Measure Set: Advanced Certification for Total Hip & Total Knee Replacement (THKR)

Measure ID#: THKR-01

Performance Measure Name: Prophylactic Antibiotic Started Within One Hour of Incision

Description: Surgical patients with prophylactic antibiotics started within one hour prior to surgical incision. Patients who receive vancomycin for prophylactic antibiotics should have the vancomycin started within two hours prior to surgical incision due to the longer infusion time required for this antibiotic.

Setting: Inpatient, Hospital Outpatient Departments, Ambulatory Surgery Centers

Rationale: A goal of prophylaxis with antibiotics is to establish bactericidal tissue and serum levels at the time of skin incision. Studies performed in the 1960’s and 1970’s demonstrated that a common reason for failure of prophylaxis was delay of antibiotic administration until after the operation. In a study of 2,847 surgery patients at LDS Hospital in Salt Lake City, it was found that the lowest incidence of post-operative infection was associated with antibiotic administration during the one hour prior to surgery. The risk of infection increased progressively with greater time intervals between administration and skin incision. This relationship was observed whether antibiotics preceded or followed skin incision (Classen 1993).

Type of Measure: Process

Improvement Noted As: An increase in the rate.

Numerator Statement: Patients undergoing total hip or total knee replacement who had the prophylactic antibiotic started within one hour of incision (two hours if receiving vancomycin).

Included Populations: As above

Excluded Populations: None

Denominator Statement: Patients undergoing a total hip or total knee replacement.

Included Populations: Patients with an ICD-10-PCS Principal Procedure Code as defined in Appendix A, Table 1 (Total Hip Replacement) or Table 2 (Total Knee Replacement).
Excluded Populations:
- Patients less than 18 years of age
- Patients who have a Length of Stay greater than 120 days
- Patients enrolled in clinical trials
- Patients whose ICD-10 principal procedure occurred prior to the date of admission
- Patients with physician/advanced practice nurse/physician assistant (physician/APN/PA) documented infection prior to surgical procedure of interest
- Patients with an ICD-10-CM Principal Diagnosis suggestive of preoperative infectious diseases (as defined in Appendix A, Table 3 for ICD-10-CM codes)
- Patients who had other procedures requiring general or neuraxial anesthesia that occurred within 3 days prior to or after the procedure of interest (during separate surgical episodes) during this hospital stay

Risk Adjustment: No

Data Reported As: Proportion for hip replacements, proportion for knee replacements and aggregated proportion for hip & knee replacements.

Selected References:
Candidate Performance Measure Profile

Candidate Performance Measure Profile

**Measure Set:** Advanced Certification for Total Hip & Total Knee Replacement (THKR)

**Measure ID#:** THKR-02

**Performance Measure Name:** Prophylactic Antibiotic Completely Infused Prior to Inflation of Proximal Tourniquet (Knee Replacements Only)

**Description:** Patients undergoing total knee replacement who had the prophylactic antibiotic completely infused prior to inflation of proximal tourniquet.

**Setting:** Inpatient, Hospital Outpatient Departments, Ambulatory Surgery Centers

**Rationale:** The prevention of infection is paramount when replacing a joint. Often the antibiotic is not administered until just before the surgery begins. With the use of a tourniquet, all blood flow to the leg ceases, thereby stopping the flow of antibiotic to the places it is needed most, the site of the incision and the implant. As a result infection continues to be a common complication of conventional joint replacement surgery.¹ This measure evaluates that the prophylactic antibiotic is completely infused prior to the inflation of the tourniquet. Antibiotic prophylaxis was evaluated by SooHoo et al. They evaluated the timing, the discontinuation, the appropriateness of the antibiotic and the proximal tourniquet inflation after infusion. Adherence to this indicator ranged from 24 to 27 percent.²

**Type of Measure:** Process

**Improvement Noted As:** An increase in the rate.

**Numerator Statement:** Patients undergoing total knee replacement who had the prophylactic antibiotic completely infused prior to inflation of the proximal tourniquet.

