



Measure Information

This document contains the information submitted by measure developers/stewards, but is organized according to NQF's measure evaluation criteria and process. The item numbers refer to those in the submission form but may be in a slightly different order here. In general, the item numbers also reference the related criteria (e.g., item IM1.1 relates to sub criterion IM1).

Brief Measure Information

NQF #: 1609

De.2. Measure Title: ETG Based HIP/KNEE REPLACEMENT cost of care measure

Co.1.1. Measure Steward: Optum

De.3. Brief Description of Measure: The measure focuses on resources used to deliver episodes of care for patients who have undergone a Hip/Knee Replacement. Hip Replacement and Knee Replacement episodes are initially defined using the Episode Treatment Groups (ETG) methodology and describe the unique presence of the condition for a patient and the services involved in diagnosing, managing and treating the condition. The Procedure Episode Group (PEG) methodology uses the ETG results and further logic to creating a procedure episode that focuses on the Hip Replacement and Knee Replacement component of the care. Procedure episodes identify a unique procedure event as well as the related services performed before and after the procedure including workup and therapy prior to the procedure as well as post-op activities such as repeated surgery and patient follow-up. Together, the ETG and PEG methodologies identify the services involved in diagnosing, managing and treating patients with Hip/Knee Replacements. A methodology to assign a severity level to each episode is employed to group Hip and Knee Replacement episodes by level of risk.

A number of resource use measures are defined for Hip/Knee Replacement episodes, including overall cost of care, cost of care by type of service, and the utilization of specific types of services. Each resource use measure is expressed as a cost or a utilization count per episode and comparisons with internal and external benchmarks are made using risk adjustment to support valid comparisons.

As requested by NQF, the focus of this submission is for Hip/Knee Replacement procedure episodes and will cover both measures at the Hip Replacement and Knee Replacement PEGs and severity level and also a Hip/Knee Replacement composite measure where Hip and/or Knee Replacement procedure episode results are combined across severity levels. At the most detailed level, the measure is defined as a Hip Replacement or Knee Replacement episode and an assigned level of severity (e.g., resources per episode for Knee Replacement, severity level 1 episodes). Composite measures can then be created using these measurement units to meet a specific need. For example, a composite measure for Hip/Knee Replacement is derived by combining episode results across Hip and Knee Replacements and severity levels. Appropriate risk adjustment is applied to support comparisons (e.g., for physician measurement, adjusting for a physician's mix of Hip and Knee Replacement episodes by severity level when supporting a composite comparison).

IM.1.1. Developer Rationale: Benefits envisioned by this set of measures relates to identifying opportunities and measuring value. In particular, the measure and its components can support:

- The understanding of opportunities to improve the efficiency of healthcare, in particular for patients with selected conditions. Reducing unwarranted variation will provide an opportunity to decrease resources expended without a significant impact on quality of care and outcomes. In some cases, outcomes may improve due to the decrease in the provision of unnecessary services.
- Measurement of the value delivered by individual providers, provider groups, and delivery systems – in particular the resources expended in care delivery. A number of current initiatives require a valid and robust approach to resource measurement, including medical homes, value-based payment and accountable care organizations (ACOs). The ETG episode and PEG procedure episode methodology described in this submission provides a solid foundation to support such measurements. The resource cost and use measures included in this submission provide actionable insights into relative performance and opportunities for improvement.

De.1. Measure Type: Cost/Resource Use

S.5. Data Source: Claims

Other

S.3. Level of Analysis: Clinician : Group/Practice, Clinician : Individual, Facility, Health Plan, Integrated Delivery System, Other, Population : Community, County or City, Population : Regional and State

IF Endorsement Maintenance – Original Endorsement Date: Apr 02, 2012 **Most Recent Endorsement Date:** Apr 02, 2012

IF this measure is included in a composite, NQF Composite#/title:

IF this measure is paired/grouped, NQF#/title:

De.4. IF PAIRED/GROUPED, what is the reason this measure must be reported with other measures to appropriately interpret results?

Importance to Measure and Report

Extent to which the specific measure focus is evidence-based, important to making significant gains in healthcare quality, and improving health outcomes for a specific high-priority (high-impact) aspect of healthcare where there is variation in or overall less-than-optimal performance. ***Measures must be judged to meet all sub criteria to pass this criterion and be evaluated against the remaining criteria.***

IM.1. Opportunity for Improvement

IM.1.1. Briefly explain the rationale for this measure (e.g., the benefits or improvements in performance envisioned by use of this measure)

Benefits envisioned by this set of measures relates to identifying opportunities and measuring value. In particular, the measure and its components can support:

--The understanding of opportunities to improve the efficiency of healthcare, in particular for patients with selected conditions. Reducing unwarranted variation will provide an opportunity to decrease resources expended without a significant impact on quality of care and outcomes. In some cases, outcomes may improve due to the decrease in the provision of unnecessary services.
--Measurement of the value delivered by individual providers, provider groups, and delivery systems – in particular the resources expended in care delivery. A number of current initiatives require a valid and robust approach to resource measurement, including medical homes, value-based payment and accountable care organizations (ACOs). The ETG episode and PEG procedure episode methodology described in this submission provides a solid foundation to support such measurements. The resource cost and use measures included in this submission provide actionable insights into relative performance and opportunities for improvement.

IM.1.2. Provide performance scores on the measure as specified (current and over time) **at the specified level of analysis.** (This is required for endorsement maintenance. Include mean, stddev, min, max, interquartile range, scores by decile. Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities include).

This information also will be used to address the subcriterion on improvement (U.3.1.) under Usability and Use.

Information can be provided as a follow-up, if relevant.

IM.1.3. If no or limited performance data on the measure as specified is reported in IM.1.2., then provide a summary of data from the literature that indicates opportunity for improvement or overall less than optimal performance on the specific focus of measurement.

Variations in per capita spending - Inpatient-based and specialist-oriented pattern of practice

Regional differences in Medicare spending are largely explained by the more inpatient-based and specialist-oriented pattern of practice observed in high-spending regions. Neither quality of care nor access to care appear to be better for Medicare enrollees in higher-spending regions.

Fisher ES, Wennberg DE, Stukel TA, Gottlieb DJ, Lucas FL, Pinder EL. The Implications of Regional Variations in Medicare Spending. Part 1: The Content, Quality, and Accessibility of Care. Ann Intern Med . 2003 138(4): 273-287.

The Dartmouth Atlas shows a more than two-fold variation in per capita Medicare spending in different regions of the country. Adjusting for price differences leads to only a modest decline in overall variations. It is utilization -- the amount of care delivered to patients - that explains most of the regional variation in Medicare spending. Most spending variation was due to differences in use of the hospital as a site of care (versus, say, hospice, nursing home, or the doctor's office) and to discretionary specialist visits and tests.

Reflections on variations, The Dartmouth Atlas Of Health Care. Available at: <http://www.dartmouthatlas.org/keyissues/issue.aspx?con=1338>. Accessed on February 12, 2011.

Variations in clinical decision making – ambulatory care-sensitive conditions

Clinicians have identified a group of diagnoses referred to as “ambulatory care-sensitive” conditions – such as poorly controlled diabetes or worsening heart failure – which can be treated in either the inpatient or the outpatient setting, and for which hospitalization can often be prevented by better outpatient management. The variations among regions in admission rates of patients with these conditions can be ascribed to differences in clinical decision-making, rather than to differences in underlying illness rates. Hospitalization rates for these – and for most medical conditions – are also highly correlated with the local supply of hospital beds.

Hospital Discharges for Ambulatory Care-Sensitive Conditions Per 1,000 Medicare Enrollees, By Gender And Type Of Admission, The Dartmouth Atlas Of Health Care (2005) Available at: <http://www.dartmouthatlas.org/data/topic/topic.aspx?cat=20> Accessed on February 12, 2011.

Variations in the use of diagnostic tests and discretionary services

Variations in ECG ordering are not explained by patient characteristics. The tremendous nonclinical variations in ECG test ordering suggest a need for greater consensus about use of screening ECGs in primary care.

Randall SS, Bismruta M. Variation in routine electrocardiogram use in academic primary care practice. Arch Intern Med. 2001;161:2351-2355

Physicians in high-spending regions see patients back more frequently and are more likely to recommend screening tests of unproven benefit and discretionary interventions compared with physicians in low-spending regions; however, both appear equally likely to recommend guideline-supported interventions.

Physicians in higher-spending regions were much more likely than those in lower-spending regions to recommend discretionary services, such as referral to a subspecialist for typical gastroesophageal reflux or stable angina or, in another vignette, hospital admission for an 85-year-old patient with an exacerbation of end-stage congestive heart failure. And they were three times as likely to admit the latter patient directly to an intensive care unit and 30% less likely to discuss palliative care with the patient and family. Differences in the propensity to intervene in such gray areas of decision making were highly correlated with regional differences in per capita spending.

Sirovich B, Gallagher PM, Wennberg DE, Fisher ES. Discretionary decision making by primary care physicians and the cost of U.S. health care. Health Aff (Millwood), 2008; 27:813-823

Widely varying levels of health care spending across the United States are strongly correlated with the tendency of local physicians to recommend discretionary interventions. Physicians in regions of differing spending appear to differ only in their discretionary decision making. For decisions that are informed by evidence or practice guidelines (such as screening mammography and standard exercise tolerance testing), physicians were equally likely to recommend interventions regardless of local spending levels

Sirovich B, Gallagher PM, Wennberg DE, Fisher ES. Discretionary Decision Making By Primary Care Physicians And The Cost Of U.S. Health Care. Health Aff (Millwood). 2008; 27(3): 813–823.

Supply sensitive care

Supply-sensitive care accounts for more than half of all Medicare spending. In regions where there are more hospital beds per capita, patients will be more likely to be admitted to the hospital. In regions where there are more intensive care unit beds, more patients will be cared for in the ICU. More specialists will result in more visits to specialists. And the more CT scanners are available, the more CT scans patients will receive. The Dartmouth Atlas has consistently demonstrated these relationships.

Patients do not experience improved survival or better quality of life if they live in regions with more care. In fact, the care they receive appears to be worse. They report being less satisfied with their care than patients in regions that spend less, and having more trouble getting in to see their physicians.

Supply sensitive care, The Dartmouth Atlas Of Health Care (2005) Available at:

<http://www.dartmouthatlas.org/keyissues/issue.aspx?con=2937> Accessed on February 14, 2011.

Numerous studies have found that higher bed supply is associated with more hospital use for conditions where outpatient care is a viable alternative. This includes most medical causes of hospitalization. In 2006, bed supply remained an important determinant of medical discharges.

The implications of regional variations in Medicare spending. Part 1: the content, quality, and accessibility of care. Annals of Internal Medicine. Feb 18 2003;138(4):273-287.

Fisher ES, Wennberg DE, Stukel TA, Gottlieb DJ, Lucas FL, Pinder EL. The implications of regional variations in Medicare spending. Part 2: health outcomes and satisfaction with care. *Annals of Internal Medicine*. Feb 18 2003;138(4):288-298.

By far, the most significant factor associated with how much Medicare spends in any given region is the availability of medical resources. Studies from the Dartmouth Atlas Project have shown that the frequency with which physicians admit patients with chronic diseases to the hospital is highly correlated with the number of beds per capita in the region. The frequency of visits to medical specialists is correlated with the number of specialists available. And the frequency with which chronically ill patients undergo many diagnostic tests and procedures also varies. We call such procedures and tests, along with the rates of hospitalization and physician visits, "supply-sensitive" care, or care that varies with the local availability of such medical resources as physicians, hospital beds, intensive care unit (ICU) beds, and diagnostic imaging equipment. The volume of supply-sensitive care that is delivered to the chronically ill is a powerful force driving Medicare spending. The utilization of supply-sensitive services for treating the chronically ill varies dramatically across different regions of the country, and it is responsible for much of Medicare spending. Local capacity, or the local supply of medical resources per capita, varies widely, and this local capacity bears directly on how much care is used to treat the chronically ill.

Wennberg JE, Fisher ES, Goodman DC, Skinner JS. "Tracking the care of patients with severe chronic illness." *The Dartmouth Atlas of Health Care* 2008. Available at: http://www.dartmouthatlas.org/downloads/atlas/2008_Chronic_Care_Atlas.pdf Accessed on February 14, 2011.

