

NATIONAL QUALITY FORUM

Resource Use Measure Evaluation 1.0 January 2011

This form contains the measure information submitted by stewards. Blank fields indicate no information was provided. Attachments also may have been submitted and are provided to reviewers. The subcriteria and most of the footnotes from the evaluation criteria are provided in Word comments within the form and will appear if your cursor is over the highlighted area. Hyperlinks to the evaluation criteria and ratings are provided in each section.

Resource Use Definition:

- Resource use measures are broadly applicable and comparable measures of input counts—(in terms of units or dollars)-- applied to a population or population sample
- Resource use measures count the frequency of specific resources; these resource units may be monetized, as appropriate.
- The approach to monetizing resource use varies and often depends on the perspective of the measurer and those being measured. Monetizing resource use allows for the aggregation across resources.

NQF Staff: NQF staff will complete a preliminary review of the measure to ensure conditions are met and the form has been completed according to the developer's intent. Staff comments have been highlighted in green.

TAP/Workgroup (if utilized): Complete all yellow highlighted areas of the form. Evaluate the extent to which each subcriterion is met. Based on your evaluation, summarize the strengths and weaknesses in each section.

Note: If there is no TAP or workgroup, the SC also evaluates the subcriteria (yellow highlighted areas).

Steering Committee: Complete all pink highlighted areas of the form. Review the workgroup/TAP assessment of the subcriteria, noting any areas of disagreement; then evaluate the extent to which each major criterion is met; and finally, indicate your recommendation for the endorsement. Provide the rationale for your ratings.

Evaluation ratings of the extent to which the subcriteria are met (TAP or Steering Committee)

High (H) - based on the information submitted, there is high confidence (or certainty) that the criterion is met

Moderate (M) - based on the information submitted, there is moderate confidence (or certainty) that the criterion is met

Low (L) - based on the information submitted, there is low confidence (or certainty) that the criterion is met

Insufficient (I) - there is insufficient information submitted to evaluate whether the criterion is met, e.g., blank, incomplete, or information is not relevant, responsive, or specific to the particular question (unacceptable)

Not Applicable (NA) - Not applicable (only an option for a few subcriteria as indicated)

Evaluation ratings of whether the measure met the overall criterion (Steering Committee)

Yes (Y)- The overall criteria has been met

No (N)-The overall criterion has NOT been met

High (H) - There is high confidence (or certainty) that the criterion is met

Moderate (M) - There is moderate confidence (or certainty) that the criterion is met

Low (L) - There is low confidence (or certainty) that the criterion is met

Recommendations for endorsement (Steering Committee)

Yes (Y) - The measure should be recommended for endorsement

No (N)-The measure should NOT be recommended for endorsement

Abstain (A)- Abstain from voting to recommend the measure

TAP/Workgroup Reviewer Name:

Steering Committee Reviewer Name:

Staff Reviewer Name(s):

NQF Review #: 1609 NQF Project: Endorsing Resource Use Standards- Phase II

BRIEF MEASURE INFORMATION

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

Measure Steward (IP Owner): Ingenix, 950 Winter Street, Suite 3800, Waltham, Massachusetts, 02154

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).

Resource use service categories: 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

Brief description of measure clinical logic: 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.

If included in a composite or paired with another measure, please identify composite or paired measure:

Subject/ Topic Areas: Musculoskeletal : Joint Surgery

Type of resource use measure: Cost/Resource Use
Data Type: Administrative claims Other

CONDITIONS FOR CONSIDERATION BY NQF	
Four conditions must be met before proposed measures may be considered and evaluated for suitability as voluntary consensus standards:	NQF Staff
<p>A. Measure Steward Agreement. <i>The measure is in the public domain or an intellectual property (measure steward agreement) is signed. Public domain only applies to governmental organizations. All non-government organizations must sign a measure steward agreement even if measures are made publicly and freely available.</i></p> <p>A.1. Do you attest that the measure steward holds intellectual property rights to the measure? (If no, do not submit)</p> <p>Yes</p> <p>A.2. Please check if either of the following apply:</p> <p>Proprietary measure</p> <p>A.3. Measure Steward Agreement.</p> <p>Agreement signed and submitted</p> <p>A.4. Measure Steward Agreement attached:</p> <p>NQF Resource Use Addendum FINAL-634370831064566863.pdf</p>	<p>A</p> <p>Y <input type="checkbox"/> N <input type="checkbox"/></p>
<p>B. Maintenance. <i>The measure owner/steward verifies there is an identified responsible entity and process to maintain and update the measure on a schedule that is commensurate with the rate of clinical innovation, but at least every 3 years. (If no, do not submit)</i></p> <p>Yes, information provided in contact section</p>	<p>B</p> <p>Y <input type="checkbox"/> N <input type="checkbox"/></p>
<p>C. Purpose/ Use (All the purposes and/or uses for which the measure is specified and tested:</p> <p>Payment Program Public Reporting Quality Improvement (Internal to the specific organization) Quality Improvement with Benchmarking (external benchmarking to multiple organizations)</p>	<p>C</p> <p>Y <input type="checkbox"/> N <input type="checkbox"/></p>
<p>D. Testing. <i>The measure is fully specified and tested for reliability <u>and</u> validity (See guidance on measure testing).</i></p> <p>Yes, reliability and validity testing completed</p>	<p>D</p> <p>Y <input type="checkbox"/> N <input type="checkbox"/></p>
<p>E. Harmonization and Competing Measures. <i>Have NQF-endorsed measures been reviewed to identify if there are related or competing measures? (List the NQF # and title in the section on related and competing measures)</i></p> <p>Yes</p> <p>E.1. Do you attest that measure harmonization issues with related measure (either the same measure</p>	<p>E</p> <p>Y <input type="checkbox"/> N <input type="checkbox"/></p>

<p>focus or the same target population) have been considered and addresses as appropriate? (List the NQF # and title in the section on related and competing measures)</p> <p>Yes</p> <p><i>E.2. Do you attest that competing measures (both the same measure focus and the same target population) have been considered and addressed where appropriate? Yes</i></p>	
<p>F. Submission Complete. <i>The requested measure submission information is complete and responsive to the questions so that all the information needed to evaluate all criteria is provided.</i></p>	<p>F</p> <p>Y <input type="checkbox"/></p> <p>N <input type="checkbox"/></p>
<p>Have all conditions for consideration been met? Staff Notes to Steward (if submission returned):</p>	<p>Y <input type="checkbox"/></p> <p>N <input type="checkbox"/></p>
<p>Staff Notes to Reviewers (issues or questions regarding any criteria):</p>	
<p>File Attachments Related to Measure/Criteria:</p> <p>Attachment: ETG_PEG Construct Logic.doc</p> <p>Attachment: S5_jointDegenerationHipKnee 052311.xls</p> <p>Attachment:</p> <p>Attachment: S6_DataProtocol-634417561306970710.xls</p> <p>Attachment: S7 2_Data Source Reference.xls</p> <p>Attachment:</p> <p>Attachment:</p> <p>Attachment: S9 7_RU_Categories dd.xls</p> <p>Attachment: S10_Risk Adjustment Method Example-634417568824864783.xls</p> <p>S12_sample_score_report_EPI-634417569213768544.pdf</p> <p>Attachment:</p>	

IMPORTANCE TO MEASURE AND REPORT	
<p>Extent to which the specific measure focus is important to making significant gains in health care quality (safety, timeliness, effectiveness, efficiency, equity, patient-centeredness) and improving health outcomes for a specific high impact aspect of healthcare where there is variation in performance.</p>	
<p>Importance to Measure and Report is a threshold criterion that must be met in order to recommend a measure for endorsement. All subcriteria must be met to pass this criterion.</p>	<p>Eval Rating</p>
<p>High Impact</p> <p>IM1. Demonstrated high impact aspect of healthcare:</p> <p>Affects large numbers</p> <p>Frequently performed procedure</p> <p>High resource use</p> <p>IM1.1. Summary of evidence of high impact:</p> <p>Osteoarthritis (OA) is a disease characterized by degeneration of cartilage and its underlying bone within a joint. The breakdown of these tissues eventually leads to pain and joint stiffness. The joints most commonly affected are the knees, hips, and those in the hands and spine. Disease onset is gradual and usually begins after the age of 40. There is currently no cure for OA.</p> <p>The prevalence per 100 persons of symptomatic OA of the knee among adults aged 60+ years is 12.1% (13.6% female; 10.0% male) (3) and 16% among adults aged 45+ years (18.7% female; 13.5% male). (4) (Data from Framingham OA Study reports similar rates - Knee = 6.1% all adults > age 30 (5) and 9.5% for age 63-96 (11.4 female; 6.8 male) (5)).</p> <p>The prevalence per 100 persons of symptomatic OA of the hip = 4.4% among adults = 55 years of age (3.6% female;</p>	<p>1a</p> <p>H <input type="checkbox"/></p> <p>M <input type="checkbox"/></p> <p>L <input type="checkbox"/></p> <p>I <input type="checkbox"/></p>

5.5% male) (2)

OA accounts for 55% of all arthritis-related hospitalizations; 409,000 hospitalizations for OA as principal diagnosis in 1997 (6), and knee and hip joint replacement procedures accounted for 35% of total arthritis-related procedures during hospitalization. (8) From 1990 to 2000 the age-adjusted rate of total knee replacements in Wisconsin increased 81.5% (162 to 294 per 100,000). (7) Rates increased most among youngest age group (45–49 years). (7) Costs doubled from \$69.4 million to \$148 million dollars. Nationwide, the estimated costs of knee and hip replacements in 1997 was \$7.9 billion. (6)

Analyses of the Ingenix healthcare benchmark data for a large population of individuals can support an understanding of the importance of Hip/Knee Joint Degeneration and the measurement of resource use. Using a 12-month sample population of more than 7 million individuals (primarily non-elderly) from 9 health care organizations, patients with Hip/Knee Joint Degeneration were identified using diagnosis codes assigned to medical administrative claim records. Data from this population for Joint Degeneration episodes can further support an understanding of the relative financial importance of resource use measures for the condition. As shown below, across all physician episodes, the average total cost per episode for Joint Degeneration – Knee is more than \$27,000. Specialty and Hospital Services comprise the largest component of costs for these episodes.