- **Included Populations:** As above
- **Excluded Populations:** None

**Denominator Statement:** Patients undergoing a total knee replacement.

- **Included Populations:** Patients with an ICD-10-PCS Principal Procedure Code as defined in Appendix A, Table 2 (Total Knee Replacement).
- **Excluded Populations:**
  - Patients less than 18 years of age
  - Patients who have a Length of Stay greater than 120 days
  - Patients enrolled in clinical trials
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- Patients whose ICD-10 principal procedure occurred prior to the date of admission
- Documentation of medical reason for not completely infusing the prophylactic antibiotic prior to the inflation of the proximal tourniquet
- Tourniquet was not used
- Patients with physician/advanced practice nurse/physician assistant (physician/APN/PA) documented infection prior to surgical procedure of interest
- Patients with an ICD-10-CM Principal Diagnosis suggestive of preoperative infectious diseases (as defined in Appendix A, Table 3 for ICD-10-CM codes)
- Patients who had other procedures requiring general or neuraxial anesthesia that occurred within 3 days prior to or after the procedure of interest (during separate surgical episodes) during this hospital stay

Risk Adjustment: No

Data Reported As: Proportion for knee replacements

Selected References:

Candidate Performance Measure Profile

**Measure Set:** Advanced Certification for Total Hip & Total Knee Replacement (THKR)

**Measure ID#:** THKR-03

**Performance Measure Name:** Regional Anesthesia

**Description:** Patients undergoing a total hip or total knee replacement with regional anesthesia.

**Setting:** Inpatient, Hospital Outpatient Departments, Ambulatory Surgery Centers

**Rationale:** Regional anesthesia (peripheral nerve blocks, spinal/epidural anesthesia and periarticular local anesthetic injections) provide better pain control and lead to faster rehabilitation and fewer complications than general anesthesia. The utilization of regional anesthesia for primary joint arthroplasty is associated with improved perioperative outcomes. Research shows that patients who received regional anesthesia had statistically significant decreases in 30-day mortality, length of hospital stay and in-hospital complications. Additional studies show decrease in DVT/PE, operating room time and need for blood transfusions. Compared with general anesthesia alone, regional anesthesia reduced postoperative pain, morphine consumption, and opioid-related adverse effects. Length of stay may be reduced and rehabilitation facilitated for patients undergoing regional anesthesia and analgesia for total knee arthroplasty.

Anesthetic practice for joint replacements has been evolving towards wider use of regional anesthesia. According to the National Surgical Quality Improvement Project database, from 2005-2011, 52% and 60% of knee and hip replacements respectively were performed under general anesthesia.

Some surgeons avoid using regional anesthesia due to concerns that regional anesthesia may cause motor weakness, making patients more likely to fall when they are walking in the first days after joint replacement surgery. Research has shown that use of regional anesthesia had lower adjusted odds of inpatient falls compared with adjusted odds of inpatient falls with the use of general anesthesia alone. The type of anesthesia may represent a modifiable risk factor and the use of regional over general anesthesia may be considered in the context of a fall-prevention program.

**Type of Measure:** Process

**Improvement Noted As:** An increase in the rate.

**Numerator Statement:** Patients undergoing a total hip or total knee replacement with regional anesthesia performed

**Included Populations:** Patients receiving any of the following during the
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operative episode:

- Peripheral nerve block, single dose
- Peripheral nerve block, continuous infusion
- Epidural anesthesia
- Spinal anesthesia
- Periarticular local anesthetic infiltrations/injection

Excluded Populations: None.

Denominator Statement: Patients undergoing a total hip or total knee replacement.

Included Populations: Patients with an ICD-10-PCS Principal Procedure Code as defined in Appendix A, Table 1 (Total Hip Replacement) or Table 2 (Total Knee Replacement).

Excluded Populations:
- Patients less than 18 years of age
- Patients who have a Length of Stay greater than 120 days
- Patients enrolled in clinical trials
- Documentation of patient preference of anesthesia other than regional
- Documented contraindication by physician/APN/PA to regional anesthesia (i.e., anticoagulated patients, coagulopathies, neurologic condition, previous spinal fusion)

Risk Adjustment: No

Data Reported As: Proportion for hip replacements, proportion for knee replacements and aggregated proportion for hip & knee replacements.