IM.1.4. Provide disparities data from the measure as specified (current and over time) **by population group, e.g., by race/ethnicity, gender, age, insurance status, socioeconomic status, and/or disability.** (This is required for endorsement maintenance. Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities include.) **This information also will be used to address the subcriterion on improvement (U.3.1.) under Usability and Use.**

Health disparities are defined as differences in the occurrence, frequency, death and burden of diseases and other unfavorable health conditions that exist among specific population groups¹. Examining health care differences or gaps experienced by one population compared to another is an integral part of understanding and improving health care quality². The quality of healthcare delivered within the United States also differs from population to population due to differences in access to care, healthcare utilization and other factors².

Measures of healthcare utilization allow for a broader understanding of access to care². Barriers to care that are associated with differences in healthcare utilization may have a more significant impact on healthcare quality than other factors². Several studies on disparities have relied upon measures of healthcare utilization and the data demonstrates some of the most significant differences in care among diverse groups². Current efforts to improve healthcare delivery continue to rely upon measures of health care utilization to fully understand the complexities surrounding disparate health care outcomes. For example, greater utilization of services does not necessarily indicate better care. In fact, high use of some inpatient services may reflect compromised access to outpatient health services².

In 2006, the Nation's 14 million health service workers provided approximately 960 million office visits, 673 million hospital outpatient visits, treated 37 million hospitalized patients and 1.4 million nursing home residents². Approximately 70% of the non-institutionalized civilian population visited a provider's medical office or outpatient facility and about 60% received a prescription medication². National health expenditures totaled over \$2 trillion dollars in fiscal year 2006 with 5% of the population accounting for 55% of total costs². Additionally, almost one-third of all healthcare expenditures are estimated to be the result of low-quality care, including overuse, misuse and waste². Utilization resource measures provide a mechanism to better understand healthcare delivery patterns in order to improve the health of all population groups.

The cost and use measures included in this submission will provide an approach to assessing disparities. For example, episode-based measures of cost and use can be employed to create severity-adjusted comparisons of the resources expended in treating cardiovascular conditions, including supporting a focus on the condition-related resources.

IM.1.5. If no or limited data on disparities from the measure as specified is reported in IM.1.4., then provide a summary of data from the literature that addresses disparities in care on the specific focus of measurement. Include citations.

1. Health Disparities in the United States: Facts and Figures, American Society of Clinical Oncology, 2009
2. National Healthcare Disparities Report, U.S. Department of Health & Human Services, Agency for Healthcare Research and Quality, 2008

IM.2. Measure Intent

IM.2.1. Describe intent of the measure and its components/ Rationale (including any citations) for analyzing variation in resource use in this way.

All of our submitted measures for Hip/Knee Replacements rely on foundational “episodes of care” and “procedure episodes” concepts that use the Ingenix Episode Treatment Groups (ETG) and Procedure Episode Groups (PEG) methodologies. The ETG/PEG methodology define a procedure episode for hip replacements and a separate procedure episode for knee replacements. Episode and Procedure-based resource use measurement provides a representation of a patient’s course of treatment for a specific condition. The attached ETG & PEG General Methods Construct Logic provides a high level explanation of our ETG and PEG concepts.

As noted in IM2.1, the intent of the measure and its components is to support:

-- The understanding of opportunities to improve the efficiency of healthcare, in particular for patients with selected conditions. Reducing unwarranted variation will provide an opportunity to decrease resources expended without a significant impact on quality of care and outcomes. In some cases, outcomes may improve due to the decrease in the provision of unnecessary services

-- Measurement of the value delivered by individual providers, provider groups, and delivery systems - in particular the resources expended in care delivery. A number of current initiatives require a valid and robust approach to resource measurement, including medical homes, value-based payment and accountable care organizations (ACOs). The ETG episode and PEG procedure episode methodologies described in this submission provides a solid foundation to support such measurements. The resource cost and use measures included in this submission provide actionable insights into relative performance and opportunities for improvement.

Scientific Acceptability of Measure Properties

Extent to which the measure, as specified, produces consistent (reliable) and credible (valid) results about the quality of care when implemented. ***Measures must be judged to meet the sub criteria for both reliability and validity to pass this criterion and be evaluated against the remaining criteria.***

Specifications The measure is well defined and precisely specified so it can be implemented consistently within and across organizations and allows for comparability. eMeasures should be specified in the Health Quality Measures Format (HQMF) and the Quality Data Model (QDM).

De.5. Subject/Topic Area (check all the areas that apply):

Musculoskeletal : Joint Surgery

De.6. Non-Condition Specific (check all the areas that apply):

Care Coordination

Safety : Overuse

De.7. Care Setting (Select all the settings for which the measure is specified and tested):

Ambulatory Care : Clinic/Urgent Care

Ambulatory Care : Clinician Office

Emergency Department and Services

Home Care

Inpatient/Hospital

Outpatient Services

Post Acute/Long Term Care Facility : Rehabilitation

Post-Acute Care

S.1. Measure-specific Web Page (Provide a URL link to a web page specific for this measure that contains current detailed specifications including code lists, risk model details, and supplemental materials. Do not enter a URL linking to a home page or to general information.)

S.2. Type of resource use measure (Select the most relevant)

Per episode

S.3. Level of Analysis (Check ONLY the levels of analysis for which the measure is SPECIFIED AND TESTED):

Clinician : Group/Practice, Clinician : Individual, Facility, Health Plan, Integrated Delivery System, Other, Population : Community, County or City, Population : Regional and State

S.4. Target Population Category (Check all the populations for which the measure is specified and tested if any):

Elderly

S.5. Data Source (Check ONLY the sources for which the measure is SPECIFIED AND TESTED).

If other, please describe in S.5.1.

Claims

Other

S.5.1. Data Source or Collection Instrument (Identify the specific data source or data collection instrument, e.g. name of database, clinical registry, collection instrument, etc.)

Both medical and pharmacy administrative service records (claims or encounters) are used to support the measures. Member enrollment span, pharmacy benefit status and age and gender are also required. Provider characteristics, including specialty and unique provider identifier also have importance to support episode grouping, attribution and definition of peers.

S.5.2. Data Source or Collection Instrument Reference (available at measure-specific Web page URL identified in S.1 OR in the file attached here) (Save file as: S_5_2_DataSourceReference)

S7_2_Data Source Reference-636426333779114692.xls

S.6. Data Dictionary or Code Table (Please provide a web page URL or attachment if exceeds 2 pages. NQF strongly prefers URLs. Attach documents only if they are not available on a web page.)

Data Dictionary:

URL:

Please supply the username and password:

Attachment: S5_jointDegenerationHipKnee 052311-636426333780052192.xls

Code Table:

URL:

Please supply the username and password:

Attachment:

Construction Logic

S.7.1. Brief Description of Construction Logic

If applicable, summarize the general approach or methodology to the measure construction. This is most relevant to measures that are part of or rely on the execution of a measure system or applies to multiple measures.

Please refer to information provided in S2 and S8 for construction logic

S.7.2. Construction Logic (Detail logic steps used to cluster, group or assign claims beyond those associated with the measure's clinical logic.)

Please refer to information provided in S2 and S8 for construction logic

S.7.2a. CONSTRUCTION LOGIC ATTACHMENT or URL: If needed, attach supplemental documentation (Save file as:

S_7_2_Construction_Logic). All fields of the submission form that are supplemented within the attachment must include a summary of important information included in the attachment and its intended purpose, including any references to page numbers, tables,

text, etc.

URL:

Please supply the username and password:

Attachment:

S.7.3. Concurrency of clinical events, measure redundancy or overlap, disease interactions *(Detail the method used for identifying concurrent clinical events, how to manage them, and provide the rationale for this methodology.)*

ETG does provide methodology to deal with cases where a code will shift an episode from one ETG to another. For example, a concurrent renal transplant procedure will shift an episode of ETG Chronic renal failure to an episode of ETG Kidney transplant. There are no codes that will cause an episode of Hip/Knee Joint Degeneration to shift to another ETG.

As described in detail in S8.2, in the case where a diagnosis and procedure code on a claim are eligible for multiple episodes, a specific hierarchy of rules determines the most appropriate episode to group to, based on the rankings of the diagnosis and procedure code for the ETG of each episode. All of the eligibility and ranking information for Hip/Knee Joint Degeneration is described in the attachment for S5.

PEG also provides methodology to deal with combined procedures. If two different triggers occur on the same day then the episode is said to be combined. For Hip/Knee Replacement procedure episodes there would need to be a trigger for both Hip and Knee for the combined status flag to be assigned.

For more information about episode building construction/logic, please refer to the attachment for S.2 .

S.7.4. Complementary services *(Detail how complementary services have been linked to the measure and provide rationale for this methodology.)*

ETG and PEG do not group based on complementary services. All claims group to the appropriate episode on their own merits.) For more information about episode building construction/logic, please refer to the attachment we provided in S.2 .

S.7.5. Clinical hierarchies *(Detail the hierarchy of codes or condition groups used and provide rationale for this methodology.)*

As noted in S8.2 and S8.3, ETG uses different clinical relationships between diagnosis and procedure codes and conditions to support the creation of Hip/Knee Joint Degeneration episodes. Many of these relationships involve clinical hierarchies, including how specific and non-specific and signs and symptoms diagnosis codes are used. The relationship between primary and incidental diagnoses and the strength of association of incidental diagnoses to Hip/Knee Joint Degeneration and other episode concepts is a further example. A third example is the procedure hierarchies that apply across all concepts for Hip/Knee Joint Degeneration. Please see specifications S8.2 and S8.3 and the attachment for S2 for a summary of the role of rankings, strength of association and hierarchies are used in the ETG methodology for Hip/Knee Joint Degeneration.

S.7.6. Missing Data *(Detail steps associated with missing data and provide rationale for this methodology (e.g., any statistical techniques to impute missing data)*

:

Missing provider specialty assignment will impact the ability to assign a record type to a claim line. In addition, invalid and incomplete diagnosis and procedure coding, will impact the results of the episode grouping and the measures for Hip/Knee Replacement. For example, inaccurate coding may result in a service record not grouping to a Hip/Knee Replacement episode – due to the miscoding of a Hip/Knee Replacement diagnosis or the procedure code assigned to the service. ETG and PEG will attempt to group these services. However, invalid data may prevent this grouping to happen in an appropriate way. In this way, ETG and PEG handle data quality issues through the rigor of the logic designed to create appropriate episodes.

In terms of working with missing information during the episode grouping process, ETG and PEG use the following approaches:

-- Missing Diagnosis Codes: If all four diagnosis codes are missing from a non-pharmaceutical claim the ETG application will use the

procedure code to group, except when the procedure code requires a valid diagnosis code to be present. This requirement is per the ETG eligibility table. In cases where all diagnosis codes are missing and the procedure requires a valid diagnosis code to also be present, the service record will not group to a Hip/Knee Replacement episode and the service will be assigned to an error ETG.

-- Missing Procedure Codes: If there is no procedure code on a service record, then the record will group based on the diagnosis codes or NDC drug code during ETG processing. If there is no diagnosis, procedure or pharmacy code on the claim, then the claim will not group to a Hip/Knee Replacement episode and will have an error code assigned to it. PEG would not be able to identify claims for procedure episodes without valid procedure codes.

--Missing Provider Specialty: If the provider specialty is not available on a service record then the record will be assigned an error ETG code and will not group to a Hip/Knee Replacement episode.

The services not assigned to an episode and noted as “errors” based on missing data are marked with an error ETG number. Services with these ETG numbers would not be included in a Hip/Knee Replacement episode or procedure episode and would not be used in episode-based resource measurement for Hip/Knee Replacement.

-- Missing Pharmacy Data: For some members and populations, pharmacy data can be missing generally, due to the different factors, including not having a pharmacy benefit with the entity collecting the data used in measurement or pharmacy services being managed by a pharmacy benefits manager (PBM) for the measurement entity. As noted below, the ETG and PEG methodologies will continue to attempt to group the medical claims for an individual without pharmacy data. However, where pharmacy data are not generally available for a member, adjustments are required to ensure valid comparisons.

The ETG and PEG grouping methodologies for Hip/Knee Replacement do not require pharmacy data. Pharmacy services are treated as ancillary records and can never start an episode for Hip/Knee Replacements. Pharmacy services will join Hip/Knee Replacement episodes. However, missing pharmacy records will impact the observed cost of an episode – which will be underestimated, on average, where pharmacy data are missing. It is recommended that pharmacy benefit/data status be used as a separate category in risk adjusting pharmacy and total costs per episode. For example, the expected or “peer” results for a physician should reflect their mix of members with and without pharmacy benefits/data.

