Primary Total Hip Arthroplasty
Performance Measurement Set

Approved Final Measures

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EXECUTIVE SUMMARY

The American Association of Hip and Knee Surgeons (AAHKS) formed a Hip Arthroplasty Work Group to identify and define quality measures towards improving outcomes for patients undergoing an elective primary total hip arthroplasty.

In 2012 AAHKS developed a set of quality measures to improve the outcomes for patients undergoing total knee replacement. Several of the total knee replacement measures have been adopted for use with patients undergoing a hip arthroplasty.

An earlier pilot project that utilized the RAND/UCLA modified Delphi methodology to develop a set of candidate quality indicators for total joint replacement was used to identify the potential topic areas for the quality measures for hip arthroplasty.[1]

Purpose of Measurement Set

AAHKS formed a Hip Arthroplasty Work Group to identify and define quality measures to improve outcomes for patients undergoing an elective primary total hip arthroplasty. This project utilized the expertise of practicing orthopaedic surgeons and other clinicians to create explicit, valid, and feasible quality measures that can be used to monitor and improve the quality of orthopaedic care. The measures evaluate outcomes and appropriate preoperative, intraoperative, postoperative care which are critical to improving patient function and quality of life.

Importance of Topic

In 2005 it was estimated that 26.9 million adults in the United States had osteoarthritis.[2] In 2010 there were 326,100 hip arthroplasties performed.[3] From 2004 to 2009 the annual rate of hip arthroplasties covered by Medicare grew by 2.2 percent.[4]

A 2015 Blue Health Intelligence report found the average cost for a total hip replacement to be $30,124 between 2010 and 2013.[5] The report showed a wide variation (between $11,327 and $73,987) in the cost of hip arthroplasty across the nation. The total hospital expenditures in 2009 for hip joint replacements totaled $13.7 billion.[6]

In a study conducted by Kurtz and colleagues, it was estimated that the demand for hip arthroplasties will continue to grow to 572,000 annual procedures by 2030.[7]

Intended Audience, Care Setting, and Patient Population

These measures are designed for use by physicians and eligible health care professionals managing ongoing care for all patients undergoing an elective primary total hip arthroplasty. Three measures address patient outcomes and three measures address processes of care.

These measures are meant to be used for performance at the individual physician level.

Measure Harmonization

When existing hospital-level or plan-level measures are available for the same measurement topics, AAHKS attempts to harmonize the measures to the extent possible.

Hip Arthroplasty
Measure #1: Postoperative Complications within 90 Days Following the Procedure

Measure Description

Percentage of patients undergoing an elective primary total hip arthroplasty who **did not** have a secondary procedure on the operative hip for any of the following reasons: periprosthetic fracture, dislocation, mechanical failure of the implant, irrigation/debridement of deep infection or a debridement of a superficial infection or hematoma within 90 days following the procedure

Measure Components

Numerator Statement	Patients who **did not** have a secondary procedure on the operative hip for any of the following reasons: periprosthetic fracture, dislocation, mechanical failure of the implant, irrigation/debridement of deep infection or a debridement of a superficial infection or hematoma within 90 days following the procedure See definition of periprosthetic joint infection below*
Denominator Statement	All patients undergoing an elective primary total hip arthroplasty
Denominator Exceptions	Patient does not keep postoperative visit
Supporting Guideline & Other References	The following evidence statements are quoted <u>verbatim</u> from the referenced clinical guidelines: Patients with hip or knee OA who are not obtaining adequate pain relief and functional improvement from a combination of non-pharmacological and pharmacological treatment should be considered for joint replacement therapy. Replacement arthroplasties are effective and cost-effective for patients with significant symptoms, and/or functional limitations associated with a reduced health-related quality of life, despite conservative therapy. (OARSI 2008)[8]

* **PJI Is Present When One of the Major Criteria Exists or Three Out of Five Minor Criteria Exists:**

Major Criteria	Two positive periprosthetic cultures with phenotypically identical organisms, **OR** A sinus tract communicating with the joint, **OR**
Minor Criteria	1) Elevated serum C-reactive protein (CRP) **AND** erythrocyte sedimentation rate (ESR) 2) Elevated synovial fluid white blood cell (WBC) count **OR** ++change on leukocyte esterase test strip 3) Elevated synovial fluid polymorphonuclear neutrophil percentage (PMN%) 4) Positive histological analysis of periprosthetic tissue 5) A single positive culture

The Threshold for the Minor Diagnostic Criteria

Criterion	Acute PJI (< 90 days)
Erythrocyte Sedimentation Rate (mm/hr)	Not helpful. No threshold was determined
C-Reactive Protein (mg/L)	100
Synovial White Blood Cell Count (cells/μl)	10,000
Synovial Polymorphonuclear (%)	90
Leukocyte Esterase	+ Or ++
Histological Analysis of Tissue	> 5 neutrophils per high power field in 5 high power fields (× 400)