Joint Degeneration - Knee

of Episodes 18,771

Cost per Episode:

Total Cost per Episode	\$27,883	
Primary Care Core Cost per Episode		\$30
Specialty Care Cost per Episode	\$7,375	
ER Cost per Episode	\$18	
Radiology Cost per Episode	\$204	
Pharmacy Cost per Episode	\$223	
Laboratory Cost per Episode	\$115	
Hospital Services Cost per Episode	\$19,919	

Utilization per 1,000 Episodes:

Radiology Encounters per 1000 Episodes	3,065
Laboratory Encounters per 1000 Episodes	1,790
ER Visits per 1000 Episodes	28
Admission Days per 1000 Episodes	2,016
Number of Admissions per 1000 Episodes	1,363
Number of Prescriptions per 1000 Episodes	3,575

Across all physician episodes, the average total cost per episode for Joint Degeneration – Hip is more than \$25,000. Specialty and Hospital Services comprise the largest component of costs for these episodes.

Joint Degeneration - Hip

of Episodes 12,909

Cost per Episode:

Total Cost per Episode	\$25,389	
Primary Care Core Cost per Episode		\$24
Specialty Care Cost per Episode	\$6,089	
ER Cost per Episode	\$21	
Radiology Cost per Episode	\$244	
Pharmacy Cost per Episode	\$187	
Laboratory Cost per Episode	\$128	
Hospital Services Cost per Episode	\$18,695	

Utilization per 1,000 Episodes:

Radiology Encounters per 1000 Episodes	3,553
Laboratory Encounters per 1000 Episodes	1,805
ER Visits per 1000 Episodes	34
Admission Days per 1000 Episodes	1,760
Number of Admissions per 1000 Episodes	1,275

Number of Prescriptions per 1000 Episodes 2,447

IM1.2. Citations for evidence of high impact cited in IM1.1.:

- Centers for Disease Control and Prevention. Arthritis Basics - Osteoarthritis, 2009. Atlanta, GA [Internet]: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Available at <http://www.cdc.gov/arthritis/basics/osteoarthritis.htm>. Accessed on February 4, 2011.
- Lawrence RC, Felson DT, Helmick CG, et al. Estimates of the prevalence of arthritis and other rheumatic conditions in the United States. Part II. Arthritis Rheum 2008;58(1):26–35.
- Dillon CF, Rasch EK, Gu Q, Hirsch R. Prevalence of knee osteoarthritis in the United States: arthritis data from the Third National Health and Nutrition Examination Survey 1991–1994. J Rheumatol, 2006;33(11):2271–2279.
- Jordan JM, Helmick CG, Renner JB, et al. Prevalence of knee symptoms and radiographic and symptomatic knee osteoarthritis in African Americans and Caucasians: The Johnston County Osteoarthritis Project. J Rheumatol, 2007;34(1):172–180.
- Felson DT, Naimark A, Anderson J, Kazis L, Castelli W, Meenan RF. The prevalence of knee osteoarthritis in the elderly. The Framingham Osteoarthritis Study. Arthritis Rheum. 1987;30(8):914–918.
- Mehrotra C, Remington PL, Naimi TS, Washington W, Miller R. Trends in total knee replacement surgeries and implications for public health, 1990–2000. Public Health Rep 2005;120(3):278–282.
- Mahomed NN, Barrett J, Katz JN, Baron JA, Wright J, Losina E. Epidemiology of total knee replacements in the United States Medicare population. J Bone Joint Surg Am 2005;87(6):1222–1228.
- Maetzel A, Li LC, Pencharz J, Tomlinson F, Bombardier C. The economic burden associated with osteoarthritis, rheumatoid arthritis, and hypertension : a comparative study. Ann Rheum Dis 2004;63(4):395–401.

IM2. Opportunity for Improvement

IM2.1. Briefly explain the benefits 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.

IM2.2. Summary of data demonstrating variation across providers or entities:

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

IM2.3. Citations for data on variation:

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:

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<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.

IM2.4. Summary of data on disparities by population group:

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.

IM2.5. Citations for data on disparities cited in IM2.4:

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

IM3. Measure Intent

IM3.1. Describe intent of the measure and its components/ Rationale (including any citations) for analyzing variation in resource use in this way

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

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<p>-- 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</p> <p>-- 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.</p>	
<p>IM4. Resource use service categories are consistent with measure construct</p> <p><i>Refer to IM3.1. & all S9 items to evaluate this criteria.</i></p>	<p>1d</p> <p>H <input type="checkbox"/></p> <p>M <input type="checkbox"/></p> <p>L <input type="checkbox"/></p> <p>I <input type="checkbox"/></p>
<p>TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for <i>Importance to Measure and Report</i>?</p>	
<p>Steering Committee: Was the threshold criterion, <i>Importance to Measure and Report</i>, met?</p> <p>Rationale:</p>	<p>Y <input type="checkbox"/></p> <p>N <input type="checkbox"/></p>

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.

MEASURE SPECIFICATIONS

<p>S1. Measure Web Page: <i>Do you have a web page where current detailed measure specifications can be obtained?</i></p> <p>No</p> <p>S2. General Approach <i>If applicable, summarize the general approach or methodology to the measure specification. This is most relevant to measures that are part of or rely on the execution of a measure system or applies to multiple measures.</i></p> <p>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.</p> <p>Attachment: ETG_PEG Construct Logic.doc</p>	<p>Eval Rating 2a1/2b1</p>
<p>S3. Type of resource use measure:</p> <p>Per episode</p>	

<p>S4. Target Population:</p> <p>Adult/Elderly Care</p>	
<p>S4.1. Subject/Topic Areas:</p> <p>Musculoskeletal : Joint Surgery</p>	
<p>S4.2. Cross Cutting Areas (HHS or NPP National health goal/priority)</p> <p>Care Coordination Overuse</p>	
<p>S5. Data dictionary or code table <i>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 and keep attached file to 5MB or less.</i></p> <p>Data Dictionary:</p> <p>URL: Please supply the username and password: Attachment: S5_jointDegenerationHipKnee 052311.xls</p> <p>Code Table:</p> <p>URL: Please supply the username and password: Attachment:</p>	
<p>S6.Data Protocol (Resource Use Measure Module 1) <i>The measure developer must determine which of the following data protocol steps: data preparation, data inclusion criteria, data exclusion criteria, and missing data, are submitted as measure specifications or as guidelines. Specifications limit user options and flexibility and must be strictly adhered to; whereas guidelines are well thought out guidance to users while allowing for user flexibility. If the measure developer determines that the requested specification approach is better suited as guidelines, please select and submit guidelines, otherwise specifications <u>must</u> be provided.</i></p>	
<p>Data Protocol Supplemental Attachment or URL: <i>If needed, attach document that <u>supplements</u> information provided for data protocol for analysis, data inclusion criteria, data exclusion criteria, and missing data (Save file as: S6_Data Protocol). 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.</i></p> <p>URL: Please supply the username and password: Attachment: S6_DataProtocol-634417561306970710.xls</p>	
<p>S6.1. Data preparation for analysis <i>Detail (specify) the data preparation steps and provide rationale for this methodology.</i></p> <p>Guidelines : Administrative medical and pharmacy claims, member enrollment and demographic information and provider characteristics describe the primary data sources used in creating ETG and PEG episodes of care and measures of resource use per episode. The key data elements required to support ETG and PEG processing and the creation of resource use per episode measures for Hip/Knee Replacement are detailed in attachment S6_DataProtocol.</p> <p>General recommendations for preparing data for ETG and PEG processing and the creation of resource use sub-measures are as follows:</p> <p>-- The data for all required elements should be complete, valid and consistently populated. In particular:</p>	

- Only final claims should be included in processing. Adjustments and pended/non-fully adjudicated claims should be removed;
- All recorded diagnosis, procedure and NDC codes should be included and conform to standard ICD-9, HCPCS, CPT, NUBC revenue code and NDC coding conventions. Any non-standard, or "local" codes should be cross-walked to a valid code;
- An assessment of the relative validity of diagnosis and procedural coding should be made. If significant differences in the prevalence or validity of diagnosis and procedural coding are observed across populations, data sources or administrative claims systems, these discrepancies should be validated and addressed, if relevant. If systematic discrepancies and data issues are the result of incomplete data, the members impacted by the incomplete information should be excluded from processing and measurement. An example is a defined population with significant evidence of missing or invalid coding or a population where primary care capitation is in place and claims or encounters for those services are not available;
- Financial fields should be complete and valid, reflecting the actual payment or costs associated with the service or a standard-priced resource cost amount. As a 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;
- An assessment of the relative validity of the financial information should be made. Systematic gaps in financial data should be validated and if resulting from incomplete data, the members impacted by the incomplete information should be excluded from processing. An example is a defined population with significant evidence of missing or invalid financial data where options are not available to estimate the financial amounts;
- Inpatient facility claims should accurately represent the admission and discharge dates for the inpatient stay. Interim facility bills where the patient has not been discharged should reflect the time period of the services rendered and captured on the interim bill.
- The member IDs used to identify a member should be unique – describing an individual member. The member ID field across claims and membership should follow the same format. Duplicate IDs for a member are not recommended;
- Each member enrollment record should describe a unique enrollment span, that is, the input data includes one row per member for each continuously enrolled period where the member has consistent attributes. A member may have multiple enrollment records reflecting a gap in enrollment or a change to their member attributes (i.e. PCP or Pharmacy Benefit) over time.
- It is recommended that member enrollment span overlaps are reconciled prior to processing;
- A member's pharmacy benefit status should be noted and reflects whether or not the member has pharmacy data generally available for use in measurement. Examples of populations where pharmacy data may not be available include the individual not have pharmacy coverage for the defined enrollment period or pharmacy services managed by a pharmacy benefits manager (PBM) and the PBM data has not been integrated with the medical claims;
- The provider IDs used to identify a provider should be unique – describing an individual physician or other provider. The provider ID field across claims and membership (Assigned PCP) should follow the same format. Duplicate IDs for a provider are not recommended;
- Each provider ID should be assigned a specialty that reflects the primary specialty of the provider. This information is used to support valid episode grouping and also to assign providers to an appropriate peer group to support episode analysis;
- A place of service crosswalk table that maps each native place of service code to a standard format is required. Ingenix valid values include:
 - 11 – Office
 - 12 – Home
 - 21 – Inpatient Hospital
 - 22 – Outpatient Hospital