S.7.7. Resource Use Service Categories (Units) (Select all categories that apply)

Inpatient services: Inpatient facility services

Inpatient services: Admissions/discharges

Ambulatory services: Outpatient facility services

Ambulatory services: Emergency Department

Ambulatory services: Pharmacy

Ambulatory services: Evaluation and management

Ambulatory services: Procedures and surgeries

Ambulatory services: Imaging and diagnostic

Ambulatory services: Lab services

S.7.8. Identification of Resource Use Service Categories (Units)

(For each of the resource use service categories selected above, provide the rationale for their selection and detail the method or algorithms to identify resource units, including codes, logic and definitions.)

The following resource-use categories are included as measures for this submission.

Cost of Care per Episode

1. Total
2. Primary Care Core Services, Total
3. ER Services
4. Hospital Services, Total
5. Hospital Services, Inpatient Acute
6. Hospital Services, Inpatient Non-Acute
7. Radiology Services, Diagnostic, Total
8. Radiology, MRI, CT Scan Services, Total
9. Radiology, MRI, CT Scan Services, Lower Extremity Joint
10. Radiology, Other Diagnostic Services, Total
11. Radiology, Other Diagnostic Services, Hip Imaging, Plain Film
12. Radiology, Other Diagnostic Services, Knee Imaging, Plain Film
13. Specialty Care Services, Total
14. Specialty Care, Other Diagnostic Testing Services
15. Specialty Care, Evaluation & Management Services
16. Specialty Care, Medicine Services, Total
17. Specialty Care, Medicine Services, Physical Therapy
18. Specialty Care, Surgery Services, Total
19. Specialty Care, Surgery Services, Knee Replacement
20. Specialty Care, Surgery Services, Hip Replacement
21. Specialty Care, Surgery Services, Pain Management
22. Specialty Care, Other Services
23. Pharmacy Prescription Services

Utilization per 1,000 Episodes

1. Evaluation & Management Visits, Total
2. Evaluation & Management Visits, PCP Visits
3. Evaluation & Management Visits, Specialist Visits
4. Specialist Referrals
5. ER Visits
6. Hospital Inpatient Days, Acute
7. Hospital Inpatient Admits, Non-Acute
8. Hospital Inpatient Days, Non-Acute
9. Radiology Services, Diagnostic, Total
10. Radiology, MRI, CT Scan Services, Total
11. Radiology, MRI, CT Scan Services, Lower Extremity Joint
12. Radiology Services, Other Diagnostic Services, Total
13. Radiology Services, Imaging Plain Film, Hip (Subset of Radiology, Other Diagnostic Services)
14. Radiology Services, Imaging Plain Film, Knee (Subset of Radiology, Other Diagnostic Services)
15. Pharmacy Prescriptions Services

Other Utilization

16. Inpatient Non-Acute, Length of Stay

Each resource use category measure is described below, including reference to the specific codes and logic used to identify the services involved.

I. General Methods

The following notes on General Methods apply to all resource measures described here and provide guidelines on service costs, the treatment of incomplete and outlier episodes, and the selection of time periods. The logic described for type of service plays a specific role in each measure. These general methods are employed across all submitted measures:

-- Service cost – as a guideline, the service cost used in resource use measurement should reflect the actual payments or costs associated with the service or a standard-priced resource cost amount. As a further guideline, the financial amount used in resource measurement should reflect all payments for a service, including those made to the provider by payer, patient and other entities. The

allowed or equivalent payment is an example.

-- Complete episodes – Only complete episodes should be included in resource measurement. See the attachment for s.2 for a discussion of how ETG/PEG assigns completion status to an episode.

-- Outlier episodes – as a guideline, low outlier cost episodes should be excluded from resource use measurement. High outlier cost episodes should be included, but all costs truncated at the high outlier cost threshold used for the episode (a technique called “winsorization”). Where costs by type of service are used in measurement, individual service costs can be pro-rated to reflect the truncated total cost for a high cost outlier episode.

-- Episode Time periods – as a guideline, the episodes included in resource use measure should focus on a specific 12 month period, for example, all episodes ending in calendar year 2010.

-- Type of Service. The type of service logic for each measure is described in the sections below. Each type of service definition includes an overview of the key steps used in identifying the relevant services used in measuring cost and utilization. As an initial step, prescription pharmacy services and hospital inpatient confinements are identified (more detail below). For the remaining services:

- a. Providers are categorized into facility, anesthesiology specialties and other professional (not anesthesiology);
- b. The attached document S9.5_RU_Categories then describes two levels of specifications used in assigning services to a type of service category;
- c. The first table in the attachment IMAP_TOS_PROC includes one row per procedure code (CPT, HCPCS, Revenue). For each row, the table includes the procedure code, a short description and the columns PROF_TOS, ANESTOS, OPTOS, and PCC_TYPE. PROF_TOS, ANESTOS, OPTOS include standard TOS_I codes that are assigned to each procedure code based on whether the provider is a facility, anesthesiologist or other professional, using OPTOS, ANESTOS and PROF_TOS, respectively;
- d. Some services are also assigned a value for PCC_TYPE (described below);
- e. The second table, IMAP_TOS, includes one row for each of the standard TOS codes included in PROF_TOS, ANESTOS and PROF_TOS and columns for the TOS_I codes, ENC_TOS, and ENC_TOP and a brief description of the TOS_I. ENC_TOS and ENC_TOP are used in defining encounters below.
- f. These two tables are used in creating the measures described below.

-- Encounters. An Encounter is contact between an individual and the health care system for a related set of services. It is based on the type of service and the type of provider for a member on a specific day. Providing the ability to view data by encounters helps convey the scope and influence of all services associated with patient-health care system meetings. The concept of an encounter is used for the utilization measures described below. The following steps are used to assign an encounter value to each service record:

- a. Hospital inpatient admissions. A hospital inpatient confinement is considered a single encounter (ENCOUNTER=1).
- b. Prescription pharmacy. A pharmacy service record (claim record) is considered a single encounter (ENCOUNTER=1).
- c. Ancillary Drug Administered Services. All Ancillary, Drugs Administered (TOS_I values 201 thru 211), are considered an encounter (ENCOUNTER=1).
- d. For all other services, the number of encounters is dependent on the Type of Service and the Type of Provider assigned to the claims. In particular, the values included in the table IMAP_TOS for Encounter Type of Service (ENC_TOS) and Encounter Type of Provider (ENC_TOP) are used. As shown in IMAP_TOS, both the Encounter TOS and Encounter TOP are based on Type of Service (TOS_I) and can be assigned using table IMAP_TOS, and joining on TOS_I from the service record.
- e. For these other services, medical service records are sorted by Member, Date of Service, ENC_TOS and ENC_TOP.
- f. The calculation of encounters for services other than emergency room, laboratory and radiology services is 1 divided by the total number of records in the combination of Member, Date of Service, Encounter TOS, and Encounter TOP.
- g. Additional logic. Emergency room, laboratory and radiology services need to have a different logic because these services often are billed using both a technical and professional component – where both a professional provider and facility provider are involved.
- h. Any service with the following Encounter TOS values will use the additional logic when calculating encounters.
 1. ER professional and facility services (ENC_TOS=24)
 2. Lab and pathology professional and facility services (ENC_TOS=29, 31)
 3. Diagnostic and therapeutic radiology professional and facility services (ENC_TOS=47, 49)
- i. For the services using the additional logic, for each Member, Date of Service, and ENC_TOS distinct combination, sum the number of records for each of the Encounter TOP values of 1 and 2.
 1. Two cases can exist for these services: there are both facility and professional records in the combination; or there are only facility records or only professional records.
 2. Where at least one facility record and one professional record, the encounter is divided up equally between the professional and technical components. Therefore, the calculations for Encounters for these situations are: 0.5 divided by {number of records with Encounter TOP = 1 (Facility)} and 0.5 divided by {number of records with Encounter TOP = 2 (Professional)}

3. Where all records have the same ENC_TOP value, the encounters calculation will be the generic calculation: 1 divided by {number of records in the combination of Member, Date of Service, Encounter TOS, Encounter TOP}
-- Cost and Utilization Measures. The actual resource use for an episode is the sum of the costs or encounters for those services grouped to the episode. Measures of actual cost or use per episode across episodes, is the sum of cost or use divided by the total number of episodes included in the measurement.

II. Cost of Care per Episode

Total Service Costs. Total services costs include the total costs for all services included in the selected clinical episodes.

Primary Care Core Services Costs. Primary Care Core (PCC) services include a select group of services traditionally performed by an individual's primary care physician. The PCC concept is similar to the idea of the group of services typically included in a primary care capitation definition. In particular, these services include non-inpatient evaluation and management services and selected imaging, diagnostic and minor procedure services. PCC Services are identified as follows:

-- First select services rendered by a primary care provider. The identification of primary care providers can be made configurable.

At a minimum, these providers include the individual's assigned PCP. Further, to include covering providers, other primary care providers in the network are included, defined using either a list of provider ids or all physicians with a specialty of internal medicine, family practice, geriatric medicine, adolescent medicine and pediatrics, or both (e.g., using a list to include specific OB/GYN providers in addition to all providers with primary care specialties).

i. The CPT procedure code on the selected services is then used to identify:

1. PCC Services Total
2. PCC Services, Visits and
3. PCC Services Other.

ii. The CPT procedure codes assigned to these categories are included in the column PCC_TYPE in the attachment table IMAP_TOS_PROC. Values of "Visit" and "Other" are used. Blank entries for a procedure code indicate that they are not included as a PCC service.

-- ER Service Costs. These services include professional and facility emergency room services.

- i. Professional ER Services are identified as having values of 1803 thru 1805 in IMAP_TOS
- ii. Facility ER Services are identified as having values of 801 and 802 in IMAP_TOS

-- Hospital Costs. Includes the facility cost of an inpatient stay and services provided by an outpatient facility other than those defined elsewhere (e.g., ER, Lab, Radiology, Other). These services include professional and facility emergency room services.

- i. Inpatient Acute Services are identified as having a value of 601 in IMAP_TOS
- ii. Non-Inpatient Acute Services are identified as having a value of 703 in IMAP_TOS
- iii. Other Outpatient Hospital Services are identified as having values of 901 thru 1399 in IMAP_TOS

-- Laboratory Services. These services include professional and facility laboratory services.