International Consensus Group on Periprosthetic Joint Infection 2014[9]

Measure Importance

Rationale

A study based on data from the California Joint Registry performed by SooHoo and colleagues found a 90-day complication rate of 3.81% including dislocations of 1.39%, infection of 0.90% and perioperative fracture of 0.01%.[10]

A study of Medicare data by Katz showed a dislocation rate of 3.1% and an infection rate of 0.20% within 90 days.[11]

Deep infection represents approximately 15% of the reasons for hip revisions in the US.[12]

In a 2012 study conducted by Katz et al, it was identified that the risk of revision for total hip replacements was approximately 2 % per year for the first 18 months following the primary surgery.[13]

National Quality Strategy Domain	Patient Safety
Exception Justification	This measure has a denominator exception.
Harmonization with Existing Measures	Harmonization with existing measures under development was attempted.

Measure Designation

Measure purpose	• Quality improvement • Accountability
Type of measure	• Outcome
Level of Measurement	• Individual practitioner
Care setting	• Ambulatory care • Hospital care

Data source	• Electronic health record (EHR) data • Paper medical record • Registry data

Technical Specifications

The specifications listed below are those needed for the performance calculation.

Denominator (Eligible Population)	All patients undergoing an elective primary total hip arthroplasty CPT Service Code: 27130 (**Excludes hip fractures** - see addendum for exclusion codes)
Denominator Exception	Patient does not keep postoperative visit
Numerator	Patients who **did not** have a secondary procedure on the operative hip for any of the following reasons: periprosthetic fracture, dislocation, mechanical failure of the implant, irrigation/debridement of deep infection or a debridement of a superficial infection or hematoma within 90 days following the procedure

Hip Arthroplasty
Measure #2: Health and Functional Improvement

Measure Description

Percentage of patients undergoing a hip arthroplasty who reported functional status based on the Hip dysfunction and Osteoarthritis Outcome Score for Joint Replacement (HOOS Jr,) **AND either** the NIH PROMIS-10 Global instrument **OR** the VR-12 during the preoperative visit within 3 months prior to the procedure and at the postoperative visit between 180 and 365 days following the procedure

Measure Components

Numerator Statement	Patients who reported functional status based on the Hip dysfunction and Osteoarthritis Outcome Score for Joint Replacement (HOOS Jr,) **AND either** the NIH PROMIS-10 Global instrument **OR** the VR-12 during the preoperative visit within 3 months prior to the procedure and at the postoperative visit between 180 and 365 days following the procedure Note: The HOOS Jr. Hip Survey includes 6 questions (2 questions related to pain and 4 questions related to function).
Denominator Statement	All patients undergoing an elective primary total hip arthroplasty
Denominator Exceptions	Patient refuses to participate in the patient reported functional status survey Patient does not keep postoperative visit
Supporting Guideline & Other References	The following evidence statements are quoted <u>verbatim</u> from the referenced clinical guidelines: Patients with hip or knee OA who are not obtaining adequate pain relief and functional improvement from a combination of non-pharmacological and pharmacological treatment should be considered for joint replacement therapy. Replacement arthroplasties are effective and cost-effective for patients with significant symptoms, and/or functional limitations associated with a reduced health-related quality of life, despite conservative therapy. (OARSI 2008)[14] Evidence to support the efficacy of THA and TKA is based substantially on numerous uncontrolled observational studies and a very small number of cohort studies where outcomes have been compared with standard medical care. These are well summarized in a 2004 qualitative and systematic review[15] of the scientific literature relating to health-related quality of life outcomes following THA and TKA. This analyzed the outcomes in 74 arthroplasty studies (32 hip and knee, 26 THA and 16 TKA alone) involving many thousands of patients with OA. The Short Form-36 (SF-36) (40 studies) and the WOMAC index (28 studies) were the instruments most frequently employed. Most studies reported on post-operative outcomes up to 6 or 12 months but there were some data on clinical outcomes up to 7 years following surgery. All studies reported substantial improvements in pain and physical functioning but the effects on mental health and social functioning were more variable. Pain scores improved more quickly and more dramatically than physical functional outcomes with maximal improvements in the first 3 – 6 months.

Measure Importance

Rationale	There is increased emphasis on evaluating patient reported outcomes especially in the area of joint replacement. A study conducted by SooHoo and colleagues identified that 81 percent of patients achieved a minimal clinically important difference of three patient reported outcome measures 3 months following THA and TKR.[16] In addition, the study showed the importance of measuring both generic quality of life function and disease-specific function.
National Quality Strategy Domain	Person and Caregiver-Centered Experience Outcomes
Exception Justification	This measure has two denominator exceptions.
Harmonization with Existing Measures	This measure has been harmonized with the new proposed CMS measure.