Selected References:


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- Premier-IHI Integrated Care Pathway for Total Joint Arthroplasty (April 2013)
- National Surgical Quality Improvement Project database
- FORCE-Total Joint Registry database
Candidate Performance Measure Profile

**Measure Set:** Advanced Certification for Total Hip & Total Knee Replacement (THKR)

**Measure ID#:** THKR-04

**Performance Measure Name:** Postoperative Mobilization on Day of Surgery

**Description:** Patients undergoing total hip or total knee replacement who mobilized the day of surgery.

**Setting:** Inpatient, Hospital Outpatient Departments, Ambulatory Surgery Centers

**Rationale:** Early mobilization as close to the time of surgery as possible, can reduce the risk of complications associated with bed rest such as deep vein thrombosis, pulmonary embolism, atelectasis, pneumonia and urinary retention. Additionally, early mobilization results in a decreased length of stay, lowering the patient’s risk for hospital acquired infections and other complications. Early mobilization leads to improvement in outcomes (range of motion, gait, balance, muscle strength and pain) without an increase in adverse events.¹ Studies demonstrating positive results showed that rapid mobilization can be achieved as early as in the recovery room.²

**Type of Measure:** Process

**Improvement Noted As:** An increase in the rate.

**Numerator Statement:** Patients undergoing total hip or total knee replacement who mobilized the day of surgery.

**Included Populations:**

Postoperative mobilization with nursing, physical therapy or other health care provider on the day of surgery includes any of the following activities (with assistive devices and/or physical assist as needed/appropriate for safety):

- Transfer from bed to chair
- Sit out of bed
- Sit to stand
- Stand
- Walk

**Excluded Populations:** None

**Denominator Statement:** Patients undergoing a total hip or total knee replacement.
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Included Populations: Patients with an ICD-10-PCS Principal Procedure Code as defined in Appendix A, Table 1 (Total Hip Replacement) or Table 2 (Total Knee Replacement).

Excluded Populations:
- Patients less than 18 years of age
- Patients who have a Length of Stay greater than 120 days
- Patient enrolled in clinical trials
- Postoperative patients who are admitted to ICU the day of surgery
- Documented contraindication by physician/APN/PA for not mobilizing on day of surgery.
- Patients with an ICD-10-CM Principal or Secondary diagnosis of hip fracture as defined in Appendix A, Table 4 (Hip fracture diagnosis)

Risk Adjustment: No

Data Reported As: Proportion for hip replacements, proportion for knee replacements and aggregated proportion for hip & knee replacements.

Selected References:
- 1Guerra ML, Singh PJ, Taylor NF. Early mobilization of patients who have had a hip or knee joint replacement reduces length of stay in hospital: A systematic review. Clin Rehabil. 2014 Dec 1.
- AAOS Guidelines on Preventing Venous Thromboembolic Disease in Patients Undergoing Elective Hip and Knee Arthroplasty”, AAOS.
- Premier-IHI Integrated Care Pathway for Total Joint Arthroplasty (April 2013)
Raut S, Mertes SC, Muniz-Terrera G, Khanduja V. Factors associated with prolonged length of stay following a total knee replacement in patients aged over 75. *Int Orthop* 2012; 36: 1,601–1,608.


Renkawitz T, Rieder T, Handel M. Comparison of two accelerated clinical pathways – after total knee replacement how fast can we really go? *Clinical Rehabilitation* 2010; 24:230-239.


Measure Set: Advanced Certification for Total Hip & Total Knee Replacement (THKR)

Measure ID#: THKR-05

Performance Measure Name: Discharged to Home

Description: Patients whose preoperative goal (as documented in the medical record) was to be discharged to home and who were discharged to home following total hip or total knee replacement.

Setting: Inpatient, Hospital Outpatient Departments, Ambulatory Surgery Centers

Rationale: Home-based rehabilitation is increasingly utilized to reduce health-care costs; however, with a shorter hospital stay, the possibility arises for an increase in adverse clinical outcomes. Research has shown that despite concerns about early hospital discharge, there is no difference in pain, functional outcomes, or patient satisfaction between groups that received home-based rehabilitation versus inpatient rehabilitation. Home-based rehabilitation protocol following elective primary total hip or knee replacement is the more cost-effective strategy.\(^1\)\(^2\)

According to 2012 Medicare claims data, 49% of patients undergoing hip and knee replacements were discharged to an inpatient rehabilitation facility (IRF) or skilled nursing facility (SNF) for rehabilitation. Therefore, only 51% of patients were discharged to home.

Type of Measure: Process

Improvement Noted As: An increase in the rate.

Numerator Statement: Patients whose preoperative goal (as stated in the medical record) was to be discharged to home and who were discharged to home following total hip or total knee replacement.

Included Populations: As above.