- i. Professional Lab Services are identified as having values of 2101-2118 (Professional, Lab) or 2501-2511 (Professional, Pathology) in IMAP_TOS
- ii. Facility LAB Services are identified as having values of 1001 thru 1005 in IMAP_TOS

-- Radiology Services, Diagnostic. These services include diagnostic professional and facility radiology services:

- i. Professional Radiology, MRI, CT Scan Services are identified as having values of 2901 thru 2903 in IMAP_TOS
- ii. Facility Radiology, MRI, CT Scan Services are identified as having values of 1201, 1203, 1204 in IMAP_TOS
- iii. Professional Radiology, Other Diagnostic Services are identified as having values of 2905, 2906, 2907, 2908 in IMAP_TOS
- iv. Facility Radiology, Other Diagnostic Services are identified as having values of 1202, 1206, 1207, 1208 in IMAP_TOS
- v. Note that Therapeutic Radiology is included in Specialty Care Services, Medicine

-- Radiology Services, Additional Cost and Utilization Categories. These categories describe additional detail below Radiology Services, Diagnostic:

- i. Radiology, MRI, CT Scan Services, Lower Extremity Joint -- See attachment S9.7_RU_Categories.xls, tab "AdditionalResourceUseCats" for the procedure codes that map to this category. See Target Category "LEJMRI".
- ii. Radiology Services, Imaging Plain Film, Hip (Subset of Radiology, Other Diagnostic Services) -- See attachment S9.7_RU_Categories.xls, tab "AdditionalResourceUseCats" for the procedure codes that map to this category. See Target Category "HIPX"

iii. Radiology Services, Imaging Plain Film, Knee (Subset of Radiology, Other Diagnostic Services) – See attachment S9.7_RU_Categories.xls, tab “AdditionalResourceUseCats” for the procedure codes that map to this category. See Target Category “KNEEX”

-- Specialty Care Services. These services include those services not identified above and are categorized as follows (including TOS_I values in IMAP_TOS):

- i. Specialty Care, Other Diagnostic Testing
 - 1. 1701-1733 (Professional, Diagnostic)
- ii. Specialty Care, Evaluation & Management
 - 1. 1601-1609 (Professional, Consult)
 - 2. 2001-2013 (Professional, Inpatient Visit)
 - 3. 2401-2411 (Professional, Office Visit)
 - 4. 2717-2719 (Professional, Home Visit)
 - 5. 2729-2731 (Professional, Domiciliary/Rest Home Visit)
 - 6. 2801-2807 (Professional, Preventive Medicine)
 - 7. Excludes any services assigned to Primary Care Core
- iii. Specialty Care, Medicine
 - 1. 1401-1405 (Professional, Allergy Tests)
 - 2. 1901-1901 (Professional, Immunizations / Injection)
 - 3. 2909-2915 (Professional, Therapeutic Radiology)
- iv. Specialty Care, Surgery
 - 1. 3001-3214 (Professional, Surgery)
- v. Specialty Care, Other
 - 1. 101-131 (Ancillary, DME)
 - 2. 201-211 (Ancillary, Drug Admin)
 - 3. 301-307 (Ancillary, Home Health)
 - 4. 401-403, 431 (Ancillary, Services and Supplies)
 - 5. 405-414 (Ancillary, Med and Surg Supplies)
 - 6. 416-424 (Ancillary, Orthotics)
 - 7. 425-429, 432 (Ancillary, Supplies)
 - 8. 433-436 (Ancillary, Oxygen/Resp)
 - 9. 437-446 (Ancillary, Prosthetics)
 - 10. 448-449 (Ancillary, Vision)
 - 11. 450-459 (Ancillary, Rpt/Trking)
 - 12. 501-503 (Ancillary, Transportation)
 - 13. 1501-1599 (Professional, Anesthesia)
 - 14. 2203-2212 (Professional, Mental Health)
 - 15. 2302-2317 (Professional, Obstetrics)
 - 16. 2601-2625 (Professional, Phys Medicine/Rehab)
 - 17. 2701-2715, 2721-2728 (Professional, Professional Other)

-- Specialty Care, Additional Cost and Utilization Categories. These categories describe additional detail below Specialty Care:

- i. Specialty Care, Medicine, Physical Therapy – See attachment S9.7_RU_Categories.xls, tab “AdditionalResourceUseCats” for the procedure codes that map to this category. See Target Category “PT”.
- ii. Specialty Care, Surgery, Hip Replacement – See attachment S9.7_RU_Categories.xls, tab “AdditionalResourceUseCats” for the procedure codes that map to this category. See Target Category “HIPREP”.
- iii. Specialty Care, Surgery, Knee Replacement – See attachment S9.7_RU_Categories.xls, tab “AdditionalResourceUseCats” for the procedure codes that map to this category. See Target Category “KNEREP”.
- iv. Specialty Care, Surgery, Pain Management – See attachment S9.7_RU_Categories.xls, tab “AdditionalResourceUseCats” for the procedure codes that map to this category. See Target Category “PAINMT”.

III. Utilization per 1,000 Episodes

Encounters are used for all utilization counts for the utilization measures described below.

Evaluation and Management Visits. E&M Visit services by all professional providers and include the following TOS_I values from

IMAP_TOS:

- i. 1601-1609 (Professional, Consult)
- ii. 1803-1805 (Professional, ER)
- iii. 2001-2013 (Professional, Inpatient Visit)
- iv. 2401-2411 (Professional, Office Visit)
- v. 2717-2719 (Professional, Home Visit)
- vi. 2729-2731 (Professional, Domiciliary/Rest Home Visit)
- vii. 2801-2807 (Professional, Preventive Medicine)

PCP Visits. PCP Visits include E&M visits rendered by a PCP or a PCP covering provider (see discussion above for PCC services).

Specialist Visits. Specialist Visits include E&M visits rendered by a provider other than a PCP or a PCP covering provider (see discussion above for PCC services).

Specialist Referrals. A Specialist Referral is indicated using E&M visits and indicates the first instance of the Provider for an E&M service for that member. A specialist is a provider other than a PCP or a PCP covering provider (see discussion above for PCC services).

ER Visits. Indicates an ER service encounter. ER services are defined by a TOS_I value of Facility Outpatient, ER (801, 802) or Professional, ER (1803, 1805).

Radiology Services, Diagnostic. Radiology utilization is defined as an encounter for the following Types of Service:

-MRI/Cat Scans – Facility Outpatient (1201, 1203, 1204), Professional (2901, 2902, 2903)

-Other Diagnostic Radiology – Facility Outpatient, Diag. Radiology (1202, 1206, 1207, 1208), Professional, Diagnostic Radiology, Nuclear Medicine (2905 thru 2908)

Radiology, MRI, CT Scan Services, Lower Extremity Joint – See attachment S9.7_RU_Categories.xls, tab “AdditionalResourceUseCats” for the procedure codes that map to this category. See Target Category “LEJMRI”.

Radiology Services, Imaging Plain Film, Hip (Subset of Radiology, Other Diagnostic Services) -- See attachment S9.7_RU_Categories.xls, tab “AdditionalResourceUseCats” for the procedure codes that map to this category. See Target Category “HIPX”

Radiology Services, Imaging Plain Film, Knee (Subset of Radiology, Other Diagnostic Services) – See attachment S9.7_RU_Categories.xls, tab “AdditionalResourceUseCats” for the procedure codes that map to this category. See Target Category “KNEEX”

Pharmacy Services. A pharmacy service prescription record.

Inpatient Days. An inpatient stay describes the entire stay by a patient in a facility at the same level of care. Transfers to a different level of care at the same facility results in a new admission. Acute inpatient stays describe inpatient confinements in an acute care facility. Non-acute inpatient stays describe inpatient confinements in a skilled nursing facility, transitional care unit/rehab, or other longer term/sub-acute facility. Inpatient days describe the difference between inpatient admission and discharge dates. Inpatient stays where the admission and discharge dates are equal are assigned one inpatient day. Average length of stay is described by the ratio of total inpatient days to total admissions.

S.7.8a. If needed, provide supplemental resource use service category specifications in either URL (preferred) or as an attachment (Save file as S.7.8a_RU_Service_Categories):

URL:

Please supply the username and password:

Attachment: S9 7_RU_Categories dd-636426333787864692.xls

Clinical Logic

S.8.1. Brief Description of Clinical Logic (Briefly describe your clinical logic approach including clinical topic area, whether or not your account for comorbid and interactions, clinical hierarchies, clinical severity levels and concurrency of clinical events.)

This measure identifies patients with Hip/Knee Replacement and creates Hip/Knee Replacement episodes of care using the ETG and

PEG methodologies described in the ETG_PEG Construction Logic attached in our response to S.2. Each procedure episode of Hip/Knee Replacement is characterized by a PEG Anchor Category ID that specifies the type of procedure; the PEG Anchor Category ID representing Hip Replacement is 71518 and the PEG Anchor Category ID representing Knee Replacement is 71918.

An ETG/PEG episode of Hip/Knee Replacement will contain all clinically relevant information related to the procedure. The Hip/Knee Replacement episode clinical framework is defined by the services, or claim lines, that can begin an episode, the primary and incidental diagnosis relationships involved and how records group to an episode, including relative strength of relationship.

S.8.2. Clinical Logic *(Detail any clustering and the assignment of codes, including the grouping methodology, the assignment algorithm, and relevant codes for these methodologies.)*

The Hip/Knee Replacement measure's episodes are defined using the Episode Treatment Group (ETG) and Procedure Episode Group (PEG) methodologies. Please note that this specification will reference different attachments included with the submission for these measures, including:

- S2_ETG_PEG_Construction_Logic. This attachment provides an overview of the ETG and PEG methodology used for Hip/Knee Replacement episodes.
- S5_HipKneeReplacement_DataDictionary (Excel workbook attachment). This attachment describes the clinical relationships between diagnosis and procedure codes and the episode condition.

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The individual Worksheets in these attachments that relate to the specific components of the methodology are referenced in the following specification.

As described above, the clinical ETG/PEG methodology for Hip and Knee replacement episodes employs a two step process. The first step involves ETG episode grouping to identify the services related to the diagnostic condition that describes the context for the procedure episode. For example, the Hip/Knee Joint Degeneration ETG episode building process supports the identification of a diagnostic episode of care related to Hip/Knee Replacement procedure episode. The ETG methodology involves three important steps:

- Step 1: Identify Records; Assign Record Type and Anchor Records, Classify Diagnoses and Procedures
- Step 2: Build Episodes from Anchor Records
- Step 3: Group Non-Anchor Records to Episodes

The second step of the episode building process for Hip and Knee Replacement procedure episodes, involves the PEG procedure episode building methodology. This step leverages results from the ETG step and further logic related to the procedure episode. The PEG methodology has three important steps:

- Step 1: Identify Anchor Procedures that Signal the Presence of a Procedure Episode
- Step 2: Gather Medical and Pharmacy Services to Episodes
- Step 3: Finalize the Episodes (identification of laterality, and identification of the primary surgeon most responsible for care)

This section (S8.2 Clinical Framework) describes the three steps in the ETG episode building process and all steps related to the PEG procedure episode building process

ETG Episode Building Specifications:

Step 1- Identify Records; Assign Record Type and Anchor Records, Classify Diagnoses and Procedures

Assign services to record types, identify anchor records and classify diagnoses and procedures on service records to support the creation of Hip/Knee Joint Degeneration and other episodes.

Step 1A: Assign Record Type to each Service:

Assign each service to one of the following 5 record types:

- Facility: A claim record submitted by a treatment facility for room & board charges (F)
- Surgery: A claim record submitted by a provider for surgical or related procedure (S)
- Management: A claim record submitted by a provider related to the evaluation of a patient's condition (M)
- Ancillary: A claim record submitted by any provider for laboratory, radiological or similar services (A)

-- Pharmaceutical: A claim record for a prescription drug claim (P)

Assign record type based upon servicing provider type and the nature of the service procedure.

- Assign provider type based on the specialty of the service provider. The "ExTypeOfProvider" worksheet of the attachment S5_HipKneeReplacement_DataDictionary includes an example mapping of specialty to provider type. Based upon the specialty of the service provider on the claim record the provider type recognized by ETG is assigned. For example, using the "ExTypeOfProvider" worksheet a provider specialty code of 100 on the claim would be assigned the ETG provider type of Facility.
- Type of service is based on the service procedure code (CPT, HCPCS, Revenue, NDC). The worksheet "ProcToRecordType" in the attachment S5_HipKneeReplacement_DataDictionary includes the information required to assign record type based upon the procedure code on the claim record.
- Use the combination of type of provider and type of service to determine record type. The worksheet "ProcToRecordType" in the attachment S5_HipKneeReplacement_DataDictionary provides a mapping of provider type and type of service to record type. For example, procedure code 99025 (Initial surgical evaluation) is assigned a record type of Management (M) when the provider type is either clinician (see column "Clinician Record Type" where procedureCode=99025) or a facility (see column "Facility Record Type" where procedureCode=99025). This same procedure code would be assigned a record type of Ancillary (A) when the provider type is non-clinician (see column "Non-Clinician Record Type" where procedureCode=99025).

Examples of record type assignment include:

- An office visit record provided by an internist will be assigned a "Clinician" provider type and a record type of "Management (M)"
- A cholecystectomy provided by a general surgeon will be assigned a "Clinician" provider type and a record type of "Surgery (S)"
- A pharmacy prescription will be assigned a record type of "Pharmaceutical (P)"
- An injection for chemotherapy (e.g., HCHPS J-code) will also be assigned a record type of "Pharmaceutical (P)"
- An imaging service provided by a radiologist, orthopedic surgeon, facility or any provider will be assigned a record type of "Ancillary (A)".

The worksheet "ExRecordType" in the attachment S5_HipKneeReplacement_DataDictionary includes further examples.

The assigned record type provides information to the Hip/Knee Joint Degeneration episode-building methodology about the nature of the service and whether the diagnostic and other information on the service provides confirmatory information for a clinician service (versus potentially rule-out information from imaging, lab or other diagnostic services). Record type plays an important role in how services can trigger episodes of care and join and/or modify existing episodes.