Measure Designation

Measure purpose	• Quality improvement • Accountability
Type of measure	• Outcome
Level of Measurement	• Individual practitioner
Care setting	• Ambulatory care
Data source	• Electronic health record (EHR) data • Paper medical record • Registry data

Technical Specifications

The specifications listed below are those needed for the performance calculation.

Denominator (Eligible Population)	All patients undergoing an elective primary total hip arthroplasty CPT Service Code: 27130 (**Excludes hip fractures** – see addendum for exclusion codes)
Denominator Exceptions	Patient refuses to participate in the patient reported functional status survey Patient does not keep postoperative visit
Numerator	Patients who reported functional status based on the Hip dysfunction and Osteoarthritis Outcome Score for Joint Replacement (HOOS Jr,) **AND either** the NIH PROMIS-10 Global instrument **OR** the VR-12 during the preoperative visit within 3 months prior to the procedure and at the postoperative visit between 180 and 365 days following the procedure

Hip Arthroplasty
Measure #3: Shared Decision-Making: Trial of Conservative (Non-surgical) Therapy

Measure Description

Percentage of patients undergoing a hip arthroplasty with documented shared decision-making including discussion of conservative (non-surgical) therapy (e.g. NSAIDs, analgesics, weight loss, exercise, injections) prior to the procedure

Measure Components

Numerator Statement	Patients with documented shared decision-making including discussion of conservative (non-surgical) therapy (e.g. NSAIDs, analgesics, weight loss, exercise, injections) prior to the procedure
Denominator Statement	All patients undergoing an elective primary total hip arthroplasty
Denominator Exceptions	None
Supporting Guideline & Other References	The following evidence statements are quoted verbatim from the referenced clinical guidelines: Patients with hip or knee OA who are not obtaining adequate pain relief and functional improvement from a combination of non-pharmacological and pharmacological treatment should be considered for joint replacement therapy. Replacement arthroplasties are effective and cost-effective for patients with significant symptoms, and/or functional limitations associated with a reduced health-related quality of life, despite conservative therapy. (OARSI 2008)[17]

Measure Importance

Rationale	A trial of non-surgical therapy should be used prior to surgery, when possible. Non-surgical therapy may include the use of NSAIDs, other analgesics, exercise, or injections. For patients with severe disability, the patient and surgeon may decide after a thorough review of conservative options that the optimal treatment is to proceed with the operative intervention. In a study conducted by Bozic and others, patients who were considered appropriate for hip or knee replacement were provided either a shared decision making intervention or normal care. The patients in the intervention group reached an informed decision 58 percent of the time during the first visit with the surgeon compared to the control group (33 percent). The decision and communication materials helped both the patients and the orthopedic surgeons.[18]
National Quality Strategy Domain	Communication and Care Coordination
Exception Justification	This measure has no exceptions.

Harmonization with Existing Measures	Harmonization with existing measures was not applicable to this measure.

Measure Designation

Measure purpose	• Quality improvement • Accountability
Type of measure	• Process
Level of Measurement	• Individual practitioner
Care setting	• Ambulatory care
Data source	• Electronic health record (EHR) data • Paper medical record • Registry data

Technical Specifications

The specifications listed below are those needed for the performance calculation.

Denominator (Eligible Population)	All patients undergoing an elective primary total hip arthroplasty CPT Service Code: 27130 (**Excludes hip fractures** – see addendum for exclusion codes)
Numerator	Patients with documented shared decision-making including discussion of conservative (non-surgical) therapy (e.g. NSAIDs, analgesics, weight loss, exercise, injections) prior to the procedure

Hip Arthroplasty
Measure #4: Venous Thromboembolic and Cardiovascular Risk Evaluation

Measure Description

Percentage of patients undergoing a hip arthroplasty who are evaluated for the presence or absence of cardiovascular risk factors within 30 days prior to the procedure (e.g. history of deep venous thrombosis (DVT), pulmonary embolism (PE), myocardial infarction (MI), arrhythmia, and stroke)