- 23 – Emergency Room, Hospital
- 24 – Ambulatory Surgical Center
- 31 – Skilled Nursing Facility
- 39 – Nursing Home, Custodial, Hospice
- 49 – Ambulance
- 51 – Inpatient Psychiatric Facility
- 59 – Psychiatric Facility
- 61 – Comprehensive Inpatient Facility
- 69 – Rehab Facility
- 81 – Independent Lab
- 99 – Unknown or Other (this POS value should represent a small portion of the data for optimal results)
- Provider Specialty on claims should accurately reflect the primary specialty of the provider and support assignment of higher level ETG Type of Provider for each claim. Type of Provider values used to support ETG and PEG processing include:
 - 0 – Clinician
 - 1 – Facility
 - 2 – Other
- Place of Service, Provider Specialty, CPT/HCPC Procedure Codes and Revenue codes should be accurate and support assignment of ETG Type of Service for each claim. Type of Service values used to support ETG processing include:
 - 0 – Ancillary
 - 1 – Medical/Surgical
 - 2 – Room and Board

S6.2. Data inclusion criteria

Detail initial data inclusion criteria and rationale (related to claim-line or other data quality, data validation, e.g. truncation or removal of low or high dollar claim)

Specifications : 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.

S6.3. Data exclusion criteria

Detail initial data exclusion criteria and rationale (related to claim-line or other data quality, data validation, e.g. truncation or removal of low or high dollar claim)

Specifications : 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.

S6.4. Missing Data

Detail steps associated with missing data and rationale(e.g., any statistical techniques used)

Specifications : 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.

S7. Data Type: Administrative claims Other

S7.1. Data Source or Collection Instrument

Identify the specific data source/data collection instrument (e.g. name of database, clinical registry, collection instrument, etc.)

Eval
Rating
2a1

H ☐
M ☐
L ☐
I ☐

Eval
Rating
2b1

H ☐
M ☐
L ☐
I ☐

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.

S7.2. Data Source or Collection Instrument Reference

(Please provide a web page URL or attachment). NQF strongly prefers URLs. Attach documents only if they are not available on a web page and keep attached file to 5MB or less)

URL:

Please supply the username and password:

Attachment: S7 2_Data Source Reference.xls

S8.Measure Clinical Logic (Resource Use Measure Module 2)

The measure's clinical logic includes the steps that identify the condition or event of interest and any clustering of diagnoses or procedures. For example, the diagnoses and procedures that qualifies for a cardiac heart failure episode, including any disease interaction, comorbid conditions, or hierarchical structure to the clinical logic of the model. (Some of the steps listed separately below may be embedded in the risk adjustment description, if so, please indicate NA and in the rationale space list 'see risk adjustment details.')

Clinical Logic Supplemental Attachment or URL:

If needed, provide a URL or document that supplements information provided for the clinical framework, co-morbid interactions, clinical hierarchies, clinical severity levels, and concurrency of clinical events

URL:

Please supply the username and password:

Attachment:

S8.1. Brief Description of Clinical Framework

Briefly describe your clinical logic approach including clinical topic area, whether or not you 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.

S8.2. Clinical framework

Detail any clustering and the assignment of codes, including the grouping methodology, the assignment algorithm, and relevant codes and rationale 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.

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.

S8.3. Comorbid and interactions

Detail the treatment of co-morbidities & 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.

S8.4. Clinical hierarchies

Detail the hierarchy for 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.

S8.5. 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).

S8.6. Concurrency of clinical events (that may lead to a distinct measure)

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 .

S9. Measure Construction Logic (Resource Use Measure Module 3)

The measure’s construction logic includes steps used to cluster, group or assign claims beyond those associated with the measure’s clinical logic. For example, any temporal or spatial (i.e., setting of care) parameters used to determine if a particular diagnosis or event qualifies for the measure of interest.

Construction Logic Supplemental Attachment or URL:

If needed, attach supplemental documentation (Save file as: S9_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:	
S9.1. Brief Description of Construction Logic <i>Briefly describe the measure's construction logic.</i> Please refer to information provided in S2 and S8 for construction logic	
S9.2. Construction Logic <i>Detail logic steps used to cluster, group or assign claims beyond those associated with the measure's clinical logic.</i> Please refer to information provided in S2 and S8 for construction logic	
S9.3. Measure Trigger and End mechanisms <i>Detail the measure's trigger and end mechanisms and provide rationale for this methodology.</i> 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 .	
S9.4.Measure redundancy or overlap <i>Detail how redundancy and overlap of measures can be addressed and provide rationale for this methodology.</i> The ETG application is able to keep related conditions separate. For example, suppose that there are concurrent episodes of CHF and Diabetes and there is record eligible for both ETGs. A specific hierarchy of rules coupled with a set of eligibility tables with strengths of association of each diagnosis and procedure code for each ETG will uniquely determine which episode the record will group to. There are no ambiguous assignments and episode assignment of each claim record will be unique. For more information about episode building construction/logic, please refer to S8 and the attachment we provided in s.2 . S9.5.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 .

S9.6.Resource Use Service Categories

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

S9.7.Identification of Resource Use Service Categories

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 PROFTOS, ANESTOS, OPTOS, and PCC_TYPE. PROFTOS, 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 PROFTOS, 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 PROFTOS, ANESTOS and PROFTOS 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:
- Hospital inpatient admissions. A hospital inpatient confinement is considered a single encounter (ENCOUNTER=1).
 - Prescription pharmacy. A pharmacy service record (claim record) is considered a single encounter (ENCOUNTER=1).
 - Ancillary Drug Administered Services. All Ancillary, Drugs Administered (TOS_I values 201 thru 211), are considered an encounter (ENCOUNTER=1).
 - 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.
 - For these other services, medical service records are sorted by Member, Date of Service, ENC_TOS and ENC_TOP.
 - 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.
 - 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.
 - Any service with the following Encounter TOS values will use the additional logic when calculating encounters.
 - ER professional and facility services (ENC_TOS=24)
 - Lab and pathology professional and facility services (ENC_TOS=29, 31)
 - Diagnostic and therapeutic radiology professional and facility services (ENC_TOS=47, 49)
 - 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.
 - 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.
 - 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)}
 - 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.

If needed, provide specifications URL (preferred) or as an attachment:

URL:

Please supply the username and password:

Attachment: S9_7_RU_Categories dd.xls

S9.8. Care Setting; provides information on which care settings the measure encompasses.

Ambulatory Care : Ambulatory Surgery Center (ASC)

Ambulatory Care : Clinic/Urgent Care

Ambulatory Care : Clinician Office

Emergency Medical Services/Ambulance

Home Health

Hospice

Hospital/Acute Care Facility

Imaging Facility

Laboratory

Post Acute/Long Term Care Facility : Nursing Home/Skilled Nursing Facility

Post Acute/Long Term Care Facility : Rehabilitation

S10.Adjustments for Comparability (Resource Use Measure Module 4)

External factors can mingle and affect or confound a measure's result. Confounding occurs if an extraneous factor causes or influences the outcome (e.g., higher resource use) and is associated with the exposure of interest (e.g., episode of diabetes with multiple co-morbidities). Measure developers often include steps to adjust the measure to increase comparability of results among providers,

employers, and health plans.

S10.1. Risk adjustment method

Define risk adjustment variables and describe the conceptual, statistical, or other relevant aspects of the model and provide rationale for this methodology.

The attachment for S2 and responses to S8 above provided a description of the approach used to assign a severity level to each Hip/Knee Replacement episode.

Risk adjustment is an important step in resource use measurement. Measures of the cost of care for an organization or provider can be impacted by the underlying risk and severity of the patients they enroll or manage. Case-mix or risk adjustment addresses these differences and supports more consistent and equitable comparisons. These approaches allow a focus on differences in resource use deriving from differences in the practice of medicine rather than differences in the mix of episodes or patients.

The level of severity assigned to an episode is used to support risk adjustment. The risk adjustment approach 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 (hip or knee replacement) and severity level. For a peers benchmark, average cost per episode across all peers for the base procedure and severity 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 table in S10.1 provides an example comparing the cost of care performance of two cardiologists using episodes of care and the condition of CHF. The analysis used only complete, non-outlier CHF episodes. The upper section of the table summarizes results at the condition and severity level. A higher severity level for a condition indicates the presence of one or more condition status factors and/or co-morbidities that impact the resources required for treatment. The table also summarizes results for CHF, across all severity levels. The same general approach would be used for orthopedic surgeons when risk adjusting for mix of hip and knee replacement episodes and severity.

The table shows the number of episodes attributed to the cardiologist, the observed cost per episode, peers cost per episode (the “expected” amount), and the ratio of the cost per episode of the cardiologist to his peers. By condition and severity level, the peers cost per episode is the average experience of all cardiologists included in the measurement for those episodes. The peer’s experience is risk adjusted and assumes the same mix of episodes (by condition and severity) as the physician being measured. Notice that for the overall CHF summary, the peers cost per episode for Dr. Jones is \$2,081, while that amount for Dr. Smith is \$1,841. The higher amount for Dr. Jones indicates a higher case-mix and greater expected costs relative to Dr. Smith. These peer amounts, adjusted for the specific mix of episodes observed for the physician being measured, capture the risk adjustment appropriate for the analysis.