Step 1B: Identify Anchor Records. The record type assigned in Step 1A is used to identify anchor records. An anchor record indicates that a clinician has evaluated the patient, assigned a diagnosis and has initiated the treatment and care of the patient for the condition. If the record type assigned to the service is M, S, or F (Management, Surgery or Facility), the service is an anchor record. All other services are considered non-anchor records.

Steps 1C through 1F: Before episodes can be built from anchor records and non-anchor services can be assigned to episodes, the relationship of diagnoses and procedures to each condition, including Hip/Knee Joint Degeneration, need to be assigned. Steps 1C through 1F describe how these relationships are defined. These initial steps categorize diagnoses and procedures relative to each condition, saving this information for use in the subsequent steps described in Step 2 and Step 3.

Note that in some instances a service may have a potential clinical relationship to more than one condition. This concept has importance to episode building, in general, and for episodes of Hip/Knee Joint Degeneration. While each service can inform grouping decisions across multiple episodes, the ETG methodology assigns each service uniquely to a single episode. Such an approach ensures that double-counting does not occur when considering service cost and utilization in the creation of resource use measures. As a result, accurate decisions on assigning a service to an episode of Hip/Knee Joint Degeneration or to another condition require the assessment of both the relationship of a service to Hip/Knee Joint Degeneration and to all other conditions for a patient. The methodology described in this section classifies diagnoses and procedures based on their relationship to Hip/Knee Joint Degeneration and also the strength of that relationship relative to other conditions. Using ETG, accurate episode grouping for Hip/Knee Joint Degeneration and other conditions must occur in the context of all of a patient's conditions.

Step 1C: Assign Diagnoses to Diagnosis Class

Assign each ICD-9 diagnosis code to a "diagnosis class". There are three diagnosis classes applied across all diagnosis codes, including diagnosis codes eligible for Hip/Knee Joint Degeneration:

- Specific: These diagnosis codes indicate a specific disease as opposed to a sign or symptom. These codes are specific enough to be

linked to a single ETG. ICD-9 diagnosis code 715.16 (Primary Localized Osteoarthritis, Lower Leg) is an example of a specific diagnosis code for Joint Degeneration – Knee and 715.5 (Primary Localized Osteoarthritis, Pelvic Region and Thigh) is an example of a specific diagnosis code for Joint Degeneration - Hip.

- Non-Specific: Like specific diagnoses, these diagnosis codes represent a disease or condition, but are not specific enough to support linkage to a single condition. Osteoarthritis, localized, secondary (ICD-9 715.2) is an example of a non-specific diagnosis for both Joint Degeneration – Knee and Joint Degeneration – Hip. Although 715.2 represents disease as opposed to a sign or symptoms, it is not specific as to representing a single disease. Services with this diagnosis will be assigned to an episode based on both information related to a Hip/Knee Joint Degeneration episode as well as information related to other potential conditions.

- Signs and Symptom: These diagnosis codes represent signs and symptoms of disease as opposed to a disease or condition. For example, Swelling of limb (ICD-9 diagnosis code 729.81) represents a sign and symptom rather than a disease. 729.81 could be related to multiple diseases. ETG assigns sign and symptoms diagnoses to the lowest specificity. Services with signs and symptoms diagnosis codes may be eligible for many ETGs due to their generic nature. These services will be gathered to episodes as a later step in the grouping process, after other, more specific, information has been considered.

Diagnosis class assignments determine how a service is grouped to an episode and the order in which it is considered. The ETG methodology considers one person at a time and an individual's medical and pharmacy service records are grouped in several distinct passes. The methodology first processes the specific and non-specific diagnosis codes on anchor records so that concrete conditions/diseases are created. It then processes services with sign and symptom diagnosis codes in reverse chronological order (based on dates of service) to determine the best episode these services can group to.

Step 1D: Identify the Clinical Relationship Between Diagnosis Codes and Conditions, Including Hip/Knee Joint Degeneration

Match each diagnosis code with one or more conditions (ETGs) through a diagnosis eligibility table. In addition to mapping diagnosis codes to conditions, each diagnosis code is further ranked, based on its strength of association with a condition. A rank of "primary" or "incidental" is assigned to each diagnosis and condition combination, with a further ranking assigned to incidental relationships:

- Primary: A "primary" diagnosis/condition relationship is assigned where the diagnosis defines that condition. The diagnosis codes that are classified as primary to Hip/Knee Joint Degeneration are listed on the "PrimaryDxCodes" worksheet within the attachment "S5_HipKneeReplacement_DataDictionary" (Note: the word "primary" here is used to describe the relationship between a diagnosis and an episode, it is not used to indicate the position of the diagnosis code on the claim line. The diagnosis in any position on the claim line can have a primary relationship with Hip/Knee Joint Degeneration). This map is used to identify primary diagnoses for Hip/Knee Joint Degeneration. Examples of diagnoses ranked as primary for Joint Degeneration – Knee are Primary localized osteoarthritis, lower leg (715.16), Secondary localized osteoarthritis, lower leg (715.26) and Ankylosis of lower leg joint (718.56). Examples of diagnoses ranked as primary for Joint Degeneration – Hip are Primary localized osteoarthritis, pelvic region and thigh (715.15), Secondary localized osteoarthritis, pelvic region and thigh (715.25) and Ankylosis of pelvic region and thigh joint (718.55). Primary diagnosis codes can only be ranked as primary for a single ETG condition.

- Incidental: These diagnosis codes are eligible for a condition but are not classified as primary. These diagnosis codes can be incidental to other conditions. To support the linkage of these diagnosis codes to a final episode, a further ranking is assigned for each condition based on the relative strength of association between the diagnosis and condition. Values of low, medium, or high are assigned for each diagnosis/condition. The Diagnosis codes that are incidental to Hip/Knee Joint Degeneration are listed on the "IncidentalDxCodes" worksheet within the attachment "S5_HipKneeReplacement_DataDictionary". The column "diagnosisEligibilityType" in the worksheet describes the relative strength ranking where 3 represents a high association, 2 represents a medium association and 1 represents a low association.

Step 1E: Identify Relationships between Procedure Codes and Conditions, Including Hip/Knee Joint Degeneration

Match each procedure code with one or more conditions, including Hip/Knee Joint Degeneration, through a procedure eligibility table. All procedure codes that are eligible for Hip/Knee Joint Degeneration are listed on the "ProcedureCodes" worksheet within attachment "S5_HipKneeReplacement_DataDictionary". In the same way diagnoses can relate multiple conditions, a procedure can relate to more than one episode. The ProcedureCodes worksheet also includes a ranking of the strength of the clinical relationship of each CPT and HCPCS code with Hip/Knee Joint Degeneration, ranked from 1 to 4 based on the relative strength of the clinical relationship between the procedure and Hip/Knee Joint Degeneration. This relationship is included in the "ProcedureRank" column in the worksheet. A rank of 4 represents the strongest association and a rank of 1 the lowest. In this way, ETG considers not only the diagnostic information on a service when making grouping decisions around Hip/Knee Joint Degeneration, but also the service procedure and the strength of the relationship between the procedure and Hip/Knee Joint Degeneration relative to other potential conditions.

Step 1F: Identify Relationships Between Pharmacy Services and Conditions, Including Hip/Knee Joint Degeneration

The relationship between pharmacy services and Hip/Knee Joint Degeneration and other conditions is based on the pharmacy code assigned to the service. To support this assessment, the ETG methodology assigns each pharmacy service to a Drug Category Code

(DCC). The DCC describes the drug's active ingredients and route of administration. DCCs are then mapped to ETGs and define the relationships between a drug and a condition. Most pharmacy services are defined using NDC procedure codes, however selected pharmacy services with a CPT or HCPCS code are also mapped to a DCC by ETG (e.g., J-codes describing injections). The "Pharmacy" worksheet in the attachment "S5_HipKneeReplacement_DataDictionary" describes the DCCs assigned to Hip/Knee Joint Degeneration. Similar to diagnoses and procedures, there are some instances a DCC code may be eligible for more than one ETG. In these cases, the ETG methodology uses strength of the clinical relationship between the DCC code and the episode condition. The "Rank" in the worksheet describes this strength of association for each DCC and Hip/Knee Joint Degeneration. The lower the value is for Rank, the stronger the association between the DCC and the episode. If multiple episodes are competing for a pharmacy service, this rank is used to support decisions on assignment.

Given the clinical relationships described in Steps 1A through 1F, the following steps are used to build ETG episodes from anchor records.

Step 2- Build Episodes from Anchor Records.

Building Hip/Knee Joint Degeneration episodes from anchor records is a multi-step process that utilizes diagnostic and procedural information and the clinical relationships defined in Step 1. Anchor records are grouped in two passes through the patient's data. The first pass groups the anchor records with specific and non-specific diagnoses. The second pass groups anchor records with sign and symptoms diagnoses. All anchor records are grouped before all non-anchor records.

Step 2A: Use Anchor Records to Start an Episode of Hip/Knee Joint Degeneration Using Specific and Non-Specific Diagnoses

A service must be an anchor record to start an episode of Hip/Knee Joint Degeneration. The service must also have a procedure code that is eligible for Hip/Knee Joint Degeneration and an ICD-9 diagnosis code that is primary for Hip/Knee Joint Degeneration. See worksheets "PrimaryDxCodes" and "ProcedureCodes" within attachment S5_HipKneeReplacement_DataDictionary for a complete list of diagnosis codes and procedure codes that are primary for Hip/Knee Joint Degeneration. All codes within the "PrimaryDxCodes" worksheet are considered primary to Hip/Knee Joint Degeneration. If an anchor record meeting these requirements is observed, start an episode for Hip/Knee Joint Degeneration.

As an example of an anchor record that starts an episode of Joint Degeneration – Knee, an orthopedist sees a patient and submits a claim record using the CPT procedure code 99212 (Office visit, established patient) with and ICD-9 diagnosis code 715.16 (Primary localized osteoarthritis, lower leg).

Note that a single anchor record can start more than one episode. For example, an anchor record with a diagnosis and procedure code combination that is eligible for Hip/Knee Joint Degeneration will start a Hip/Knee Joint Degeneration episode. If that record also has a diagnosis and procedure code combination that is eligible for Hypertension, it will also start a Hypertension episode. (See Section I of the Attachment for S2 above for a discussion of the concept of "phantom episode clusters".)

Step 2B: Group Anchor Records to an Episode of Hip/Knee Joint Degeneration Using Specific and Non-Specific Diagnoses

Once an episode of Hip/Knee Joint Degeneration is started, group further anchor records to that episode. Consider specific and non-specific diagnoses on anchor records first.

First identify whether the anchor record is eligible for Hip/Knee Joint Degeneration. Eligible anchor records for Hip/Knee Joint Degeneration have a procedure code eligible for Hip/Knee Joint Degeneration and a diagnosis code that has either a primary or incidental relationship to Hip/Knee Joint Degeneration. See the "ProcedureCodes" worksheet within S5_HipKneeReplacement_DataDictionary for the procedure codes eligible for Hip/Knee Joint Degeneration. See the "PrimaryDxCodes" and "IncidentalDxCodes" worksheets within S5_HipKneeReplacement_DataDictionary for a list of the diagnosis codes primary and incidental to Hip/Knee Joint Degeneration.

For anchor records with eligibility to a Hip/Knee Joint Degeneration episode, apply the following steps to assign the anchor record to an episode.

Step 2B1 - If the anchor record is only eligible for the open Hip/Knee Joint Degeneration episode, group the anchor record to the Hip/Knee Joint Degeneration episode.

In some cases, an anchor record can be eligible to join more than one episode. This is true because a service may have more than one diagnosis code. Further, diagnosis codes that are incidental for Hip/Knee Joint Degeneration may also be eligible for another ETG condition.

Step 2B2 - If the anchor record is eligible for the Hip/Knee Joint Degeneration episode and another episode for the patient, apply the following tie-breaking steps to determine the episode an anchor record groups to:

- Assess the specificity of the diagnoses on the anchor record. Diagnosis class describes this specificity and was assigned to each diagnosis code in Step 1C (specific or non-specific).

- Assign the anchor record to an episode based on the diagnosis class. Episodes related to specific diagnoses take precedence over

episodes related to non-specific diagnoses.