Excluded Populations: None

Denominator Statement: Patients undergoing a total hip or total knee replacement whose preoperative goal) is to be discharged to home

Included Populations: Patients with an ICD-10-PCS Principal Procedure Code as defined in Appendix A, Table 1 (Total Hip Replacement) or Table 2 (Total Knee Replacement).
Excluded Populations:
- Patients less than 18 years of age
- Patients who have a Length of Stay greater than 120 days
- Patients enrolled in clinical trials
- Patients undergoing bilateral total knee or total hip replacements
- Patients whose preoperative goal is to be discharged to a destination other than home

Risk Adjustment: No

Data Reported As: Proportion for hip replacements, proportion for knee replacements and aggregated proportion for hip & knee replacements.

Selected References:
- Inpatient Rehabilitation Facility Services: Assessing payment adequacy and updating payments - Report to the Congress: Medicare Payment Policy March 2014
Measure Set:  Advanced Certification for Total Hip & Total Knee Replacement (THKR)

Measure ID#: THKR-06

Performance Measure Name: Preoperative Functional/Health Status Assessment as Reported by Patient

Description:  Percentage of patients who completed a validated pre-operative functional/health status assessment tool 90 days prior to surgery. Examples of validated tools include VR-12, PROMIS Global-10, HOOS/KOOS, HOOS JR/KOOS JR.

Setting: Inpatient, Hospital Outpatient Departments, Ambulatory Surgery Centers

Rationale: Good orthopedic care requires a knowledge of the patient’s history of musculoskeletal pain and associated limitations in daily function. Standardized measures of patient-reported outcomes (PROs) can provide this information. Integrating PROs into routine orthopedic patient visits can provide key information to monitor changes in symptom severity over time, support shared clinical care decisions, and assess treatment effectiveness.1

The American Academy of Orthopedic Surgeons and American Association of Hip and Knee Surgeons are very supportive of the Centers for Medicare and Medicaid Services’ effort to develop patient-reported functional status outcome measures for total hip and knee arthroplasty. When fully specified and risk-adjusted, these measures will be useful in assessing quality and value of care and will permit performance measurement progression beyond process measures, which are often poorly correlated with outcomes that matter to patients and clinicians.2,3

The VR-12 is a generic patient reported outcome (PRO) measure used to measure health related quality of life. This tool, which measures physical function and health status, is widely used and well validated in the total hip and total knee population. Additionally, the Patient Reported Outcomes Measurement Information System (PROMIS) Global-10 instrument, funded by the National Institutes of Health, is increasingly used in the United States. PROMIS instruments use modern measurement theory to assess patient-reported health status for physical, mental, and social well-being to reliably and validly measure patient-reported outcomes (PROs) for clinical research and practice. PROMIS instruments measure concepts such as pain, fatigue, physical function, depression, anxiety and social function.

Hip disability and Osteoarthritis Outcome Score (HOOS) and Knee injury and Osteoarthritis Outcome Score (KOOS) are well validated and widely used instruments for measuring joint-specific pain and physical function before and after joint replacement. While the full HOOS and KOOS surveys are lengthy, the orthopedic
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Community prefers an abbreviated survey that captures a subset of items referred to as HOOS JR/KOOS JR.

Type of Measure: Process

Improvement Noted As: An increase in the rate.

Numerator Statement: Patients who completed a validated pre-operative functional/health status assessment tool 90 days prior to surgery. Examples of validated tools include:

- VR-12
- PROMIS Global-10
- HOOS/HOOS JR (hip patients only)
- KOOS/KOOS JR (knee patients only)

Included Populations: As above

Excluded Populations: None

Denominator Statement: Patients undergoing elective total hip or total knee replacement.

Included Populations: Patients with an ICD-10-PCS Principal Procedure Code as defined in Appendix A, Table 1 (Total Hip Replacement) or Table 2 (Total Knee Replacement).

Excluded Populations:
- Patients less than 18 years of age
- Patients who have a Length of Stay greater than 120 days
- Patients enrolled in clinical trials
- Patients with an ICD-10-CM Principal or Secondary diagnosis of hip fracture as defined in Appendix A, Table 4 (Hip fracture diagnosis)

Risk Adjustment: No

Data Reported As: Proportion for hip replacements, proportion for knee replacements and aggregated proportion for hip & knee replacements
Selected References:

2. AAOS letter to Andy Slavitt, Acting Administrator/CMS dated April 3, 2015. Re.: Response during public comment on “Proposed Electronic Clinical Quality Measures for Functional Status Assessment and Improvement for Patients who received a Total Hip Replacement and Functional Status Assessment and Improvement for Patients who received a Total Knee Replacement.”