In the last column, a relative cost ratio less than 1.00 indicates that the observed cost per episode for a provider is less than his peers. As shown, Dr. Jones cost is lower than peers and Dr. Smith is higher cost than peers. An additional report using the same measure information could summarize results by type of service, or specific utilization such as the use of a specific diagnostic test or treatment, providing greater insights into the factors behind differences in resource use. The risk adjustment for these measures would use the same approach as described here for total cost per episode.

If needed, provide supplemental information via a web URL (preferred) or attachment with the risk adjustment specifications.

URL:

Please supply the username and password:

Attachment: S10_Risk Adjustment Method Example-634417568824864783.xls

S10.2. Stratification Method

Detail the stratification method including all variables, codes, logic or definitions required to stratify the measure and rationale for this methodology

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.)

S10.3. 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.

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.

S11. Measure Reporting (Resource Use Measure Module 5)

The measure developer must determine which of the following Measure Reporting functions: attribution approach, peer group, outliers and thresholds, sample size, and benchmarking and comparative estimates, are submitted as measure specifications or as guidelines. Specifications limit user options and flexibility and must be strictly adhered to; whereas guidelines are well thought out guidance to users while allowing for user flexibility. If the measure developer determines that the requested specification approach is better suited as guidelines, please select and submit guidelines, otherwise specifications must be provided.

S11.1. Detail attribution approach

Detail the attribution rule(s) used for attributing costs to providers and rationale for this methodology (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

S11.2. Identify and define peer group

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

Guidelines : 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.

S11.3. Level of Analysis:

Clinician : Group/Practice
 Clinician : Individual
 Clinician : Team
 Facility
 Health Plan
 Integrated Delivery System
 Population : Community
 Population : County or City
 Population : National
 Population : Regional
 Population : State

S11.4.Detail measure outliers or thresholds

Detail any threshold or outlier rules and decisions based on measure resource use and provide rationale for this methodology

Guidelines : 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.

S11.5.Detail sample size requirements

Detail the sample size requirement including rules associated with the type of measure

Guidelines : 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.

S11.6.Define benchmarking or comparative estimates

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

Guidelines : 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.

S12.Type of Score:

Continuous variable
 Count
 Rate/Proportion
 Ratio

If available, please provide a sample report:

S12_sample_score_report_EPI-634417569213768544.pdf

S12.1. Interpretation of Score.

(Classifies interpretation of score (s) according to whether higher or lower resource use amounts is associated with a higher or 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.

S12.2. 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.

S12.3. 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:

$\text{Var}(O/E)$

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

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

Where $\text{Var}(O_i)$ 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 $\text{Sqrt}(\text{Var}(O/E))$.

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>

TESTING/ANALYSIS

Measure testing must demonstrate adequate reliability and validity in order to be recommended for endorsement. Testing may be conducted for data elements and/or the computed measure score. See guidance on measure testing.

Eval
Rating

TESTING ATTACHMENT (5MB or less) or URL:

If needed, attach supplemental documentation (Save file as: SA_Reliability_VValidity Testing) 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:

SA1. Reliability Testing

For each module tested or for the overall measure score:

SA1.1. Data/sample

(Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included)

Data used to support validity testing is based upon a National Commercial member health care services benchmark database representing more than 25 million covered lives for calendar year 2009. Various permutations of the 25 million unique members are pulled to support testing initiatives, for example:

-4 million member sample used for face validity evaluation of ETG/PEG processing

-75,000 member sample, with manipulated data for content validation testing of ETG/PEG processing and associated Resource Utilization measures

SA1.2. Analytic Methods

(Describe method of reliability testing and rationale)

Reliability refers to the consistency of a measure. A measure is considered reliable when the same result is produced repeatedly. Reliability of ETG/PEG and Resource Utilization Measures are judged based upon an internal consistency reliability approach. The first level of internal consistency reliability focuses on high-level parallel processing tests and regressions performed by internal Quality Assurance (QA) teams. This level focuses on assessment of results compared to a baseline set of expected results developed based upon the experience of a benchmark database of member and health care services covering more than 25 million lives as described in SA1.1.

The second level of internal consistency reliability involves detailed parallel processing comparisons between ETG/PEG and Resource Utilization Measure software and SAS-based software prototypes. Software prototypes are developed and maintained by analysts familiar with the detailed methodology of the measures for the purpose of Content Validation (CV). This form of parallel reliability testing requires that the results of both the software and prototype match exactly and are executing the logic in accordance with methodological specifications. Observed differences in the output are researched and resolved prior to releasing the software for use. Multiple parallel processing comparisons are performed to assure that the software is producing reliable results using a variety of processing configuration options and data input scenarios.

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SA1.3. Testing Results

(reliability statistics, assessment of adequacy in the context of norms for the test conducted)

The extensive testing of ETG/PEG produces volumes of results across the test cases and other concepts that are described above. In terms of validity and assessing the reliability of the implementation, testing of the measurement software with the parallel SAS prototype involves iterations until a high degree of matching of results is observed (over 99.9%). The statistic used in this testing is the exact match of the grouping of records and assignment of resource measures. The difference in the result for each measure between the methodology and prototype is calculated and differences equal to zero are considered an exact match. Testing results can be provided as a follow up if deemed relevant.

SA1.4. Finding statement(s)—(i.e., is the measure deemed reliable, limitations identified)

As noted in SA1.3, the findings on reliability and validity suggest the measures could be applied in a consistent way, the results matched well to clinical expectations, and the results from the measurement software were consistent with those produced by a parallel process using prototype implementation of the methodologies.

SA2. Validity Testing

For each module tested or for the overall measure score:

SA2.1. Data/Sample

(Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included)

Different samples of data are used in testing ETG/PEG and the Resource Use Measures described in this submission. The general source of information is the Ingenix National health care services benchmark database. This database describes enrollment, medical and pharmacy services, and providers for a population of more than 25 million covered lives. The data used in the testing described in this submission was primarily for commercial non-elderly individuals and covered the years 2006 thru 2010, depending on the test. The primary test databases used to support the tests described in the SA section are as follows:

- 4 million member sample used for validity and reliability of the ETG methodology and the software used for ETG processing;
- 250,000 member sample, with manipulated data for content validation testing of the post-ETG processing associated with Resource Utilization measures (measures described in S9.5);

SA2.2. Analytic Method

(Describe method of validity testing and rationale; if face validity, describe systematic assessment)

Also, please see our responses to SA1 which relate to both reliability and validity.

Validity determines if the output of the measure is accurate. The measure must be valid in order for the results to be accurately applied and interpreted. Validity of a measure is not determined by a single statistic, but by evaluating the complete result of the measures and demonstrating the relationship between the result and the intended purpose of the measure. Validity of ETG/PEGs and Resource Use Utilization Measures are judged based upon both content validity and face validity.

Content validation testing involves detailed parallel processing comparisons between ETG/PEG and Resource Use Utilization Measure software and SAS-based software prototypes. Software prototypes are developed and maintained by analysts familiar with the detailed methodology of the measures for the purpose of Content Validation (CV). This form of parallel testing requires that the results of both the software and prototype match exactly and are executing the logic in accordance with methodological specifications. Observed differences in the output are researched and resolved prior to releasing the software for use. Multiple parallel processing comparisons are performed to assure that the software is producing valid results using a variety of processing configuration options and data input scenarios.

The face validity approach assesses if the measure result is reasonable and functioning according to expectations. This form of validation is most typically performed when modifications to the methodology intentionally change the result of the measure. When this occurs a pre- and post-modification parallel run is created and changes in the measure output are validated for accuracy at face value. Episodes are evaluated for validity in terms of distribution of ETGs, PEGs, Episode Types, Record Types, Outlier Status and Type of Service. Resource Utilization Measures are evaluated for

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validity in terms of measure Cost per Episode by Peer Group as well as overall evaluation of the utilization measures by Peer Group.

SA2.3. Testing Results

(statistical results, assessment of adequacy in the context of norms for the test conducted; if face validity, describe results of systematic assessment)

Please see our responses to SA1 which relate to both reliability and validity.

SA2.4. Finding statement(s)—(i.e., is the measure deemed reliable, limitations identified)

Please see our responses to SA1 which relate to both reliability and validity.

SA3. Testing for Measure Exclusions

SA3.1. Describe how the impact of exclusions (if specified) is transparent as required in the criteria

Users of the submitted Hip and Knee Replacement episode measures identify high or low cost outliers at the episode level. Financial outlier episodes are defined where the resource cost is high or low enough relative to norms for the clinical condition to distort the results. Thresholds, or “trim points”, are used to describe levels of costs considered extremely high or low relative to the norm. Specific trim points are defined for each base procedure and also for each level of severity. Low and high outlier episodes are noted.

As described in the general methodology paper on ETG and PEG (included in the response to S2), ETG and PEG consider an episode incomplete if the clean period of the episode overlaps with the boundaries of the overall time period being used for measurement (e.g., calendar years 2009 and 2010) or the member’s eligibility start and end dates. Incomplete episodes may have either an unknown start or an unknown finish. Complete and incomplete episode status and type are noted by ETG and PEG.

It is recommended that incomplete episodes be excluded from resource use measurement and comparisons. It is recommended that low outlier cost episodes be excluded from resource use measurement. It is recommended that high outlier cost episodes be included in resource use measurement, but truncated at the high outlier trim point.

In terms of resource use measure construction following ETG/PEG grouping, no additional data inclusion or exclusion are applied. Only condition episodes are included in the measurement of episode-based resource use for that condition, including the individual services that ETG groups to those episodes. As noted, it is recommended that incomplete episodes be excluded from resource measurement and outlier episodes be treated as described above.