Specific diagnoses:

- If a diagnosis on the anchor record is specific and has a relationship with a single episode, assign the anchor record to that episode.
- If the anchor record has more than one specific diagnosis and those diagnoses have clinical relationships with more than one episode, then use the strength of association of the procedure code for the anchor record to determine the episode that the anchor groups to.

- If the strength of relationship between the procedure code and the different episode conditions is the same for the specific diagnoses, then the strength of the association of the diagnosis codes themselves are used to determine the grouping of the anchor record. As discussed in Step 1D, strength of association between diagnosis codes and conditions are described as primary or incidental. Primary relationships between diagnosis codes and episode conditions have precedence over incidental relationships.
- If the strength of the relationship between the specific diagnosis codes and the episode conditions is the same, the time between the anchor record and the closest anchor for the open episode is used.

Non-specific diagnoses:

- If no specific diagnoses are observed on the anchor record, consider non-specific diagnoses in assigning the anchor record to an episode. Apply the same order of logic described directly above for specific diagnoses to the assignment of anchor records based on non-specific diagnoses.

At the completion of Step 2B, each anchor record with a specific or non-specific diagnosis has been assigned to an episode, including episodes of Hip/Knee Joint Degeneration.

Note that in the same way a single anchor record can start more than one episode (Step 2A), a single anchor record can also extend more than one episode, however the anchor record itself can only be assigned to one episode, as described above. For example, an anchor record with a diagnosis and procedure code combination that is eligible for Hip/Knee Joint Degeneration can extend a Hip/Knee Joint Degeneration episode. If that record also has a diagnosis and procedure code combination that is eligible for Hypertension, it can also extend a Hypertension episode. (See Section I of the Attachment for S2 above for a discussion of the concept of “phantom episode clusters” and the concept of extending episodes.)

Step 2C: Group Anchor Records to an Episode of Hip/Knee Joint Degeneration Using Sign and Symptom Diagnoses

The last step in grouping Anchor records to Hip/Knee Joint Degeneration and other episodes involves processing anchor records with only sign and symptom diagnosis codes. All sign and symptom diagnosis codes for Hip/Knee Joint Degeneration are listed within the S5_HipKneeReplacement_DataDictionary on worksheet “IncidentalDxCodes” where column “specificity”=“Sign and Symptom”. An example is Ganglion of joint (ICD-9 727.41).

For these anchor records with eligibility to a Hip/Knee Joint Degeneration episode, apply the following steps to assign the anchor record to an episode.

Step 2C1 - If the anchor record is only eligible for the open Hip/Knee Joint Degeneration episode, group the anchor record to the Hip/Knee Joint Degeneration episode.

Step 2C2 - If the anchor record is eligible for the Hip/Knee Joint Degeneration episode and another episode for the patient, apply the following tie-breaking steps to determine the episode an anchor record groups to:

- If the anchor record has more than one sign and symptom diagnosis and those diagnoses have clinical relationships with more than one episode, then use the strength of association of the procedure code for the anchor record to determine the episode that the anchor groups to.

- If the strength of relationship between the procedure code and the different episode conditions is the same for the sign and symptom diagnoses, then the strength of the association of the diagnosis codes themselves are used to determine the grouping of the anchor record. As discussed in Step 1D, strength of association between diagnosis codes and conditions are described as primary or incidental. For sign and symptom diagnoses, incidental relationships between diagnosis codes and episode conditions have precedence over primary relationships.

- If the strength of the relationship between the sign and symptom diagnosis codes and the episode conditions is the same, the time between the anchor record and the closest anchor for the open episode is used.

At the completion of Step 2C, each anchor record with a sign and symptom diagnosis has been assigned to an episode, including episodes of Hip/Knee Joint Degeneration.

After completing these steps, anchor records have been used to open episodes of Hip/Knee Joint Degeneration, as well as episodes for other conditions. Anchor records have been assigned uniquely to individual episodes based on the clinical logic described above and in the attachment “S5_HipKneeReplacement_DataDictionary”.

Step 3. Group Non-Anchor Records to Episodes.

Non-anchor records (record type “Ancillary” and “Pharmacy”) can not open episodes on their own, but can join episodes. For example, a service for a Radiologic examination, knee; 1 or 2 views(CPT code 73560), with a diagnosis of Primary localized

osteoarthritis, lower leg (ICD9 715.16) can group to an open episode of Knee Joint Degeneration but can not open the episode itself.
Step 3A: Group Non-Anchor Records other than Pharmacy to an Episode of Hip/Knee Joint Degeneration Using Specific and Non-Specific Diagnoses

Once an episode of Hip/Knee Joint Degeneration is started and anchor records have been grouped, non-anchor records can group to that episode. Consider specific and non-specific diagnoses on non-anchor records first.

First identify whether the non-anchor record is eligible for Hip/Knee Joint Degeneration. Eligible non-anchor records for Hip/Knee Joint Degeneration have a procedure code eligible for Hip/Knee Joint Degeneration and a diagnosis code that has either a primary or incidental relationship to Hip/Knee Joint Degeneration. See the "ProcedureCodes" worksheet within

S5_HipKneeReplacement_DataDictionary for the procedure codes eligible for Hip/Knee Joint Degeneration. See the "Pharmacy" worksheet within S5_HipKneeReplacement_DataDictionary for the pharmacy codes eligible for Hip/Knee Joint Degeneration. See the "PrimaryDxCodes" and "IncidentalDxCodes" worksheets within S5_HipKneeReplacement_DataDictionary for a list of the diagnosis codes primary and incidental to Hip/Knee Joint Degeneration.

For non-anchor records with eligibility to a Hip/Knee Joint Degeneration episode, apply the following steps to assign the record to an episode.

Step 3A1 - If the non-anchor record is only eligible for the open Hip/Knee Joint Degeneration episode, group the record to the Hip/Knee Joint Degeneration episode.

In some cases, a non-anchor record can be eligible to join more than one episode. This is true because a service may have more than one diagnosis code. Further, diagnosis codes that are incidental for Hip/Knee Joint Degeneration may also be eligible for another ETG condition.

Step 3A2 - If the non-anchor record is eligible for the Hip/Knee Joint Degeneration episode and another episode for the patient, apply the following tie-breaking steps to determine the episode the record groups to:

- Assess the specificity of the diagnoses on the non-anchor record. Diagnosis class describes this specificity and was assigned to each diagnosis code in Step 1C (specific or non-specific).

- Assign the non-anchor record to an episode based on the diagnosis class. Episodes related to specific diagnoses take precedence over episodes related to non-specific diagnoses.

Specific diagnoses:

- If a diagnosis on the non-anchor record is specific and has a relationship with a single episode, assign the record to that episode.

- If the non-anchor record has more than one specific diagnosis and those diagnoses have clinical relationships with more than one episode, then use the strength of association of the procedure code for the record to determine the episode that the anchor groups to.

- If the strength of relationship between the procedure code and the different episode conditions is the same for the specific diagnoses, then the strength of the association of the diagnosis codes themselves are used to determine the grouping of the non-anchor record. As discussed in Step 1D, strength of association between diagnosis codes and conditions are described as primary or incidental. Primary relationships between diagnosis codes and episode conditions have precedence over incidental relationships.

- If the strength of the relationship between the specific diagnosis codes and the episode conditions is the same, the time between the non-anchor record and the closest anchor for the open episode is used.

Non-specific diagnoses:

- If no specific diagnoses are observed on the non-anchor record, consider non-specific diagnoses in assigning the record to an episode. Apply the same order of logic described directly above for specific diagnoses to the assignment of non-anchor records based on non-specific diagnoses.

At the completion of Step 3A, each non-anchor record with a specific or non-specific diagnosis has been assigned to an episode, including episodes of Hip/Knee Joint Degeneration.

Step 3B: Group Non-Anchor Records other than Pharmacy to an Episode of Hip/Knee Joint Degeneration Using Sign and Symptom Diagnoses

The last step in grouping non-anchor records to Hip/Knee Joint Degeneration and other episodes involves processing non-anchor records with only sign and symptom diagnosis codes. All sign and symptom diagnosis codes for Hip/Knee Joint Degeneration are listed within the S5_HipKneeReplacement_DataDictionary on worksheet "IncidentalDxCodes" where column "specificity"="Sign and Symptom". An example is Swelling of limb (ICD-9 diagnosis code 729.81).

For these non-anchor records with eligibility to a Hip/Knee Joint Degeneration episode, apply the following steps to assign the record to an episode.

Step 3B1 -If the non-anchor record is only eligible for the open Hip/Knee Joint Degeneration episode, group the record to the Hip/Knee Joint Degeneration episode.

Step 3B2 - If the anchor record is eligible for the Hip/Knee Joint Degeneration episode and another episode for the patient, apply the following tie-breaking steps to determine the episode the record groups to:

-If the non-anchor record has more than one sign and symptom diagnosis and those diagnoses have clinical relationships with more than one episode, then use the strength of association of the procedure code for the record to determine the episode that the record groups to.

-If the strength of relationship between the procedure code and the different episode conditions is the same for the sign and symptom diagnoses, then the strength of the association of the diagnosis codes themselves are used to determine the grouping of the non-anchor record. As discussed in Step 1D, strength of association between diagnosis codes and conditions are described as primary or incidental. For sign and symptom diagnoses, incidental relationships between diagnosis codes and episode conditions have precedence over primary relationships.

-If the strength of the relationship between the sign and symptom diagnosis codes and the episode conditions is the same, the time between the non-anchor record and the closest anchor for the open episode is used.

Step 3C: Group Pharmacy Records to an Episode of Hip/Knee Joint Degeneration

Pharmacy services group differently than other non-anchor records because they usually do not have ICD-9 diagnosis codes associated with them to use in grouping. Instead, pharmacy records are assigned to Hip/Knee Replacement and other episodes using a table that maps NDC to a DCC code (Drug Category Code) based on the drug's active ingredients and route of administration. A DCC to ETG map is then used to inform the grouping for the service. The relationship between DCC codes and Hip/Knee Joint Degeneration are described in the "Pharmacy" worksheet in the attachment "S5_HipKneeReplacement_DataDictionary". In some instances a DCC code may be eligible for Hip/Knee Joint Degeneration and another open episode for a patient. In these cases, where multiple episodes are observed for a patient where the DCC code has eligibility, use the strength of the clinical relationship between the DCC code and the episode to determine final assignment. The column "Rank" in the "Pharmacy" worksheet within attachment "S5_HipKneeReplacement_DataDictionary" describes that strength of association. The lower the value is for Rank, the stronger the association between the DCC and the episode.

Due to the size of the attachment the full list of NDC to DCC mappings has not been provided within this submission. This file is available upon request. The DCC mappings included in the S5 attachment provide a summary of the key clinical relationships between drugs and the conditions described by the relevant ETGs. The NDC to DCC map would include the individual NDCs within a DCC that map to those relationships.

At the completion of Step 3C, all relevant records for Hip/Knee Joint Degeneration episodes have been assigned.

After the ETG grouping step, the PEG procedure episode methodology is applied. The following section of this specification details the steps used to create procedure episodes for Hip/Knee Replacement. These steps are executed after the completion of the 3 steps outlined for ETG episode creation detailed above.

Step 1: Identify Trigger Procedures that Signal the Presence of a Procedure Episode of Hip/Knee Replacement

PEG episodes are initiated by procedures, called "triggers" that are performed by a clinician as treatment for a condition. Identification of trigger records for PEG relies upon medical service encounters and claims.

-- Determine if the procedure qualifies as a trigger based upon the ETG assigned to the claim for the procedure. Note that the claim for the procedure must be assigned to a clinically relevant ETG to qualify as an eligible procedure for a PEG trigger. A Knee Replacement trigger must be ETG 712202 (Joint Degeneration – Knee) and a Hip Replacement trigger must be ETG 712203 (Joint Degeneration – Hip). This approach provides the diagnostic link between the procedure and the conditions related to the hip or knee replacement. The "ProceduretoTrigger" worksheet within the attachment "S5_HipKneeReplacement_DataDictionary" provides a listing of the CPT procedure codes that qualify as triggers for hip and knee replacements. Further, certain procedure code modifiers will result in a procedure code not being considered as a trigger. For example, the procedure code modifier "AA" indicates an anesthesia service when assigned to a claim record. These procedure code modifiers are listed in the "ModifiersExcludeTriggers" worksheet within the attachment "S5_HipKneeReplacement_DataDictionary"

--Once an eligible procedure is identified as a trigger, assign the PEG Trigger Category (Hip Replacement or Knee Replacement).

