic surgeries of hospitals where your patients had admissions. The measure is calculated using a weighted average of hospital rates based on the physician's shared transaction count to the hospitals. A high rate compared to peers means that patients are more likely to be readmitted at your referral hospitals than others in the area.
REFERRAL	4	Average orthopedic complication rate of your referral hospitals	This measure shows the Orthopedic complication rate of hospitals where your patients had admissions. Averages are risk adjusted and weighted based on the physician's shared transaction count to each hospital. A provider who scores below benchmark in this measure has a higher average complication rate with downstream facilities compared to peers.
REFERRAL	4	Diagnostic radiology referrals per patient	This measures how often your patients are referred to a diagnostic radiologist after an encounter with you. This is important because imaging is a key factor in visit escalation. A poor score means you have a higher rate than your peers and means that patients who come to your office are more likely to receive imaging and additional medical care than if they visited one of your peers.
REFERRAL	4	Pathology referrals per patient	This measures how often your patients are referred to a pathologist after an encounter with you. This is important because diagnostic testing is a key factor in visit escalation. A poor score indicates that your referral rate to this specialty is higher than your peers, and that patients who come to your office are more likely to receive tests and additional medical care.
REFERRAL	4	Average admission cost of your referral hospitals	This measure shows the average admission cost of hospitals that cared for your patients within the reporting period. Averages are risk adjusted and standardized by relative value, then weighted based on the physician's shared transaction count to each hospital. A higher cost compared to peers means that there may be an opportunity to refer your patients to more efficient providers in the area, or that you may want to seek out other providers as partners in value-based care arrangements.
REFERRAL	4	Average length of stay of your referral hospitals	This measure shows the average length of stay of hospitals that cared for your patients. Averages are risk adjusted and weighted based on the physician's shared transaction count to each hospital. A higher length of stay compared to peers means that there may be an opportunity to refer your patients to more efficient hospitals in the area.
REFERRAL	4	Average admission cost of your referral SNFs	This measure shows the average amount paid per episode of SNFs that cared for your patients within the reporting period. Averages are risk adjusted and weighted based on the physician's shared transaction count to each SNF. A higher cost compared to peers means that there may be an opportunity to refer your patients to more efficient providers in the area, or that you may want to seek out other providers as partners in value-based care arrangements.
REFERRAL	4	Average LOS of your referral SNFs	This measure shows the average length of stay of SNFs that cared for your patients within the reporting period. Averages are risk adjusted and weighted based on the physician's shared transaction count to each SNF. A higher LOS compared to peers means that there may be an opportunity to refer your patients to more efficient providers in the area, or that you may want to seek out other providers as partners in value-based care arrangements.
REFERRAL	4	Average admission cost of your referral HHAs	This measure shows the average amount paid per episode of HHAs that cared for your patients within the reporting period. Averages are risk adjusted and weighted based on the physician's shared transaction count to each HHA. A higher cost compared to peers means that there may be an opportunity to refer your patients to more efficient providers in the area, or that you may want to seek out other providers as partners in value-based care arrangements.
REFERRAL	4	Average LOS of your referral HHAs	This measure shows the average length of stay of HHAs that cared for your patients within the reporting period. Averages are risk adjusted and weighted based on the physician's shared transaction count to each HHA. A higher LOS compared to peers means that there may be an opportunity to refer your patients to more efficient providers in the area, or that you may want to seek out other providers as partners in value-based care arrangements.
REFERRAL	4	Percent of costs for complications of your referral hospitals	This measure shows the average percentage of cost for serious and hospital-acquired complications at hospitals that cared for your patients within the reporting period. Rates are risk adjusted and standardized by relative value, and weighted based on the physician's shared transaction count to each hospital. A higher cost compared to peers means that there may be an opportunity to refer your patients to more efficient providers in the area, or

			that you may want to seek out other providers as partners in value-based care arrangements.
VISIT	2	Visit Score	This score answers the question of what happens when a patient comes to you versus one of your peers. The concepts of visit frequency, visit cost, and visit escalation allow us to understand your practice patterns. A poor score can indicate that a visit is more likely to lead to additional care, that more is being done during a visit, or that you may be following up with patients too long before referring them back to their PCP.
VISIT	3	Visit Frequency	A component of visit score, this metric is based on visits per patient. Visits are important to the overall pattern and flow of care because they tell us how often a physician sees their patients, how long a program of care is followed before escalating to higher-intensity treatment, and how long management is retained before referral back to primary care.
VISIT	3	Visit Intensity	A component of visit score, visit intensity measures the likely intensity of treatment that patients will receive when they visit you. A poor score may indicate that you choose to intervene with tests or procedures more quickly than your peers, while a good score may indicate that you follow conservative approaches to care before intensifying treatment.
VISIT	3	Visit Escalation	A component of visit score, visit escalation indicates the likelihood that a patient will receive higher-intensity, more invasive imaging, tests or procedures when they visit you. Because these procedures are more likely to speed progression to other high-intensity procedures such as surgery, higher rates compared to peers make for a poorer score.
VISIT	3	Visit Cost Effectiveness	A component of visit score, this is a price-adjusted look at your average professional cost per visit, accounting for both professional costs and any associated outpatient facility costs. A poor score indicates that you're being paid more than peers on a per visit basis, and that you may appear less cost-efficient.
VISIT	4	Visits per patient	The frequency of visits and the period of follow-up between them are important predictors of other care. Inefficient practices include escalation to high intensity procedures after a low number of visits or periods of follow-up without definitive care when re-referral to primary care would have been more efficient and appropriate. Low-value patterns are characterized by excessive visits with specialists when the same care could have been provided by the primary care provider.
VISIT	4	Total professional cost per visit	This measure shows your standardized professional cost (adjusted for resource use and setting) per visit compared to your peers. Visits include all inpatient and outpatient settings. A good score indicates lower overall cost/resource use than your peers, while a poor score indicates higher overall cost/resource use than your peers.
VISIT	4	Ratio of low-barrier diagnostics and therapeutic procedures to outpatient visits	This measure shows the average number of low-barrier diagnostics and therapeutic procedures that you perform per outpatient visit. This category includes most imaging, lab tests and therapeutic procedures with a low-barrier to ordering. The low barrier to performing these types of procedures makes them especially prone to overuse, which can lead to additional downstream unnecessary or low-value care. High-value procedures are excluded from this measure.
VISIT	4	Ratio of high-intensity diagnostics and therapeutic procedures to outpatient visits	This measure shows the number of high-intensity diagnostic and therapeutic procedures that you perform per outpatient visit. High-intensity procedures are those with a higher barrier to decision making, including more invasive testing and surgeries. A high ratio relative to peers indicates that patients who visit you are more likely to escalate, or move at a faster pace, to more invasive treatment. A poor score indicates higher visit escalation compared to your peers. High-value procedures are excluded from this measure.
VISIT	4	OP facility cost per visit	This measure shows your standardized risk adjusted outpatient facility cost per professional visit compared to your peers. A good score indicates lower overall cost/resource use than peers. A poor score indicates higher overall cost/resource use than your peers and may indicate that you are performing procedures that could be done in a lower-cost office setting.

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