Measure Components

Numerator Statement	Patients who were evaluated for the presence or absence of cardiovascular risk factors within 30 days prior to the procedure (e.g. history of DVT, PE, MI, arrhythmia, and stroke)
Denominator Statement	All patients undergoing an elective primary total hip arthroplasty
Denominator Exceptions	None
Supporting Guideline & Other References	The following evidence statements are quoted verbatim from the referenced clinical guidelines. In patients with known coronary artery disease (CAD) or the new onset of signs or symptoms suggestive of CAD, baseline cardiac assessment should be performed. In the asymptomatic patient, a more extensive assessment of history and physical is warranted in those individuals 50 years of age or older, because the evidence related to the determination of cardiac risk factors and derivation of a Revised Cardiac Risk Index occurred in this population. Preoperative cardiac evaluation must therefore be carefully tailored to the circumstances that have prompted the evaluation and to the nature of the surgical illness. (ACC/AHA 2007)[19]

Measure Importance

Rationale

Prior to a hip arthroplasty the patient's venous thromboembolic and cardiovascular risk should be evaluated. A population-based study of all Olmstead County, Minnesota, patients undergoing a total hip or knee arthroplasty from 1994 - 2008, reported that patients undergoing a total hip arthroplasty with a previous history of a cardiac event or a thromboembolic event were associated with an increased risk of a 90-day cardiac event following surgery.[20]

A study using the Danish national resident registries compared all patients undergoing a primary total hip replacement and total knee replacement from 1998 – 2007 to control groups not undergoing one of the procedures and found that the AMI rate 2 weeks after total hip replacement was increased 25-fold compared to the control group.[21]

Any preoperative disease state should be identified and managed prior to surgery to minimize the risk of the surgical procedure.

National Quality Strategy Domain	Patient Safety
Exception Justification	This measure has no exceptions.
Harmonization with Existing Measures	Harmonization with existing measures was not applicable to this measure.

Measure Designation

Measure purpose	• Quality improvement • Accountability
Type of measure	• Process
Level of Measurement	• Individual practitioner
Care setting	• Ambulatory care • Hospital care
Data source	• Electronic health record (EHR) data • Paper medical record • Registry data

Technical Specifications

The specifications listed below are those needed for the performance calculation.

Denominator (Eligible Population)	All patients undergoing an elective primary total hip arthroplasty CPT Service Code: 27130 (**Excludes hip fractures** – see addendum for exclusion codes)
Numerator	Patients who were evaluated for the presence or absence of cardiovascular risk factors within 30 days prior to the procedure (e.g. history of DVT, PE, MI, arrhythmia, and stroke)

Hip Arthroplasty
Measure #5: Identification of Implanted Prosthesis in Operative Report

Measure Description

Percentage of patients undergoing hip arthroplasty whose operative report identifies the prosthetic implant specifications including the prosthetic implant manufacturer, the brand name of the prosthetic implant, and the size of each prosthetic implant

Measure Components

Numerator Statement	Patients whose operative report identifies the prosthetic implant specifications including the prosthetic implant manufacturer, the brand name of the prosthetic implant, and the size of each prosthetic implant
Denominator Statement	All patients undergoing an elective primary total hip arthroplasty
Denominator Exceptions	None
Supporting Guideline & Other References	The following evidence statements are quoted verbatim from the referenced clinical guidelines: Effective tracking of devices from the manufacturing facility, through the distributor network (including distributors, retailers, rental firms and other commercial enterprises, device user facilities, and licensed practitioners) and ultimately, to the patient is necessary for the effectiveness of remedies prescribed by the act, such as patient notification (section 518 (a) of the act) or device recall (section 518 (e) of the act). 21 CFR 821.1 (b)[22]

Measure Importance

Rationale	It is important to capture the type of prosthesis used. The FDA requires appropriate tracking of the device but this information may not be readily available to the surgeon performing the revision. The number of patients undergoing a revision total hip replacement is more than 40,000 annually at a direct cost of over $1 billion.[23] The surgeon performing the revision needs to be able to identify the prosthesis and size of the prostheses that were used in the initial surgery to determine if a complete revision is required or if a partial revision could be performed. The initial operative report should contain the necessary information which will ultimately help the future treating physician who performs the revision surgery.
National Quality Strategy Domain	Patient Safety
Exception Justification	This measure has no exceptions.
Harmonization with Existing Measures	Harmonization with existing measures was not applicable to this measure.

Measure Designation

Measure purpose	• Quality improvement • Accountability
Type of measure	• Process
Level of Measurement	• Individual practitioner
Care setting	• Hospital care
Data source	• Electronic health record (EHR) data • Paper medical record • Registry data

Technical Specifications

The specifications listed below are those needed for the performance calculation.

Denominator (Eligible Population)	All patients undergoing an elective primary total hip arthroplasty CPT Service Code: 27130 (**Excludes hip fractures** – see addendum for exclusion codes)
Numerator	Patients whose operative report identifies the prosthetic implant specifications including the prosthetic implant manufacturer, the brand name of the prosthetic implant, and the size of each prosthetic implant

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