Step 2: Gather Medical and Pharmacy Services to Episodes

Once a PEG trigger is identified pre- and post-procedure search windows are used to gather claims to the episode. These windows are created using a defined number of days before and after the procedure and are segmented into "close" and "further" periods. The "close" timeframe is close to the date of the anchor procedure while the further timeframes extend much longer. These

timeframes are specific to the PEG Trigger Category. The pre-close period for Hip/Knee Replacement is 14 days; the post-close period is 42 days. The pre-further period for Hip/Knee Replacement is 90 days; the post-further period is 180 days.

-- Examine the temporal proximity of the claim to the trigger procedure to determine if the claim occurs in the close or further search timeframes

-- If the service occurs within the close timeframe compare the ETG assigned to the service to the list of ETGs defined by PEG as being related to the procedure anchor category. If a match is found, assign the service to the episode. For Knee Replacement the ETG assigned to the service must be 712202 (Joint Degeneration – Knee) to be assigned to the procedure episode. For Hip Replacement the ETG assigned to the service must be 712203 (Joint Degeneration – Hip) to be assigned to the procedure episode.

-- If the service occurs within the further timeframe assess whether the service is a “target procedure” for the procedure anchor category. If a match is found, assign the service to the episode. (Notice that the logic for gathering services to a procedure episode differs based on the timing window. For the close timeframe, the ETG results help determine services that group. For the further time window, the service also has to have a procedure code that matches the target list for Hip and Knee Replacement episodes.) The “ProceduretoTargettoAnchor” worksheet within the attachment “S5_HipKneeReplacement_DataDictionary” provides a listing of the procedure codes that are used for each target that maps to a Hip or Knee Replacement. Note that a separate list for each PEG category.

Once Step 2 is complete all claims have been assigned to the appropriate episodes and the procedure episode is determined to be either complete or incomplete.

Step 3: Finalize the Episodes (identification of laterality, and identification of the primary surgeon most responsible for care)

Finalizing a PEG episode consists of 3 sub-steps:

Step 3A: Assign Laterality (when applicable)

Certain surgical procedures, such as Hip or Knee Replacement, can be performed on either side of the anatomy. Flag these episodes accordingly and also capture whether or not the procedure is performed bilaterally during the same episode.

-- Assign a flag to a procedure episode to indicate the laterality of the trigger procedure. If the procedure code modifier on the trigger service record is LT (Left Side) or RT (Right Side) then assign the laterality flag.

-- Assign a flag to the episode to indicate whether or not the trigger procedure reflects bilateralism. If the procedure code modifier on the trigger service record is 50 (Bilateral) then assign the bilateral flag.

Step 3B: Assign Combined Status

--If two different triggers occur on the same day then the episode is said to be combined. For Hip/Knee Replacement procedure episodes there would need to be a trigger for both Hip and Knee for the combined status flag to be assigned.

Step 3C: Assign Responsible Provider

-- The responsible provider assigned for a procedure episode of either Hip or Knee Replacement is the provider on the trigger record.

At the completion of Step 3C for PEG, all relevant records for Hip/Knee Replacement procedure episodes have been assigned.

S.8.3. Evidence to Support Clinical Logic Described in S.8.2 *Describe the rationale, citing evidence to support the grouping of clinical conditions in the measurement population(s) and the intent of the measure (as described in IM3)*

S.8.3a. CLINICAL LOGIC ATTACHMENT or URL: If needed, attach supplemental documentation (Save file as: S_8_3a_Clinical_Logic). All fields of the submission form that are supplemented within the attachment must include a summary of important information included in the attachment and its intended purpose, including any references to page numbers, tables, text, etc.

URL:

Please supply the username and password:

Attachment:

S.8.4. Measure Trigger and End mechanisms *(Detail the measure's trigger and end mechanisms and provide rationale for this methodology)*

As described in detail in S8, an ETG episode is triggered by an anchor record. This is a claim record with a procedure indicating a face to face physician encounter, a surgical procedure by a physician or a facility charge indicating a confinement. The rationale for this is that the diagnosis and procedure codes on these record types are most likely to specify a valid clinical condition related to the individual. The length of the episode will depend on the subsequent records that occur within the ETGs clean period. When there is

an interval longer than the clean period of the episode without any records eligible to group to the episode, it is considered complete.

As described in detail in S8, PEG episodes are initiated by procedures, called “triggers” that are performed by a clinician as treatment for a condition. Identification of trigger records for PEG relies upon medical service encounters and claims. The following steps are used:

-- Determine if the procedure qualifies as a trigger based upon the ETG assigned to the claim for the procedure. Note that the claim for the procedure must be assigned to a clinically relevant ETG to qualify as an eligible procedure for a PEG trigger. A Knee Replacement trigger must be ETG 712202 (Joint Degeneration – Knee) and a Hip Replacement trigger must be ETG 712203 (Joint Degeneration – Hip). This approach provides the diagnostic link between the procedure and the conditions related to the hip or knee replacement.

Once a PEG trigger is identified pre- and post-procedure search windows are used to gather claims to the episode. These windows are created using a defined number of days before and after the procedure and are segmented into “close” and “further” periods. The “close” timeframe is close to the date of the anchor procedure while the further timeframes extend much longer. These timeframes are specific to the PEG Trigger Category. The pre-close period for Hip/Knee Replacement is 14 days; the post-close period is 42 days. The pre-further period for Hip/Knee Replacement is 90 days; the post-further period is 180 days.

As a result of this time-window logic, the trigger date for a Hip Replacement or Knee Replacement episode is the date of service for the trigger procedure for the episode (the replacement procedure itself). The begin date is 90 days before the trigger date. The end date is 180 days after the trigger date.

For more information about episode building construction/logic, please refer to S8 and the attachment we provided in s.2 .

S.8.5. Clinical severity levels *(Detail the method used for assigning severity level and provide rationale for this methodology)*

The Hip and Knee Replacement episodes described for the submitted measures employ a further methodology to assign each episode to a level of severity or risk. In particular, the methodology uses the MS-DRG assigned to the inpatient stay where the joint replacement was performed. Each episode is mapped to a severity level based on the assigned MS-DRG. The mapping from MS-DRG to severity level is shown in tab “MSDRGSeverity” in the workbook “S5_HipKneeReplacement_DataDictionary”. For example, for a patient with a Knee Replacement where the inpatient stay was assigned to MS-DRG 469, “Major Joint Replacement or Reattachment of Lower Extremity with MCC”, the episode would be assigned a severity level of 3, reflecting the additional expected costs of the major complications and co-morbidities observed and captured by the MS-DRG methodology.

In terms of rationale for the choice of MS-DRG as the determinant of severity level, review of the cost information for Hip and Knee Replacement episodes shows that the facility cost of the inpatient stay represents more than 70% of the total cost of the episode. Further, including the professional and other services that occur while the patient is in the hospital for the joint replacement comprise more than 80% of the total episode cost. MS-DRG was designed to support prospective payment for the inpatient facility component of an inpatient stay, including for major joint procedures such as a hip and knee replacement. The MS-DRG categorizations have been shown to correlate with the costs of an inpatient stay, in a manner that is consistent with the mapping shown in the MSDRGSeverity tab referenced above. There is also a precedent with other organizations using MS-DRG as a component of measuring the severity of a knee or hip replacement episode (e.g., IHA in California, based on clinical input from advisors).

S.8.6. Comorbid and interactions *(Detail the treatment of co-morbidities and disease interactions and provide rationale for this methodology.)*

The comorbid and disease interactions are described in S8.5 to support the assignment of Clinical Severity Levels to each procedure episode.

Adjustments for Comparability

S.9.1. Inclusion and Exclusion Criteria *Detail initial inclusion/exclusion criteria and data preparation steps (related to clinical exclusions, claim-line or other data quality, data validation, e.g. truncation or removal of low or high dollar claim, exclusion of ESRD patients)*

:

In creating Hip/Knee Replacements episodes of care and procedures, ETG and PEG include all claims for initial processing provided the input format is correct and required fields are provided (refer to section S6.1 for data preparation details and considerations). The ETG and PEG methodologies do not truncate or eliminate service records based on any cost or other criteria. The identification of financial cost outliers, non-standard diagnosis or procedural coding and other invalid information at the service level is performed by the organization preparing the input data. As noted in S6.1, financial amounts on individual service records should be validated prior to their use in measurement.

In terms of resource use measure construction following ETG and PEG grouping, no additional data inclusion criteria are applied. Only Hip/Knee Replacement episodes are included in the measurement of Hip/Knee Replacement episode-based resource use, including the individual services that ETG and PEG group to those episodes. As noted below in section 6.3, it is recommended that episodes classified as incomplete be excluded from resource measurement and outlier episodes be treated appropriately. As described in the submission for S6.2, for the application of ETG and PEG episode logic for Hip/Knee Replacement, ETG and PEG accept all claims for initial processing provided the input format is correct and required fields are provided (refer to section S6.1 for data preparation details and considerations). The ETG and PEG methodologies do not truncate or eliminate service records based on any cost or other criteria. The identification of financial cost outliers, non-standard diagnosis or procedural coding and other invalid information at the service level is performed by the organization preparing the input data. As noted in S6.1, financial amounts on individual service records should be validated prior to their use in measurement.

Organizations using the resulting episodes in measurement should consider high or low cost outliers at the episode level. Although this is not the same as detailed service level data exclusions, inappropriately high individual claims or mispriced claims, in general, will impact the outlier treatment of the Hip/Knee Replacement episodes the claim is grouped to.

In terms of resource use measure construction following ETG and PEG grouping, no additional data exclusion criteria are applied. Only Hip/Knee Replacement episodes are included in the measurement of Hip/Knee Replacement episode-based resource use, including the individual services that ETG and PEG group to those episodes. It is recommended that incomplete episodes be excluded from resource measurement and outlier episodes be treated appropriately.

S.9.2. Risk Adjustment Type (Select type)

If other:

S.9.3. Stratification Details/Variables *(All information required to stratify the measure results including the stratification variables, definitions, specific data collection items/responses, code/value sets)*

The methods described in this submission describe how, for a given episode, a severity level is assigned. The severity level can then be used to stratify episodes by severity, measured as resource consumption.)

S.9.4 Costing method

Detail the costing method including the source of cost information, steps to capture, apply or estimate cost information, and provide rationale for this methodology.

Other

The financial amounts used should be complete and valid, reflecting the total payments related to the service. The financial amount used in resource measurement should reflect all payments for a service, including those made to the provider by payer, patient and other entities. The allowed or equivalent payment is an example. The use of allowed payments provides the best estimate of the actual costs involved in delivering the medical and pharmacy services included in the measure. Allowed payments will reflect both the quantity of different services provided as well as the actual unit price of those same services. Allowed amounts are used extensively in the industry as a measure of cost of care, including comparison of physicians and delivery systems.

S.10. Type of score *(Select the most relevant):*

Continuous variable

Count

Rate/Proportion

Ratio
Attachment
If other:
Attachment:

S.11. Interpretation of Score *(Classifies interpretation of a ratio score(s) according to whether higher or lower resource use amounts is associated with a higher score, a lower score, a score falling within a defined interval, or a passing score, etc.)*

The measures described in this submission include continuous cost measures, counts of utilization, rates and proportions (per episode), and the ratio of observed to expected results, based on risk adjusted comparisons.

For the continuous cost per episode measures (also a rate), an increase in costs can be interpreted as an increase in the resources used to diagnose, manage and treat the episodes in question. This score provides a representation of the weighted utilization expended, where the weights are based on the cost assigned to each individual service.

For the counts of utilization measures per 1,000 episodes (also a rate), an increase in utilization can be interpreted as an increase in the resources used to diagnose, manage and treat the episodes in question. This score provides a representation of un-weighted utilization. Counts of utilization measures are most useful when the services being aggregated are similar (e.g., inpatient admits, E&M visits, MRI services).