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SA3.2. Data/sample for analysis of exclusions

(Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included)

Different samples of data are used in testing ETG/PEG and the Resource Use Measures described in this submission. The general source of information is the Ingenix National health care services benchmark database. This database describes enrollment, medical and pharmacy services, and providers for a population of more than 25 million covered lives. The data used in the testing described in this submission was primarily for commercial non-elderly individuals and covered the years 2006 thru 2010, depending on the test. The primary test databases used to support the tests described in the SA section are as follows:

- 4 million member sample used for validity and reliability of the ETG methodology and the software used for ETG processing;

- 250,000 member sample, with manipulated data for content validation testing of the post-ETG processing associated with Resource Utilization measures (measures described in S9.5)

SA3.3. Analytic Method

(Describe type of analysis and rationale for examining exclusions, including exclusion related to patient preference)

H ☐
M ☐
L ☐
I ☐

Reliability and testing of exclusions for ETG/PEG and Resource Utilization Measures are judged based upon an internal consistency reliability approach. The first level of internal consistency reliability focuses on high-level parallel processing tests and regressions performed by internal Quality Assurance (QA) teams. This level focuses on assessment of results compared to a baseline set of expected results developed based upon the experience of the benchmark described above in SA2.1.

The second level of internal consistency reliability for exclusions involves detailed parallel processing comparisons between ETG/PEG and Resource Use Measure software and SAS-based software prototypes. Software prototypes are developed and maintained by analysts familiar with the detailed methodology of the measures for the purpose of Content Validation (CV). This form of parallel reliability testing requires that the results of both the software and prototype match exactly and are executing the logic in accordance with methodological specifications. Observed differences in the output are researched and resolved prior to releasing the software for use. Multiple parallel processing comparisons are performed to assure that the software is producing reliable results using a variety of processing configuration options and data input scenarios.

As an example, the text below provides the Table of Contents for an ETG testing plan for ETG Version 7.0. The plan includes processes around data used, test cases created, comparison of software results with those produced by a SAS prototype (to determine matching across parallel implementations of the methodology), and a review by clinical analysts to assess face validity. A similar testing approach is used for the resource use measures that are processed following ETG grouping. Note that steps 2.4 and 2.5 relate to exclusions around episode completeness and outlier status.

ETG TEST PLAN DOCUMENT – EXAMPLE TABLE OF CONTENTS

SECTION 1—OVERVIEW

1.1 PURPOSE OF TEST PLAN DOCUMENT

1.2 TESTING APPROACH AND DELIVERABLES

1.3 SCOPE OF TESTING

1.4 DATA

1.5 ETG GROUPER

SECTION 2—BENCHMARK TEST CASES

2.1 ACCOUNTING OF GROUPED VS. UNGROUPED RECORDS

2.2 DISTRIBUTION BY ETG

2.3 DISTRIBUTION BY MPC

2.4 DISTRIBUTION BY EPISODE COMPLETENESS

2.5 DISTRIBUTION BY OUTLIERS

2.6 EPISODE AGE/GENDER PROFILE

SECTION 3—FEATURE-RELATED TEST CASES

3.1 COMPARISON OF SOFTWARE TO PROTOTYPE

3.2 SEVERITY ADJUSTMENT

3.3 COMPLICATIONS

3.4 COMORBIDITIES

3.5 TREATMENT INDICATORS

3.6 EPISODE INDICATORS

SECTION 4—REVISION HISTORY

Finally, the results are applied to the healthcare data of different organizations to assess both the ability of the organization's data to support the measurements and also the consistency of results across the organizations. This assessment of reliability also provides evidence that the measures are being applied in a consistent and valid way.

SA3.4. Results

(statistical results for analysis of exclusions, e.g., frequency, variability, sensitivity analyses)

Please see our responses to SA1 which relate to both reliability and validity.

SA3.5. Finding statement(s)-- *(i.e., is the measure deemed reliable, limitations identified)*

As noted in SA1.3, the findings on reliability and validity suggest the measures could be applied in a consistent way, the results matched well to clinical expectations, and the results from the measurement software were consistent with those

<p>produced by a parallel process using prototype implementation of the methodologies. This statement applies to all methodologies involved, including exclusions.</p> <p>SA4. Testing Population <i>Which populations were included in the testing data? (Check all that apply)</i></p> <p>Commercial</p>	
<p>SA5. Risk adjustment strategy <i>Refer to items S10.1 and S10.2 to rate this criterion.</i></p>	<p>2b4</p> <p>H <input type="checkbox"/> M <input type="checkbox"/> L <input type="checkbox"/> I <input type="checkbox"/></p>
<p>SA6. Data analysis and scoring methods <i>Refer to items S12-S12.3 to rate this criterion.</i></p>	<p>2b5</p> <p>H <input type="checkbox"/> M <input type="checkbox"/> L <input type="checkbox"/> I <input type="checkbox"/></p>
<p>SA7. Multiple data sources <i>Refer to S7 & all SA1 items to evaluate this criterion.</i></p>	<p>2b6</p> <p>H <input type="checkbox"/> M <input type="checkbox"/> L <input type="checkbox"/> I <input type="checkbox"/> NA <input type="checkbox"/></p>
<p>SA6. Stratification of Disparities (if applicable) <i>Refer to item S10.2 to rate this criterion.</i></p>	<p>2c</p> <p>H <input type="checkbox"/> M <input type="checkbox"/> L <input type="checkbox"/> I <input type="checkbox"/></p>
<p>TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for <i>Scientific Acceptability of Measure Properties</i>?</p>	
<p>Steering Committee: Overall, was the criterion, <i>Scientific Acceptability of Measure Properties</i>, met? Rationale:</p>	<p>Y <input type="checkbox"/> N <input type="checkbox"/></p>
<p>USABILITY</p>	
<p>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.</p>	<p>Eval Rating</p>
<p>Meaningful, Understandable, and Useful Information</p> <p>U1. Current Use:</p> <p>Internal quality improvement Payment Public reporting (disclosure to performance results to the public at large) Quality improvement with external benchmarking</p> <p>U1.1. Use in Public Reporting Initiative Use in Public Reporting.</p>	<p>3a</p>

Disclosure of performance results to the public at large (If used in a public reporting program, provide name of program(s), locations, Web page URL(s). If not publicly reported in a national or community program, state the plans to achieve public reporting, potential reporting programs or commitments, and timeline, e.g., within 3 years of endorsement)

H ☐
M ☐
L ☐
I ☐

Disclosure of performance results to the public at large (If used in a public reporting program, provide name of program(s), locations, Web page URL(s). If not publicly reported in a national or community program, state the plans to achieve public reporting, potential reporting programs or commitments, and timeline, e.g., within 3 years of endorsement)

Several users of ETGs and Resource Use Measures rely on the analysis to support Public Reporting initiatives.

Examples include:

- Health Care Organization #1: Measuring Provider Efficiency
- HCO #1 ranks providers based on efficiency by ETG using a single provider ETG overview. Using COGNOS reporting capabilities the organization is able to drill down into procedure and drug level comparisons.
- Health Care Organization #2: Corporate Wellness Programs
- HCO #2 uses ETG output to analyze utilization patterns and identify potential diseases and populations to target for intervention. ERGs are used to adjust the average and comparison population expenditures and Specialty profiles are created using both ETG and ERG results. ERG scores are used to identify patients who could be potential high utilizers.
- Health Care Organization #3: Physician Profiling and Clinical Benchmarking
- HCO #3 has embarked upon an initiative to use ETG information for clinical reporting and benchmarking. ERG output complements the ETG information for underwriting and physician profiling programs as well.
- Health Care Organization #4: Provider Specialty Profiling and Predictive Modeling
- HCO #4 utilizes Resource Use Measures and ETG to identify variations in practice patterns, measure performance and examine utilization and disease management. The primary focus is on high cost specialties and ETGs are used to identify the top 5 conditions to support specialty profiles and cost comparisons and drill downs. ERG scores are used to risk adjust PCP profiles to adjust for patient severity.

Please note that Health Care Organization names were not provided to protect the confidentiality of our users. HCO names for reference purposes are available upon request.

U1.2. Use in QI

(If used in improvement programs, provide name of program(s), locations, Web page URL(s)).

Examples of ETGs and Resource Use Measures in action within health care industry quality improvement initiatives include:

- Health Care Organization #5: Internal Quality Improvement – Disease Management
- HCO #5 utilizes 30 months of medical and pharmacy data totaling more than 17 million claim lines to support identification of member risk and stratification of members for care management teams. ETG and ERG groupers are embedded within their claims datamart with other sources of data and support the identification of clinical care gaps and impactable dollars for quality improvement.
- Health Care Organization #6: Employer Group Utilization Reports to Identify Provider Variance
- HCO #6 generates Employer or Account Group Utilization Reports which includes a global view of ETGs for the population. These reports are used to identify the top 5 ETGs where variance is the greatest to target specific procedures for a particular ETG in order to improve quality for the Employer group.
- Health Care Organization #7: Cesarean Section Study
- HCO #7 conducted a study on Cesarean Section, Infertility and multiple births using ETGs. Providers with high rates of Cesarean Section were identified and compared based upon severity indices. The study determined that multiple births were a significant contributor to a market's cost and procedure variances. The study further identified infertility treatment specialists who need improvement based upon the comparison to their peers of best practices and procedures.

Please note that Health Care Organization names were not provided to protect the confidentiality of our users. HCO names for reference purposes are available upon request.

U1.3. Use for other Accountability Functions (payment, certification, accreditation)

(If used in a public accountability program, provide name of program(s), locations, Web page URL(s)).

Other examples of industry use of ETG/PEG and Resource Use Measures include Provider Pay for Excellence programs and Member Cost Analysis Tools. Specific examples include:

<p>-- Health Care Organization #8: Provider Analytics Team</p> <p>-- HCO #8 leverages the power of ETGs and Resource Use Measures to support their internal Provider Analytics team. This team manages the Provider Profiling program to support the Medical Directors' high-level physician review and network physician meetings as well as bi-annual provider profiling reports. In addition to provider profiling the Provider Analytics team uses ETG and Resource Use Measures to Impute PCP information to identify gaps in care, support physician group award programs and Patient Centered Medical Home projects.</p> <p>-- Health Care Organization #9: Member Cost Analysis Tools</p> <p>-- HCO #9 has created a patient website with cost calculation tools to provide detailed treatment costs for the patient based upon ETG analysis. The website includes tips on how to reduce costs as well as a pharmacy co-pay calculator. Users may access median cost reports for an ETG as well as cost ranges for procedures based upon CPT codes, pharmaceuticals and office visits. The website also provides comparison data for providers based upon performance indices.</p> <p>Please note that Health Care Organization names were not provided to protect the confidentiality of our users. HCO names for reference purposes are available upon request</p>	
<p>U2. Testing of Interpretability <i>(Provide a rationale for why the measure performance results are meaningful, understandable, and useful to the intended audience(s) for both public reporting and quality improvement).</i></p> <p>U2.1. If understanding or usefulness was demonstrated <i>(e.g., through systematic feedback from users, focus group, cognitive testing, analysis of quality improvement initiatives) describe the data, methods, and results.</i></p> <p>The assessment of the usability of the results from ETG/PEG-based measures of resource use is primarily from two entities: the ETG Medical Advisory Board and the Ingenix User Forums around these measures. The Medical Advisory Board is comprised of medical directors from healthcare organizations that employ episode based measures to assess resource use. Input and feedback from these clinicians inform both the ETG/PEG methodology itself and also how it is used in creating and sharing provider measurement results. The Ingenix User Forums include technical experts from organizations that use ETG/PEG. Similar to the Medical Advisory Board, input and feedback from this group informs the ETG methodology, but primarily is focused on how ETG/PEG results are used to create and share provider measurement results.</p>	<p>3b</p> <p>H <input type="checkbox"/> M <input type="checkbox"/> L <input type="checkbox"/> NA <input type="checkbox"/></p>
<p>U2.2. Resource use data and result can be decomposed for transparency and understanding.</p> <p><i>Refer to items S11 -S12.3.</i></p>	<p>3c</p> <p>H <input type="checkbox"/> M <input type="checkbox"/> L <input type="checkbox"/> I <input type="checkbox"/></p>
<p>U3. If there are similar or related measures (either same measure focus or target population) measures (both the same measure focus and same target population), list the NQF # and title of all related and/or similar measures.</p> <p>U3.1. If this measure has EITHER the same measure focus OR the same target population as NQF-endorsed measure(s): Are the measure specifications completely harmonized?</p> <p>U3.2. If the measure specifications are not completely harmonized identify the differences, rationale, and impact on interpretability and data collection burden. <i>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.)</i></p>	<p>3d</p> <p>H <input type="checkbox"/> M <input type="checkbox"/> L <input type="checkbox"/> I <input type="checkbox"/> NA <input type="checkbox"/></p>

TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for <i>Usability</i>?	
Steering Committee: Overall, to what extent was the criterion, <i>Usability</i> , met? Rationale:	H <input type="checkbox"/> M <input type="checkbox"/> L <input type="checkbox"/>
FEASIBILITY	
Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement.	Eval Rating
F1. Data Elements Generated as Byproduct of Care Processes <i>How are the data elements needed to compute measure scores generated? Data used in the measure are:</i> 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)	4a H <input type="checkbox"/> M <input type="checkbox"/> L <input type="checkbox"/> I <input type="checkbox"/>
F2. Electronic Sources <i>Are the data elements needed for the measure as specified available electronically? (Elements that are needed to compute measure scores are in defined, computer-readable fields)</i> ALL data elements in electronic claims F2.1. If ALL data elements are not from electronic sources, specify a credible, near-term path to electronic capture, OR provide a rationale for using other than electronic sources.	4b H <input type="checkbox"/> M <input type="checkbox"/> L <input type="checkbox"/> I <input type="checkbox"/>
F3. Susceptibility to Inaccuracies, Errors, or Unintended Consequences <i>Identify susceptibility to inaccuracies, errors, or unintended consequences of the measurement identified during testing and/or operational use and strategies to minimize or prevent. If audited, provide results.</i> The main source of inaccuracies relate to small sample size. There are lower limits on the number of episodes for a given provider or specialty that are allowed for inclusion in the analysis. Sample sizes that are determined to be too small are eliminated from the analysis. These situations will occur infrequently, as the sample sizes that are customarily dealt with are very large. A methodology for applying statistical techniques to determine confidence intervals of the results has been created and can be applied to gauge the accuracy of the analysis. In addition, sample size is less of an issue when multiple episode types are combined for a single metric. In some cases, there are physicians that are "ultra" specialized that may not have a reasonably sized peer group for comparison. Sub-specialties like hepatology, or muscular dystrophy specialists may fall into this category.) A second source of potential inaccuracies relate to the validity and completeness of the administrative data available to support the measurement. As described in S6.1, a careful evaluation of the data to be used to support the measurement is required and actions taken to address identified issues.	4c H <input type="checkbox"/> M <input type="checkbox"/> L <input type="checkbox"/> I <input type="checkbox"/>
F4. Data Collection Strategy <i>Describe what you have learned/modified as a result of testing regarding barriers to operational use of the measure (e.g., availability of data, missing data, timing and frequency of data collection,</i>	4d H <input type="checkbox"/>

<p>sampling, patient confidentiality, time and cost of data collection, cost of proprietary measures).</p> <p>The measure is in use beyond internal QI. Please see the section on Usability.</p>	M <input type="checkbox"/> L <input type="checkbox"/> I <input type="checkbox"/>
TAP/Workgroup: What are the strengths and weaknesses in relation to the subcriteria for <i>Feasibility</i>?	
Steering Committee: Overall, to what extent was the criterion, <i>Feasibility</i> , met? Rationale:	H <input type="checkbox"/> M <input type="checkbox"/> L <input type="checkbox"/>
RECOMMENDATION	
Steering Committee: Do you recommend for endorsement? Comments:	Y <input type="checkbox"/> N <input type="checkbox"/> A <input type="checkbox"/>
CONTACT INFORMATION	
Co.1 Measure Steward (Intellectual Property Owner) Co.1 Organization Ingenix, 950 Winter Street, Suite 3800, Waltham, Massachusetts, 02154 Co.2 Point of Contact Jen, Pearse, Jennifer_J_Pearse@ingenix.com, 781-419-8628-	
Measure Developer If different from Measure Steward Co.3 Organization Ingenix, 950 Winter Street, Suite 3800, Waltham, Massachusetts, 02154 Co.4 Point of Contact Dan, Dunn, daniel.dunn@ingenixconsulting.com, 781-419-8425-	
Co.5 Submitter If different from Measure Steward POC Jen, Pearse, jennifer_J_Pearse@ingenix.com, 781-419-8628-, Ingenix	
Co.6 Additional organizations that sponsored/participated in measure development	
ADDITIONAL INFORMATION	
Workgroup/Expert Panel involved in measure development Ad.1 Provide a list of sponsoring organizations and 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. 7 Date of Submission (MM/DD/YY):

03/30/2011



Physician		Number of Episodes:	93
Name:	Provider 6388502012	Case Mix, Episodes:	0.48
		Peer Group	
Primary ID:	6388502012	Peer Group Number of Episodes:	5,430
		Peer Group Name:	II Cardiology
Specialty:	Cardiology	Key Statistics	
		Overall Quality Index:	1.02
		Overall Cost Index, Episodes:	1.14
		Confidence Intervals for the Index	
		Overall Quality Index:	No data available
		Overall Cost Index, Episodes:	No data available

**Statistical significance of difference between
index and peer group average: * p<0.10; ** p <
0.05**

Episode Case Mix Summary

Top 10 ETGs, by Total Cost (Completed Episodes of Care)

ETG Family Description	Episodes			Encounters (Per 1000 Episodes)	
	Episodes	Specialist's Cost / Episode	Peers Cost / Episode	Specialist's Encounters / 1000 Episode	Peers Encounters / 1000 Episode
Hypertension	43	\$1,569.36	\$1,228.51	14,779	12,844
Hyperlipidemia, other	19	\$720.64	\$631.67	7,169	6,829
Ischemic heart disease	9	\$1,511.63	\$2,378.04	12,889	13,765
Valvular disorder	14	\$818.25	\$1,047.19	4,367	7,315
Cardiomyopathy	3	\$2,407.90	\$1,340.66	16,583	14,088
Pulmonary embolism	1	\$3,244.43	\$3,897.41	38,714	24,716
Congestive heart failure	1	\$2,817.56	\$1,496.61	6,600	14,084
Atherosclerosis	2	\$702.92	\$387.57	1,500	1,125
Atrial fibrillation & flutter	1	\$507.36	\$1,715.52	25,500	21,127
All Others	0	--	--	--	--
All Episodes	93	\$1,304.04	\$1,211.06	11,523	10,879

Relative Morbidity Histogram

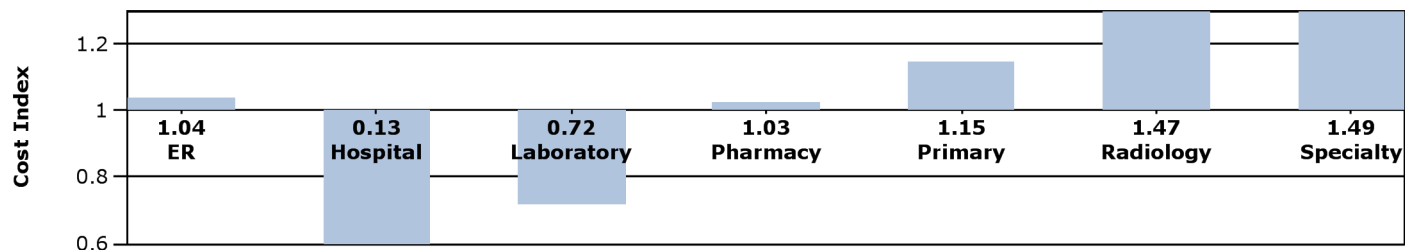


Quality Measures

**As of the End of the Report Period
(Members Must be Continuously Enrolled with Plan a Minimum of 12 Months)**

	Number of Quality Opportunities		Rates		Index
	With Compliance	Total	Provider Rate	Peer Rate	Quality Index
Cardiology					
HTN					
Pt(s) taking an ACE-inhibitor, angiotensin II receptor antagonist, diuretic, or aldosterone receptor blocker that had a serum K+ in last 12 rpt mos.	12	15	0.80	0.81	0.99
HTN					
Pt(s) taking an NSAID med.	21	23	0.91	0.92	0.99
HTN					
Pt(s) that had an annual physician visit.	23	23	1.00	0.97	1.03
HTN					
Pt(s) that had a serum creatinine in last 12 rpt mos.	19	23	0.83	0.80	1.03
CAD					
Pt(s) conon 2 meds (nitrate and phosphodiesterase type 5 inhibitor) w/ interacting properties.	6	6	1.00	1.00	1.00
CAD					
Pt(s) that had an OV for CAD care in last 12 rpt mos.	6	6	1.00	0.97	1.03
Endocrinology					
Hyperlipidemia					
Pt(s) taking a statin-containing med, nicotinic acid or fibric acid derivative that had an annual serum ALT or AST test.	10	10	1.00	0.92	1.09
Hyperlipidemia					
Pt(s) w/ a LDL cholesterol test in last 12 rpt mos.	16	16	1.00	0.90	1.12
Hyperlipidemia					
Pt(s) w/ the most recent LDL result <160mg/dL.	4	5	0.80	0.93	0.86
Hyperlipidemia					
Pt(s) w/ a HDL cholesterol test in last 12 rpt mos.	16	16	1.00	0.90	1.11
Hyperlipidemia					
Pt(s) w/ the most recent HDL result >= 40mg/dL.	1	5	0.20	0.68	0.29
Hyperlipidemia					
Pt(s) w/ a triglyceride test in last 12 rpt mos.	16	16	1.00	0.90	1.12
Total	150	164	0.91	0.89	1.03

Cost Index Summary, by Service Category



Cost and Utilization Summary Measures

Profiled Costs

	Actual Encounters	Peers Encounters	Actual Cost / Episode	Peers Cost / Episode	Cost / Episode Index	Actual Total Cost
ER	5	4	\$53.98	\$52.08	1.04	\$5,020
Facility	3	2	\$45.42	\$45.48		\$4,224
Professional	2	2	\$8.56	\$6.59		\$796
Hospital Services	8	17	\$29.49	\$227.90	0.13	\$2,743
Inpatient Facility	0	2	\$0.00	\$108.97		\$0
Outpatient Hospital Surgery	0	2	\$0.00	\$57.97		\$0
Laboratory	40	51	\$19.29	\$26.93	0.72	\$1,794
Facility	0	3	\$0.00	\$6.96		\$0
Professional	40	48	\$19.29	\$19.97		\$1,794
Pharmacy	492	499	\$271.71	\$264.70	1.03	\$25,269
Anti-Infective Agents	4	5	\$0.37	\$1.51		\$35
Cardiovascular agents	359	393	\$221.64	\$227.13		\$20,613
Primary Care Core	119	104	\$68.41	\$59.66	1.15	\$6,362
PCC Diagnostic	57	61	\$18.70	\$28.57		\$1,739
Radiology	34	27	\$210.93	\$143.69	1.47	\$19,617
Facility	1	3	\$2.51	\$25.55		\$234
Professional	34	24	\$208.42	\$118.14		\$19,383
Specialty Care	373	309	\$650.24	\$436.10	1.49	\$60,472
Medical Specialty	354	287	\$606.05	\$402.22		\$56,363
PCP Specialty	1	3	\$0.22	\$3.31		\$21
Surgical Specialty	3	4	\$1.38	\$4.23		\$129
Total	1,072	1,012	\$1,304.04	\$1,211.06	1.08	\$121,276

Overall Cost Index: 1.14

Utilization Rates Per 1,000 Episodes

Reporting Period : 1/1/2006 - 12/31/2007

Provider # : 6388502012

	Actual	Peers	Index
Specialist Visit Rate	1,387	1,407	0.99
Other Specialty Care Rate	839	616	1.36
Radiology Procedure Rate	391	365	1.07
MRI Procedure Rate	0	3	0.00
Laboratory Procedure Rate	908	887	1.02
Overall Prescribing Rate	5,290	5,360	0.99
Generic Prescribing %	0%	0%	--
ER Visit Rate	48	41	1.19
Admits per 1000 Episodes	0	25	0.00
Days per 1000 Episodes	0	63	0.00
Average Length of Stay	--	2.50	0.00

Episode Detail and Analysis

Atherosclerosis

Total Specialty Episode Costs: \$1,406

Cost per Episode	# of Episodes	Total	Primary Care Core	Specialty Care	Laboratory	Radiology	Hospital	Pharmacy	ER
Actual	2	\$702.92	\$0.00	\$702.92	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Peers		\$387.57	\$0.00	\$387.57	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Index			--	--	--	--	--	--	--

Encounters per 1000 Episodes

Actual		0	1,500	0	0	0	0	0	0
Peers		0	1,125	0	0	0	0	0	0
Index		--	--	--	--	--	--	--	--

Atrial fibrillation & flutter

Total Specialty Episode Costs: \$507

Cost per Episode	# of Episodes	Total	Primary Care Core	Specialty Care	Laboratory	Radiology	Hospital	Pharmacy	ER
Actual	1	\$507.36	\$6.20	\$106.50	\$25.66	\$0.00	\$75.58	\$293.43	\$0.00
Peers		\$1,715.52	\$35.87	\$465.51	\$46.52	\$69.43	\$459.09	\$533.92	\$105.18
Index			--	--	--	--	--	--	--

Encounters per 1000 Episodes

Actual		1,000	9,000	3,500	0	1,000	11,000	0	0
Peers		1,435	6,459	2,597	208	319	9,968	141	141
Index		--	--	--	--	--	--	--	--

Cardiomyopathy

Total Specialty Episode Costs: \$7,224

Cost per Episode	# of Episodes	Total	Primary Care Core	Specialty Care	Laboratory	Radiology	Hospital	Pharmacy	ER
Actual	3	\$2,407.90	\$32.88	\$1,410.90	\$2.32	\$0.00	\$613.18	\$348.61	\$0.00
Peers		\$1,340.66	\$19.72	\$515.26	\$49.66	\$109.92	\$300.36	\$345.74	\$0.00
Index			--	--	--	--	--	--	--

Encounters per 1000 Episodes

Actual		1,333	3,750	167	0	1,000	10,333	0	0
Peers		511	3,479	736	205	379	8,779	0	0
Index		--	--	--	--	--	--	--	--

Congestive heart failure

Total Specialty Episode Costs: \$2,818

Cost per Episode	# of Episodes	Total	Primary Care Core	Specialty Care	Laboratory	Radiology	Hospital	Pharmacy	ER
Actual	1	\$2,817.56	\$0.00	\$655.48	\$28.58	\$682.19	\$384.57	\$0.00	\$1,066.73
Peers		\$1,496.61	\$27.44	\$714.02	\$20.78	\$106.20	\$314.81	\$286.36	\$26.99
Index			--	--	--	--	--	--	--

Encounters per 1000 Episodes

Actual		0	4,000	100	1,000	1,000	0	500	500
Peers		854	3,447	349	243	269	8,881	41	41
Index		--	--	--	--	--	--	--	--

Hyperlipidemia, other

Reporting Period : 1/1/2006 - 12/31/2007

Provider # : 6388502012

Total Specialty Episode Costs: \$13,932

Cost per Episode	# of Episodes	Total	Primary Care Core	Specialty Care	Laboratory	Radiology	Hospital	Pharmacy	ER
Actual	19	\$720.64	\$38.46	\$188.41	\$20.36	\$35.22	\$0.00	\$421.22	\$16.97
Peers		\$631.67	\$28.58	\$106.52	\$34.61	\$37.56	\$9.55	\$409.05	\$5.80
Index			1.35	1.77	0.59	0.94	0.00	1.03	2.93

Encounters per 1000 Episodes

Actual			719	1,748	719	52	0	3,879	52
Peers			581	1,180	788	60	13	4,203	5
Index			1.24	1.48	0.91	0.86	0.00	0.92	11.35

Hypertension

Total Specialty Episode Costs: \$67,221

Cost per Episode	# of Episodes	Total	Primary Care Core	Specialty Care	Laboratory	Radiology	Hospital	Pharmacy	ER
Actual	43	\$1,569.36	\$88.65	\$760.21	\$27.68	\$311.39	\$7.03	\$324.61	\$49.79
Peers		\$1,228.51	\$75.29	\$468.78	\$19.68	\$188.49	\$148.75	\$266.33	\$61.20
Index			1.18	1.62	1.41	1.65	0.05	1.22	0.81

Encounters per 1000 Episodes

Actual			1,474	4,513	275	533	47	7,891	47
Peers			1,401	3,557	298	364	156	7,021	46
Index			1.05	1.27	0.92	1.46	0.30	1.12	1.02

Ischemic heart disease

Total Specialty Episode Costs: \$13,605

Cost per Episode	# of Episodes	Total	Primary Care Core	Specialty Care	Laboratory	Radiology	Hospital	Pharmacy	ER
Actual	9	\$1,511.63	\$160.14	\$759.84	\$7.31	\$381.47	\$0.00	\$202.87	\$0.00
Peers		\$2,378.04	\$45.89	\$672.60	\$29.37	\$278.61	\$978.17	\$288.30	\$85.11
Index			--	--	--	--	--	--	--

Encounters per 1000 Episodes

Actual			2,935	5,500	176	611	0	3,667	0
Peers			1,218	5,527	684	613	541	5,077	106
Index			--	--	--	--	--	--	--

Valvular disorder

Total Specialty Episode Costs: \$11,319

Cost per Episode	# of Episodes	Total	Primary Care Core	Specialty Care	Laboratory	Radiology	Hospital	Pharmacy	ER
Actual	14	\$818.25	\$17.60	\$679.04	\$0.90	\$106.43	\$10.24	\$4.04	\$0.00
Peers		\$1,047.19	\$32.37	\$590.16	\$14.37	\$108.66	\$179.66	\$61.34	\$60.62
Index			0.54	1.15	0.06	0.98	0.06	0.07	0.00

Encounters per 1000 Episodes

Actual			428	3,217	145	217	72	289	0
Peers			828	3,654	448	225	245	1,854	61
Index			0.52	0.88	0.32	0.96	0.29	0.16	0.00

Member Quality Non-Compliance List

Member ID	Member Name	Date of Birth	Gender	Age	Condition	Case	Rule
0231115813		3/25/1957	M	49	Cardiology	HTN	Pt(s) taking an NSAID med.
1576957219		9/21/1956	M	50	Cardiology	HTN	Pt(s) that had a serum creatinine in last 12 rpt mos.
1722584502		3/16/1959	F	47	Cardiology	HTN	Pt(s) taking an NSAID med.
3510814590		8/22/1968	M	38	Endocrinology	Hyperlipidemia	Pt(s) w/ the most recent HDL result \geq 40mg/dL.
5095625983		1/7/1951	F	55	Endocrinology	Hyperlipidemia	Pt(s) w/ the most recent LDL result $<$ 160mg/dL.
5095625983		1/7/1951	F	55	Endocrinology	Hyperlipidemia	Pt(s) w/ the most recent HDL result \geq 40mg/dL.
6189711566		7/4/1953	M	53	Cardiology	HTN	Pt(s) taking an ACE-inhibitor, angiotensin II receptor antagonist, diuretic, or aldosterone receptor blocker that had a serum K+ in last 12 rpt mos.
6189711566		7/4/1953	M	53	Cardiology	HTN	Pt(s) that had a serum creatinine in last 12 rpt mos.
7310373120		4/9/1960	M	46	Endocrinology	Hyperlipidemia	Pt(s) w/ the most recent HDL result \geq 40mg/dL.
8090910733		6/10/1963	F	43	Cardiology	HTN	Pt(s) taking an ACE-inhibitor, angiotensin II receptor antagonist, diuretic, or aldosterone receptor blocker that had a serum K+ in last 12 rpt mos.
8090910733		6/10/1963	F	43	Cardiology	HTN	Pt(s) that had a serum creatinine in last 12 rpt mos.
8365387487		11/5/1952	M	54	Endocrinology	Hyperlipidemia	Pt(s) w/ the most recent HDL result \geq 40mg/dL.
8577199106		6/16/1948	M	58	Cardiology	HTN	Pt(s) taking an ACE-inhibitor, angiotensin II receptor antagonist, diuretic, or aldosterone receptor blocker that had a serum K+ in last 12 rpt mos.
8577199106		6/16/1948	M	58	Cardiology	HTN	Pt(s) that had a serum creatinine in last 12 rpt mos.

Report Introduction and Interpretation

Patterns of Care

Episode Case Mix Summary

Panel Morbidity - Peer Distribution

Quality

Cost and Use

Episode Detail

Member Quality Non-Compliance

Information from Measure Evaluation

Measure Number and Name: ETG Based Hip/Knee replacement resource use measure (#1609)

Description:

Measure Developer: Ingenix

Summary Assessment

The clinical and construction logic of the measure is described in detail. Measure users should be able to implement it using the description provided.

The reliability of both the data and the measure score has been established. Validity has not been established empirically; a methodology used to assess face validity is described.

The target population is described as adult/elderly but no specific age ranges are given. The measure has been tested in a commercial database only → it can be endorsed for use in commercial populations only.

The measure is submitted for implementation in:

- Group or Practice
- Individual clinician
- Other Clinician teams
- Facility
- Health Plan
- Integrated Delivery System
- County or City
- State
- Regional
- National

The approach used to determine low and high outliers needs more explanation.

Reliability (2a)

2a1. Is the measure well defined and precisely specified?

- a) Measure clinical logic described? Yes X No
- b) Measure construction logic described? Yes X No
- c) Risk-adjustment methodology described? Yes X No
- d) Is the data derivation process described in sufficient detail for users to implement the measure?
 - i. Target population and data sources identified
 - ii. Measure specific target conditions and events identified
 - iii. Data elements and outcome variable(s) clearly defined
 - iv. Measurement windows, exclusions, risk adjustment methodology clearly defined and explained

- a) The description of the measure clinical logic is complete and exhaustive. The clinical care episode is defined using Episode Treatment Groups (ETG) and Procedure Episode Groups (PEG).
- b) The measure construction logic is described in detail. The presentation is clear and organized, including a description of how the data should be prepared and organized by potential measure users. A short list of pitfalls to avoid is also included.
- c) The risk adjustment methodology consists of simple stratification grouping by DRG.
- d) The data derivation process is described in detail:
 - i. The data source is Ingenix's own National health care services database covering medical and pharmacy services for more than 25 million individuals. The period used covered the years 2006-2010. The target population is only described as adult/elderly care. No specific age ranges could be found in the submission.
 - ii. The target condition for this measure is identified as Hip/Knee replacement. The events associated with the target condition are also identified through the ETG/PEG methodology.
 - iii. A data dictionary is provided. The outcome variables are well defined as total cost per episode and measures of utilization per 1,000 episodes.
 - iv. The measurement window is 1 year worth of data. The risk adjustment methodology consists of simple stratification grouping by DRG.

2a2 Reliability Testing

Data Reliability

- a) Was data reproducibility assessed?

Yes. The measure developers assessed data reproducibility by performing parallel development of the ETG/PEG and resource use calculations using two independent software approaches. The ETG/PEG and Resource Use Measure software results were compared to the results obtained from a SAS prototype developed using the exact same specifications. This analysis was performed on a sample of 4 million members.

The measure developers observed a matching rate of over 99.9% between the two approaches. A match is defined as exact agreement of the grouping of records and assignment of resource use.

Measure Score Reliability

- a) Measure score reliability tested (signal-to-noise ratio analysis by means of ANOVA, Intra-class Correlation Coefficient or other means)

Yes. The measure score was an integral part of the data reliability analysis described above.

Validity (2b)
2b1 Is there evidence presented that the measure specifications allow to demonstrate variations in resource use across providers and/ or population groups? Does the measure and risk-adjustment methodology address this variability allowing for fair comparisons?
<p>2b2 Validity Testing</p> <p>Data Elements</p> <p>a) Has the data been compared to other authoritative data sources? (Other databases, literature, etc.)</p> <p>There is no comparison to similar independent claims databases. A comparison of the distribution of important variables to the literature could not be found.</p> <p>b) Data integrity checked? (e.g. Percent of missing values, missing diagnosis codes, inconsistent dates, range checks, etc.)</p> <p>No evidence of checking for data integrity was found. There is no mention of any checks performed during measure development. The measure steward does recommend that users of the measure perform their own data integrity checks.</p> <p>c) Is the data representative of the target population?</p> <p>Unclear. The main source of data is the Ingenix National health care services benchmark database. This is a large database with information on providers and medical and pharmacy services for a population of more than 25 million covered lives. However, the target population is only described as adult/elderly. Further, the measure was tested in a commercial database. No specific age ranges could be found in the submission.</p> <p>Measure Score</p> <p>a) Has the measure score validity been shown? (By correlating to another valid indicator, or showing that it produces different results when applied to subgroups known to have differences in resource use or by expert opinion or other methods)</p> <p>No. The measure developers describe the assessment of face validity by describing the distribution of ETGs, PEGs, Episode Types, Record Types, Outlier Status and Type of Service. No results for these analyses were included in the submission.</p>
2b3 Are exclusions supported by clinical evidence?
<p>a) Has a sensitivity analysis been performed of the measure with and without the exclusions in terms of distribution of the outcome and number of patients affected?</p> <p>No. There are exclusions related to incomplete episodes and the presence of low outliers. The methodology used to classify an observation as a low or high outlier is not presented. The effect of the exclusions in the distribution of the outcomes and number of patients affected is</p>

not shown.

b) Are the reasons for exclusions properly addressed?

No. Patients considered low outliers are excluded from consideration. High outliers are included and their values are winsorized. The thresholds for an observation to be considered a low or high outlier are not provided. No explanation for the differential treatment of the two types of outliers was given.

c) Are any of the exclusions based on patient preferences?

No

2b4 Is the measure risk-adjusted? If not, is there a rationale that supports no risk-adjustment/risk stratification?

a) Is the risk-adjustment methodology described completely and accurately?

Yes. It consists of simple stratification grouping by DRG levels. The justification for this approach is that 70% of costs for the measure are accounted by the inpatient stay. The DRG correlates with this cost.

b) If a statistical model was used, is it appropriate for the problem at hand?

N/A

c) Candidate and final variable selection adequately described

N/A

d) Summary indicators of model fit, calibration and discrimination if appropriate provided

N/A

e) Risk factors identified make clinical/practical sense

N/A

f) Missing data/imputation methodology explained.

None used.

g) The model validates when applied to a new dataset (i.e., no overfitting)

Not tested

h) How are influential observations handled?

Low outliers are excluded. High outliers are winsorized. No explanation for the differential

treatment or the criteria used to classify an observation as an outlier was given.

2b5 Risk factors identified are associated with statistically significant and clinically meaningful differences

a) Are issues of statistical vs. practical significance addressed?

No

2b6 Demonstration that the method produces comparable results in different data sources

a) Does the method produce expected results when applied to different databases accounting for the differences in databases (e.g., an option to use administrative **or** medical record data)?

The method did not provide options for different data sources.

2c Are identified disparities in care being used as risk factors?

Factors that identify groups with differences/inequalities in care (race, socioeconomic status, gender, etc.) should not be part of the risk-adjustment methodology

N/A

Other comments:

Reviewer: Carlos Alzola