The risk adjusted observed to expected cost or utilization ratio (O/E ratio) includes three important steps:

-- Compute the observed experience for the provider being measured, across all episodes to be included in the comparison;

-- Compute the experience for peers or a best practice benchmark. Compute this experience at the level of the risk adjustment, in this case base procedure and severity level. For a peers benchmark, average cost per episode across all peers for the base procedure and episode level can be computed;

-- Compare the observed experience with the risk adjusted peers or benchmark experience – often called the “expected” result. This expected result is adjusted to reflect both the peers/benchmark levels of performance and also the provider’s own case mix of episodes by condition and level of severity. The ratio of observed to expected results can be termed the relative cost ratio and is a risk adjusted measure.

The O/E ratio (relative resource use ratio) can be interpreted based on its magnitude and relationship to a peer average or other guidelines. A relative cost ratio less than 1.00 indicates that the observed resource use per episode for a provider is less than his peers. A relative cost ratio greater than 1.00 indicates that the observed resource use per episode for a provider is greater than his risk adjusted peers.

S.12. Detail Score Estimation *(Detail steps to estimate measure score.)*

The measures described in this submission include continuous cost measures, counts of utilization, rates and proportions (per episode), and the ratio of observed to expected results, based on risk adjusted comparisons. The continuous cost measures, counts of utilization, and rates per episode are described in detail in S9.5. The details involved in computing the O/E ratio measure is provided in S10.1.

Reporting Guidelines

This section is optional and will be available for users of the measure as guidance for implementation and reporting.

S.13.1. Describe discriminating results approach

Detail methods for discriminating differences (reporting with descriptive statistics--e.g., distribution, confidence intervals).

In all of these measures we end up with an O/E ratio for a provider. In order to determine the statistical accuracy of this measure we start by measuring the variance of this metric:

$Var(O/E)$

The Variance of this metric has been estimated by the following expression in a number of journal articles :

$Var(O/E) = \frac{\sum Var(O_i)}{[\sum(E_i)]^2}$

Where $Var(O_i)$ is the variance for each of the physician’s episodes across all episodes in it’s statistical unit for the peer group.

Then the standard error (SE) for this measurement is $\sqrt{Var(O/E)}$.

Finally, a 95% confidence interval could be calculated by:

$(O/E - 1.96 * SE, O/E + 1.96 * SE)$

Alternatively, a 90% confidence interval could be calculated by: $(O/E - 1.64 * SE, O/E + 1.64 * SE)$

Adams et al. BMC Health Services Research 2010, 10:57 <http://www.biomedcentral.com/1472-6963/10/57>

S.13.2. Detail attribution approach

Detail the attribution rules used for attributing resources/costs to providers (e.g., a proportion of total measure cost or frequency of visits during the measure's measurement period) and provide rationale for this methodology.

The attribution of hip and knee procedure episodes is relatively straightforward. For physician measurement, the primary surgeon is typically attributed the episode, although applications of attribution could be developed to support an attribution method for the responsible facility.

The provider responsible for the anchor procedure (The surgical CPT code for Hip or Knee Replacement) is attributed Knee and Hip replacement episodes. If there is more than one anchor claim then a tie breaking system is used to determine the attributed provider. First, the provider with a higher ranking specialty for the procedure episode will be attributed the episode. For example, for hip and knee replacement, an orthopedic surgeon would have a higher rank than a general surgeon. Second, the provider with the highest cost across their anchor claims is chosen as the responsible provider.

Note: claims with CPT codes that map to Hip or Knee replacement are not allowed to be anchor records if they have disqualifying procedure code modifiers (like assistant surgeon or anesthesia) or disqualifying ETG grouping.

The vast majority of episodes have a single anchor record making attribution obvious.

S.13.3. Identify and define peer group

Identify the peer group and detail how peer group is identified and provide rationale for this methodology.

Peer groups define the group of physicians being compared. For example, a common practice in physician episode measurement is to assess the actual costs for those episodes attributed to an individual physician or practice and compare actual costs to peer results, risk adjusted to support more valid comparisons. The peer values use in these comparisons will be influenced by the selection of providers included in the peer group.

In defining a peer group for cost of care measurement, most organizations will include physicians from the same specialty or area of expertise. For organizations with a network covering broad geographic area, some distinction by provider geography can also be used. Internal medicine, cardiology, or general surgery within a certain geographic area are examples of a peer group. Although not directly related to defining a group of providers as peers, many organizations provide separate measurements by line of business, separating results and peer comparisons by commercial, Medicare and Medicaid products.

S.13.4. Sample size

Detail the sample size requirements for reporting measure results.

The choice of sample size is less important using techniques that include statistical methods that find only statistically significant difference. If your choice of sample size is low, you will not find many cases that are statistically significantly different. A sample size of 30 is chosen because this is when the normal distribution is a good approximation of the student's t distribution. However, the choice of sample size is less critical when using tests of statistical significance.

S.13.5. Define benchmarking and comparative estimates

Detail steps to produce benchmarking and comparative estimates and provide rationale for this methodology.

The response to section S10.1 includes examples on how to compare the results for a physician with that of their peers or with external best practice benchmarks. As a guideline, in making comparative estimates, the following considerations should be made:

- As described in S10.1, comparative results should be risk adjusted to support more valid comparisons;
- Differences in fee schedules and contracts – for some comparisons using cost of care, differences between actual practice and the benchmark can be influenced by different unit pricing assumptions. In these cases standard pricing or general adjustments to cost levels can be made; and
- Practice styles and service utilization can differ between geographic areas and also between physicians in different specialties. Although comparisons across areas and specialties can provide insights, proper care should be taken in interpreting and communicating results.

Validity – See attached Measure Testing Submission Form

SA.1. Attach measure testing form

Feasibility

F.1. Byproduct of Care Processes

For clinical measures, the required data elements are routinely generated and used during care delivery (e.g., blood pressure, lab test, diagnosis, medication order).

F.1.1. Data Elements Generated as Byproduct of Care Processes.

Generated by and used by healthcare personnel during the provision of care, e.g., blood pressure, lab value, medical condition
Coded by someone other than person obtaining original information (e.g., DRG, ICD-9 codes on claims)

If other:

F.2. Electronic Sources

The required data elements are available in electronic health records or other electronic sources. If the required data are not in electronic health records or existing electronic sources, a credible, near-term path to electronic collection is specified.

F.2.1. To what extent are the specified data elements available electronically in defined fields (*i.e., data elements that are needed to compute the performance measure score are in defined, computer-readable fields*)

[ALL data elements are in defined fields in electronic claims](#)

F.2.1a. If ALL the data elements needed to compute the performance measure score are not from electronic sources, specify a credible, near-term path to electronic capture, OR provide a rationale for using other than electronic sources.

F.2.2. If this is an eMeasure, provide a summary of the feasibility assessment in an attached file or make available at a measure-specific URL.

Attachment:

F.3. Data Collection Strategy

Demonstration that the data collection strategy (e.g., source, timing, frequency, sampling, patient confidentiality, costs associated with fees/licensing of proprietary measures) can be implemented (e.g., already in operational use, or testing demonstrates that it is ready to put into operational use). For eMeasures, a feasibility assessment addresses the data elements and measure logic and demonstrates the eMeasure can be implemented or feasibility concerns can be adequately addressed.

F.3.1. Describe what you have learned/modified as a result of testing and/or operational use of the measure regarding data collection, availability of data, missing data, timing and frequency of data collection, sampling, patient confidentiality, time and cost of data collection, other feasibility/implementation issues.

[The measure is in use beyond internal QI. Please see the section on Usability.](#)

F.3.2. Describe any fees, licensing, or other requirements to use any aspect of the measure as specified (e.g., value/code set, risk model, programming code, and algorithm)?

F.3.3. If there are any fees associated with the use of this measure as specified, attach the fee schedule here. (Save file as: F3_3_FeeSchedule)

Usability and Use

Extent to which intended audiences (e.g., consumers, purchasers, providers, policy makers) can understand the results of the measure and are likely to find them useful for decision making.

NQF-endorsed measures are expected to be used in at least one accountability application within 3 years and publicly reported within 6 years of initial endorsement in addition to performance improvement.

U.1.1. Current and Planned Use

Specific Plan for Use	Current Use (for current use provide URL)
Public Reporting	
Payment Program	
Quality Improvement (Internal to the specific organization)	

U.1.2. For each CURRENT use, checked above, provide:

- Name of program and sponsor
- Purpose
- Geographic area and number and percentage of accountable entities and patients included

U.1.3. If not currently publicly reported OR used in at least one other accountability application (e.g., payment program, certification, licensing) what are the reasons? (e.g., Do policies or actions of the developer/steward or accountable entities restrict access to performance results or impede implementation?)

U.1.4. If not currently publicly reported OR used in at least one other accountability application, provide a credible plan for implementation within the expected timeframes -- any accountability application within 3 years and publicly reported within 6 years of initial endorsement. (Credible plan includes the specific program, purpose, intended audience, and timeline for implementing the measure within the specified timeframes. A plan for accountability applications addresses mechanisms for data aggregation and reporting.)

U.2.1.1. Describe how performance results, data, and assistance with interpretation have been provided to those being measured or other users during development or implementation. How many and which types of measured entities and/or others were included? If only a sample of measured entities were included, describe the full population and how the sample was selected.

U.2.1.2. Describe the process(es) involved, including when/how often results were provided, what data were provided, what educational/explanatory efforts were made, etc.

U.2.2.1. Summarize the feedback on measure performance and implementation from the measured entities and others described in 4d.1. Describe how feedback was obtained.

U.2.2.2. Summarize the feedback obtained from those being measured.

U.2.2.3. Summarize the feedback obtained from other users.

U.2.3. Describe how the feedback described in 4a2.2 has been considered when developing or revising the measure specifications

or implementation, including whether the measure was modified and why or why not

U.3.1. Progress on Improvement. (Not required for initial endorsement unless available.) Performance results on this measure (current and over time) should be provided in IM.1.2 and IM.1.4.

Discuss:

- Purpose Progress (trends in performance results)
- Geographic area and number and percentage of accountable entities and patients included

U.3.2. If no improvement was demonstrated, what are the reasons? If not in use for performance improvement at the time of initial endorsement, provide a credible rationale that describes how the performance results could be used to further the goal of high-quality, efficient healthcare for individuals or populations.

U.4.1. Please explain any unexpected findings (positive or negative) during implementation of this measure including unintended impacts on patients.

U.4.2. Please explain any unexpected benefits from implementation of this measure.

Related or Competing Measures

If a measure meets the above criteria and there are endorsed or new related measures (either the same measure focus or the same target population) or competing measures (both the same measure focus and the same target population), the measures are compared to address harmonization and/or selection of the best measure.

H.1. Relation to Other NQF-endorsed Measures

If there are related measures (conceptually, either same measure focus or target population) or competing measures (conceptually both the same measure focus and same target population)? If yes, list the NQF # and title of all related and/or competing measures.

H.1.1. List of related or competing measures (selected from NQF-endorsed measures)

H.1.2. If related or competing measures are not NQF endorsed please indicate measure title and steward.

H.2. Harmonization

H.2.1. If this measure conceptually addresses EITHER the same measure focus OR the same target population as NQF-endorsed measure(s):

Are the measure specifications completely harmonized?

H.2.2. If the measure specifications are not completely harmonized, identify the differences, rationale, and impact on interpretability and data collection burden.

H.3. Competing Measure(s)

H.3.1. If this measure conceptually addresses both the same measure focus and the same target population as NQF-endorsed measure(s):

Describe why this measure is superior to competing measures (e.g., a more valid or efficient way to measure quality); OR provide a rationale for the additive value of endorsing an additional measure. (Provide analyses when possible.)

Contact Information
Co.1 Measure Steward (Intellectual Property Owner): Optum Co.2 Point of Contact: Steven, Pranke , steve.prnake@optum.com , 801-982-3415- Co.3 Measure Developer if different from Measure Steward: Ingenix Co.4 Point of Contact: Dan, Dunn , daniel.dunn@ingenixconsulting.com , 781-419-8425-
Additional Information
Ad.1 Workgroup/Expert Panel involved in measure development List the workgroup/panel members' names and organizations. Describe the members' role in measure development.
Measure Developer/Steward Updates and Ongoing Maintenance Ad.2 Year the measure was first released: Ad.3 Month and Year of most recent revision: Ad.4 What is your frequency for review/update of this measure? Ad.5 When is the next scheduled review/update for this measure?
Ad.6 Copyright statement: Information submitted is confidential/proprietary to Ingenix, copyright 2011 Ad.7 Disclaimers:
Ad.8 Additional Information/Comments: