

I. Impairment Due to Osteoarthritis Despite Non-Surgical Therapy

Prior to surgery, candidates for joint replacement therapy should have clearly documented impairment and evidence of osteoarthritis according to standardized radiographic criteria. Unless highly disabling osteoarthritis is evident at the time the patient first seeks medical attention, a trial of conservative therapy is appropriate.

A) Document impairment

1. Document impairment according to Knee Injury and Osteoarthritis Outcome Score (KOOS) Jr. or Hip Dysfunction and Osteoarthritis Outcome Score (HOOS) Jr.*
2. Document self-reported loss of function with the Patient Reported Outcomes Measurement Information System-10® (PROMIS-10)
3. Providers may also wish to document:
 - a. Function on lower extremity activity scale or
 - b. Pain on numeric pain rating scale.

B) Document radiological findings

1. Review standard x-ray (weight bearing hip, weight bearing knee) of the affected joint and interpret according to Kellgren-Lawrence scale. Total joint replacement therapy generally requires a grade of 3 or 4.
 - a. Standard hip radiographs may include:
 - i. Anterior posterior (AP) pelvis view (weight bearing or non-weight bearing)
 - ii. Lateral hip view (cross table or frog leg, non-weight bearing)
 - b. Standard knee radiographs may include:
 - i. Weight bearing anterior posterior (AP) view
 - ii. Weight bearing notch (Rosenberg) view
 - iii. Lateral view (weight bearing)
 - iv. Sunrise view (non-weight bearing)
2. If appropriate femur, tibia/fibula, or long leg radiographs in patients with concomitant deformities.
3. X-rays are the preferred diagnostic test for joint arthritis. In the setting of negative x-rays, with symptoms and/or exam findings suggestive of severe arthritis, an MRI of the joint may be helpful.

C) Shared decision-making. Patient must participate in shared decision-making. A Washington State-approved patient decision tool should be used when available. The shared decision-making process must include discussion of procedure, implant, and patient preference. Conversation should include understanding of evidence, likelihood of risks and benefits, tradeoffs in selecting an option, the patient's informed preferences, and a decision about surgical intervention.

1. **Communication** with the **surgical team** must include:
 - a. **Evidence-informed conversation about** risks, benefits and tradeoffs of non-surgical and surgical options
 - b. **Evidence-informed conversation about** risks, benefits and tradeoffs of different surgical approaches
 - c. Surgeon and institutional volume of procedures per year, including readmission and complication rates

* The HOOS Jr and KOOS Jr are subsets of the HOOS and KOOS. The full HOOS and KOOS satisfy this requirement if used instead of the shorter versions.

- d. Any financial relationship between surgeon and device manufacturers or other vendors
2. Implant. **Communication** with the **surgical team** must include a written document regarding the surgical implant including:
 - a. The type of implant under consideration including name, manufacturer/model, material used for bearing surface for hip implants, and surgeon's experience with the type of device.
 - b. Expected lifespan and overall performance of the device, particularly adverse outcomes.
 - c. Institution's methods for monitoring safety of devices
3. Patient preference. A record of the patient's informed preferences, and the shared decision about the treatment plan

D) Document conservative therapy for at least three months unless symptoms are severe and radiological findings show advanced osteoarthritis (such as with a Kellgren-Lawrence grade 4)

1. The length of time and intensity of conservative therapy will vary by patient-specific factors such as severity of symptoms and ability to engage actively in treatments such as physical therapy. The Bree Collaborative recommends patient-customized conservative treatments for at least three months, focusing on improving functionality and helping patients adapt expectations around persistent functional limitations.
2. Trial of one or more of the following physical measures:
 - a. **Physical therapy (e.g., activity modification, strengthening exercises) supervised by a licensed provider related to the knee or hip**

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- b. Weight loss, if indicated
- c. Strengthening exercises (e.g., yoga, tai-chi)
- d. Assistive devices
- e. Bracing if judged appropriate
3. Trial of one or more of the following medications, if not contraindicated:
 - a. Oral non-steroidal anti-inflammatory drugs
 - b. Topical non-steroidal anti-inflammatory drugs
 - c. Acetaminophen
 - d. Intra-articular injection of corticosteroids[†]
4. **Document failure of non-surgical therapy**
 - a. Document impairment according to Knee Injury and Osteoarthritis Outcome Score (KOOS) Jr. or Hip Dysfunction and Osteoarthritis Outcome Score (HOOS) Jr.[‡]
 - b. Document self-reported loss of function with the Patient Reported Outcomes Measurement Information System-10[®] (PROMIS-10).
 - c. Providers may also wish to document:
 - i. Function on lower extremity activity scale or
 - ii. Pain on numeric pain rating scale.

[†] May be contraindicated within 12 months of surgery due to increased risk of infection.

[‡] The HOOS Jr and KOOS Jr are subsets of the HOOS and KOOS. The full HOOS and KOOS satisfy this requirement if used instead of the shorter versions.

II. Fitness for Surgery

Prior to surgery, candidates for joint replacement therapy should meet minimal standards to ensure their safety and commitment to participate actively in return to function. If a patient does not meet fitness for surgery standards the case should be discussed in a multidisciplinary conference with members relevant to the standard in question as chosen by the care team.

A) Document requirements related to patient safety

1. Patient should meet the following minimum requirements prior to surgery:
 - a. Body Mass Index less than 40
 - b. Avoidance of nicotine use for at least four weeks pre-operatively
 - c. Hemoglobin A1c less than 8% in patients with diabetes
 - d. Implementation of a plan to manage opioid dependency, if present and when possible consider tapering off opioids prior to surgery
 - e. Effective management of alcohol overuse if screen is positive
 - f. Effective management of depression if screen is positive
 - g. Adequate peripheral circulation to ensure healing
 - h. Adequate nutritional status to ensure healing
 - i. Sufficient liver function to ensure healing
 - j. Absence of anemia that would complicate recovery from surgery
 - k. Absence of an active, life-limiting condition that would likely cause death before recovery from surgery
 - l. Adequate management of any conditions unrelated to osteoarthritis that may limit the benefits of surgery such as chronic use of corticosteroids, immunosuppressive drugs and/or inflammatory arthritis
 - m. Absence of dementia that would interfere with recovery – performing total joint surgery for a patient with such dementia requires preauthorization, informed consent of a patient's durable power of attorney for health care, and a contract with the patient's primary care provider
 - n. The care team must assess home environment for safety and adequate support including need for assistive devices.
2. Providers and patients should develop a pre-operative plan for post-operative return to function

B) Document patient engagement

1. Patient should designate a personal care partner[§] who actively participates in the following:
 - a. Surgical consultation
 - b. Pre-operative evaluation
 - c. Joint replacement class and/or required surgical and anesthesia educational programs
 - d. In-facility care
 - e. Post-operative care teaching
 - f. Patient's home care and exercise program
2. If patient cannot or will not designate a care partner, the surgical team should discuss how to best support the patient post-surgery and document this plan in the medical record
3. Patient will be encouraged to participate in end-of-life care planning, including completion of an advance directive and designation of durable power of attorney for health care

[§] In addition to friends, neighbors, and family members, individuals who have already had knee or hip replacement surgery have been effective care partners in existing programs.

C) Document optimal preparation for surgery

1. Perform pre-operative history, physical, and screening lab tests based on review of systems:
 - a. **Measure serum albumin**
 - b. Evaluate for cardiac and pulmonary fitness
 - c. If indicated, obtain basic lab profile, plasma glucose, prothrombin time, complete blood count, urinalysis with culture
 - d. Treat nasal passages for possible staphylococcal carrier state or culture nasal passages and treat if positive
 - e. Ensure A1c 8% or less in patients with diabetes
 - f. Perform x-rays of knee or hip, if not performed within previous 12 months
 - g. Screen for predictors of delirium
2. Obtain relevant consultations:
 - a. Evaluate for good dental hygiene with dental consultation as necessary
 - b. Refer to appropriate medical providers or specialists as necessary for preoperative evaluation
 - c. Consider consulting physical therapy to instruct in strengthening of upper and lower extremities
3. Provide education regarding care at home following discharge including:
 - a. Joint replacement class or video
 - b. Home safety
 - c. Fall avoidance
 - d. Expected psychosocial response to surgery
 - e. Expectations of surgical outcomes
 - f. Other relevant topics
4. **Screen for housing instability, food insecurity, and transportation need(s)**

- D) Discuss the case in a multidisciplinary conference with members as defined by the care team if patient does not meet standards for appropriateness or fitness for surgery.**

III. Repair of the Osteoarthritic Joint

An experienced surgical team should use evidence-based practices to avoid complications.

A) General standards for a surgical team performing TKR/THR surgery

1. The surgeon should perform at least 50 arthroplasties annually and the facility 100 arthroplasties annually (see introduction for further contractual recommendations)
2. Members of the surgical team must have documented credentials, training, and experience
3. The roster of the surgical team should be consistent
4. Elective joint arthroplasty must be scheduled to begin before 5:00 pm
5. Facilities in which surgery is performed should have policies that align with the American College of Surgeons Statement on Health Care Industry Representatives in the Operating Room. The patient should be informed if there will be an industry representative in the room.
6. Providers should follow guidelines for concurrent and overlapping surgeries as set forth by the American College of Surgeons.

B) Elements of optimal surgical process

1. Optimize pain management and anesthesia:
 - a. Use multimodal pain management format to minimize sedation and encourage early ambulation
 - b. Minimize use of opioids
 - c. Management of previously-identified anesthesia-related risk factors
2. Avoid infection:
 - a. Require application of chlorhexidine skin prep by patient at bedtime and morning prior to surgery
 - b. Administer appropriate peri-operative course of antibiotics according to Centers for Medicare and Medicaid Services (CMS) guidelines set forth in the Surgical Care Improvement Project for the prevention of surgical site infections
 - c. Restrict use of urinary catheter to less than 48 hours
3. Avoid bleeding and low blood pressure:
 - a. Administer standardized protocols using appropriate medications to limit blood loss
 - b. Use standardized IV fluid protocols including those implemented by RNs post-operatively with appropriate supervision and monitoring
4. Avoid deep venous thrombosis and embolism according to CMS guidelines set forth in the Surgical Care Improvement Project
5. Avoid hyperglycemia through standardized protocol to maintain optimal glucose control

C) Selection of the surgical implant

1. Select an implant that has a <5% failure rate at ten years. ** For more recently introduced implants registry data should demonstrate a failure rate of less than 1% per year for the first 5 years and then never > 5% between years 6-10.
2. All hospitals and facilities must report level I data to the American Joint Replacement Registry
3. Surgical teams are encouraged to select implants from suppliers that offer warranties against defects

** This performance standard is supported by evidence from both the Australian Orthopedic Association National Joint Replacement Registry and the National Joint Registry for England and Wales. The 2012 reports are available online: <https://aoanjrr.dmac.adelaide.edu.au/annual-reports-2012> and [www.njrcentre.org.uk/njrcentre/Portals/0/Documents/England/ Reports/9th annual report/NJR 9th Annual Report 2012.pdf](http://www.njrcentre.org.uk/njrcentre/Portals/0/Documents/England/Reports/9th%20annual%20report/NJR%209th%20Annual%20Report%202012.pdf), respectively.

IV. Post-Operative Care and Return to Function

A standard process should be in place to support the goals of avoiding post-surgical complications, ensuring rapid return to function, optimizing hospital length of stay, and avoiding unnecessary readmissions.

A) Standard process for post-operative care

1. Utilize a rapid recovery track to mobilize patients on the day of surgery:
 - a. Provide accelerated physical therapy and mobilization if regional pain control is acceptable
 - b. Provide a patient-oriented visual cue to record progress on functional milestones required for discharge
 - c. Instruct patients in home exercise, use of walking aids and precautions
 - d. Instruct care partner to assist with home exercise regimen
2. Patients that meet Medicare standards for placement in a skilled nursing facility will have their post-operative nursing and rehabilitative needs addressed
3. Hospitalists or appropriate medical consultants will be available for consultation to assist with complex or unstable medical problems in the post-operative period
4. Instruction to contact care team if recovery is not proceeding according to plan

B) Use standardized hospital discharge process aligned with Washington State Hospital Association (WSHA) toolkit

1. Arrange follow up with care team according to WSHA toolkit
2. Evaluate social and resource barriers based on WSHA toolkit
3. Reconcile medications
4. Provide patient and family/caregiver education with plan of care:
 - a. Signs or symptoms that warrant follow up with provider
 - b. Guidelines for emergency care and alternatives to emergency care
 - c. Contact information for orthopedist and primary care provider
5. Ensure post-discharge phone call to patient by care team to check progress, with timing of call aligned with WSHA toolkit

C) Arrange home health services

1. Provide the patient and care partner with information about home exercise programs
2. Arrange additional home health services as necessary

D) Schedule follow up appointments

1. Schedule return visits as appropriate
2. Measure patient-reported functional outcomes with HOOS Jr./KOOS Jr. instrument at nine to twelve months.
3. If opioid use exceeds six weeks, develop a formal plan for opioid management

Quality Standards

The provider group performing surgery must maintain or participate in a registry of all patients having first-time, single-joint total knee or total hip replacement surgery for osteoarthritis (TKR/THR patients), excluding patients with joint replacement for fracture, cancer, or inflammatory arthritis. This registry will be updated quarterly and be available for reporting to current or prospective purchasers and their health plan. It will be made available to quality organizations such as the Washington Health Alliance and the Foundation for Health Care Quality.

During the first year of the bundled contract, providers will be expected to install methods to measure appropriateness, evidence-based surgery, return to function, and the patient care experience according to the standards noted below. Reporting of results will be expected to begin the second year of the contract. The only exception to this reporting requirement is that the measures of patient safety and affordability noted in section 5 below will begin the first year of the contract.

See **Appendix** for more detailed information on quality standard numerators and denominators.

1. Standards for appropriateness

These standards are intended to document patient engagement in medical decision-making and measurement of impairment prior to surgery. Report:

- a. Proportion of TKR/THR patients (as defined above) receiving formal shared decision-making decision aids pre-operatively
- b. Proportion of TKR/THR patients with documented musculoskeletal function prior to surgery – the Knee Injury and Osteoarthritis Outcome Score (KOOS) Jr. or Hip Dysfunction and Osteoarthritis Outcome Score (HOOS) Jr.
- c. Proportion of TKR/THR patients with documented patient-reported measures of quality of life – the PROMIS-10 Global Health.
- d. Results of scores for KOOS Jr. and HOOS Jr. and questions regarding everyday physical activities (Question 7) and pain (Question 10) on the PROMIS-10 survey

2. Standards for evidence-based surgery

These standards are intended to document adherence to evidence-based best practices related to the peri-operative process. Report the proportion of TKR/THR patients that have received all of the following in the peri-operative period:

- a. Measures to manage pain using multimodal anesthesia
- b. Measures to reduce risk of venous thromboembolism and pulmonary embolism
- c. Measures to reduce blood loss such as administration of tranexamic acid
- d. Measures to reduce infection such as administration of prophylactic antibiotics
- e. Measures to maintain optimal blood sugar control

3. Standards for ensuring rapid return to function

These standards are intended to optimize mobilization following surgery and measure patient recovery. Report:

- a. Proportion of TKR/THR patients with documented physical therapy within 24 hours of surgery
- b. Proportion of TKR/THR patients for which there are documented patient-reported measures of quality of life and musculoskeletal function nine to twelve months following surgery – the same measures should be used as in standard 1b
- c. Results of measures from 2b, specifically including responses to the questions identified in standard 1c

4. Standards for the patient care experience

These standards are intended to measure patient-centered care. Report:

- a. Proportion of total hospital or practice patients surveyed using HCAHPS
- b. Results of measures from 4a, specifically including responses to Q6 and Q22 if HCAHPS is used

5. Standards for patient safety and affordability

These standards are intended to measure success in avoiding complications and reducing readmissions.

Report:

- a. 30-day all-cause readmission rate for TKR/THR patients
- b. 30-day readmission rate for TKR/THR patients with any of the nine complications included under the terms of the warranty

Providers are encouraged to use the CAHPS Surgical Care Survey to focus specifically on contribution of the surgeon to the patient care experience. Providers may also wish to share the results of the patient care experience from other vendors (e.g., Press Ganey).

Warranty

The warranty associated with the total joint bundle specifies that the purchaser will not provide reimbursement for readmission for avoidable complications within the risk windows specified below.

The Bree Collaborative Accountable Payment Model workgroup developed a warranty and bundled payment model for total knee and total hip replacement (TKR/THR), approved by the Collaborative in July and November of 2013. The 2013 warranty was based most heavily on a technical expert panel study of TKR/THR complications commissioned by the Centers for Medicare and Medicaid Services (CMS) (referred to as the CMS TEP report' in this document).¹ The workgroup also worked to align the warranty with the High Value Healthcare Collaborative (HVHC), a group of 18 major medical systems from across the country founded by the Dartmouth Institute for Health Policy and Clinical Practice (TDI), Dartmouth-Hitchcock, Mayo Clinic, Denver Health, Intermountain Healthcare, and Cleveland Clinic, to improve quality for these surgeries and studied private sector data from the Washington State marketplace and bundled payment initiatives from the Integrated Healthcare Association in California, from Meriter Health Plan in Wisconsin, and the CMS bundled payment initiative.²

The primary intent of the warranty is to set a high priority on patient safety. The warranty is also intended to balance financial gain for providers and institutions performing TKR/THR surgery with financial accountability for complications attributable to these procedures. In this warranty the intent is to distribute financial risk across professional and facility components in proportion to the revenue generated by the procedure.

Definitions related to a warranty for TKR and THR

- Diagnostic code for osteoarthritis - excludes trauma, cancer, inflammatory arthritis (e.g. rheumatoid arthritis) and congenital malformation
- Procedural codes for TKR and THR
- Age limits
- Definition of complications excluded from additional reimbursement
- Definition of warranty period

Diagnostic codes^{3,4}

The ICD-10 diagnostic code for osteoarthritis of the knee = M17.X

The ICD-10 diagnostic code for osteoarthritis of the hip = M16.X

The ICD-9 diagnostic code for osteoarthritis for either knee or hip = 715.X ("715 Osteoarthrosis and allied disorders")⁵

Procedure codes⁶

- Total hip replacement: ICD-9 procedure code = 81.51 (CPT procedure code = 27130 (total hip replacement) ICD-10 codes OSR90J9, OSR90JA, OSR90JZ, OSRBOJ9, OSRBOJA, OSRBOJZ.
- Total knee replacement: Associated ICD-9 procedure code = 81.54 (CPT procedure code = 27447 (total knee replacement) ICD-10 codes OSRC07Z, OSRC0JZ, OSRC0KZ, OSRD07Z, OSRD0JZ, OSRD0KZ, OSRT07Z, OSRT0JZ, OSRT0KZ, OSRU07Z, OSRU0JZ, OSRU0KZ, OSRV07Z, OSRV0JZ, OSRV0KZ, OSRW07Z, OSRW0JZ, OSRW0KZ.

Age limits⁷

≥18 years old (no upper limit)

Avoidable Complications⁸

Definition of avoidable complications included in warranty:

- As specified by CMS TEP report (*included in the 2012 Total Knee and Total Hip Replacement Warranty here: www.breecollaborative.org/wp-content/uploads/bree_warranty_tkr_thr.pdf*)
- Aligned with ICD-9/ICD-10 codes adopted by HVHC and NQF-1550
- See www.breecollaborative.org/wp-content/uploads/TJR-Codes-17-1031.xlsx for ICD-9/ICD-10 crosswalk of avoidable complications

Warranty period and other terms^{9,10}

1. Warranty period is complication-specific:

7 days*	30 days*	90 days*
<ul style="list-style-type: none">• Acute myocardial infarction• Pneumonia• Sepsis/septicemia	<ul style="list-style-type: none">• Pulmonary embolism• Surgical site bleeding• Wound infection	<ul style="list-style-type: none">• Mechanical complications• Periprosthetic joint infection

2. The warranty is valid only at the hospital or facility performing the surgery.

*From date of surgery

Appendix A: Bree Collaborative Members

Member	Title	Organization
Susie Dade MS	Deputy Director	Washington Health Alliance
John Espinola MD, MPH	Executive Vice President, Health Care Services	Premera Blue Cross
Gary Franklin MD, MPH	Medical Director	Washington State Department of Labor and Industries
Stuart Freed MD	Chief Medical Officer	Confluence Health
Richard Goss MD	Medical Director	Harborview Medical Center – University of Washington
Jennifer Graves, RN, MS	Senior Vice President, Patient Safety	Washington State Hospital Association
Christopher Kodama MD	President, MultiCare Connected Care	MultiCare Health System
Daniel Lessler MD, MHA	Chief Medical Officer	Washington State Health Care Authority
Paula Lozano MD, MPH	Associate Medical Director, Research and Translation	Kaiser Permanente
Wm. Richard Ludwig MD	Chief Medical Officer, Accountable Care Organization	Providence Health and Services
Greg Marchand	Director, Benefits & Policy and Strategy	The Boeing Company
Robert Mecklenburg MD	Medical Director, Center for Health Care Solutions	Virginia Mason Medical Center
Kimberly Moore MD	Associate Chief Medical Officer	Franciscan Health System
Carl Olden MD	Family Physician	Pacific Crest Family Medicine, Yakima
Mary Kay O'Neill MD, MBA	Partner	Mercer
John Robinson MD, SM	Chief Medical Officer	First Choice Health
Terry Rogers MD (Vice Chair)	Chief Executive Officer	Foundation for Health Care Quality
Jeanne Rupert DO, PhD	Medical Director, Community Health Services	Public Health – Seattle and King County
Kerry Schaefer	Strategic Planner for Employee Health	King County
Bruce Smith MD	Medical Director	Regence Blue Shield
Lani Spencer RN, MHA	Vice President, Health Care Management Services	Amerigroup
Hugh Straley MD (Chair)	Retired	Medical Director, Group Health Cooperative; President, Group Health Physicians
Shawn West MD	Family Physician	Edmonds Family Medicine

Appendix B: Accountable Payment Models Charter and Roster

Problem Statement

Health care in the United States is typically fee-for-service, rewarding providers for volume instead of quality. This misalignment between health care reimbursement and quality does not provide incentive for appropriateness, best outcomes, and affordability.

Aim

To recommend reimbursement models including warranties and bundled payments that align with patient safety, appropriateness, evidence-based quality, timeliness, outcomes and the patient care experience.

Purpose

To identify conditions of high variability in clinical practice and cost to purchasers, to define evidence-based standards of practice for these conditions and to develop quality measures that align with best practice. The intent of developing such standards and quality measures is to provide a basis for production, payment, and purchasing of health care that should be used by providers, health plans and purchasers as a basis for market-based health care reform.

Methods used by the Accountable Payment Models Workgroup (APM) should themselves be standardized, permitting applicability to a variety of medical conditions.

Duties and Functions

The APM workgroup shall:

1. Select a series of medical conditions in which variation in practice and price to purchasers is not associated with commensurate quality of outcomes.
2. Review existing standards related to each condition, particularly those developed by the Centers for Medicare and Medicaid Services.
3. Ensure that appropriate content experts and opinion leaders are recruited to participate in the work associated with each medical condition the APM workgroup selects.
4. Consult members of stakeholder organizations and subject matter experts on feedback on content of payment models the APM develops.
5. Define scope of work for each medical condition.
6. Identify common medical interventions for each condition to create a standardized patient care pathway.
7. Use standardized evidence search and appraisal methods to create an evidence table that can be used to assess the value of each intervention.
8. Eliminate interventions from the pathway that are not value-added to create a future-state patient care pathway.
9. Develop quality metrics that can be used to assess performance as providers to support payment and purchasing of health care.
10. Solicit feedback from stakeholders to improve the patient care pathway, evidence table and quality metrics.
11. Present the final draft to the Bree Collaborative for approval.

Structure

The APM will consist of individuals appointed by the Bree Collaborative Steering Committee. Individuals must have in-depth knowledge and expertise in at least one of the following: payment reform, the health care delivery system, benefit design, and/or quality improvement. There must be at least one representative from each stakeholder group: employer, health plan, hospital, provider (including a specialist), and quality improvement organization.

The workgroup will consist of individuals confirmed by Bree Collaborative members. Membership can be revised by the chair of the Bree Collaborative or the workgroup chairs. The chair of the workgroup will be appointed by the chair of the Bree Collaborative. The Bree Collaborative project director will staff and provide management and support services for the workgroup.

Less than the full workgroup may convene to: gather and discuss information; conduct research; analyze relevant issues and facts; or draft recommendations for the deliberation of the full workgroup. A quorum shall be a simple majority and shall be required to accept and approve recommendations to send to the Bree Collaborative.

Meetings

The APM will hold meetings at least once a month and more frequently if necessary.

The APM chairs will conduct meetings. The Collaborative project director will arrange for the recording of each meeting, and will distribute meeting agendas and other materials prior to each meeting.

Name	Title	Organization
Robert Mecklenburg, MD (Co-Chair)	Medical Director, Center for Health Care Solutions	Virginia Mason Medical Center
Kerry Schaefer (Co-Chair)	Strategic Planner for Employee Health	King County
Lydia Bartholomew, MD	Senior Medical Director, Pacific Northwest	Aetna
Shawn Boice, RN, BSN, MHA	Nurse Navigator, MSK Administration	Evergreen Health Care
Greg Brown, MD, PhD	Orthopedic Surgeon	CHI Franciscan
Sharon Eloranta, MD	Medical Director, Quality and Safety Initiatives	Qualis Health
Andrew Friedman, MD	Physiatrist	Virginia Mason Medical Center
Fred Huang, MD	Orthopedic Surgeon	Proliance Orthopedic Associates
Kevin Macdonald, MD	Orthopedic Oncology, Adult Reconstruction	Virginia Mason Medical Center
Linda Radach	Patient Advocate	
Jacqui Sinatra, MPA, FACHE	Service Line Director of Sports, Spine, & Ortho Health Svc	University of Washington Medical Center
Gaelon Spradley	Chief of Clinic Operations	Mason General Hospital
Theresa Sullivan	CEO	Samaritan Healthcare, Moses Lake

APPENDIX C: DETAILED QUALITY STANDARDS

For all of the following, THR/TKR patients refers to first-time, single-joint total knee or total hip replacement surgery for osteoarthritis, excluding patients with joint replacement for fracture, cancer, or inflammatory arthritis.

Please note that three of the quality measures refer to specific results or scores and therefore have no numerator or denominator.

	Numerator	Denominator
1: Standards for appropriateness		
a	Number of TKR/THR patients receiving formal shared decision-making decision aids pre-operatively	Total number of TKR/THR patients
b	Number of TKR/THR patients with documented patient-reported measures of quality of life and musculoskeletal function prior to surgery (Knee Injury and Osteoarthritis Outcome Score (KOOS) Jr. or Hip Dysfunction and Osteoarthritis Outcome Score (HOOS) Jr.	Total number of TKR/THR patients
c	Proportion of TKR/THR patients with documented patient-reported measures of quality of life – the PROMIS-10 Global Health	Total number of TKR/THR patients
d	Result of scores for KOOS Jr. and HOOS Jr. and questions regarding everyday physical activities (Question 7) and pain (Question 10) on the PROMIS-10 survey	
2: Standards for evidence-based surgery		
a	Number of TKR/THR patients receiving measures to manage pain while speeding recovery in a multimodal format in the peri-operative period	Total number of TKR/THR patients
b	Number of TKR/THR patients receiving measures to reduce risk of venous thromboembolism and pulmonary embolism in the peri-operative period	Total number of TKR/THR patients
c	Number of TKR/THR patients receiving measures to reduce blood loss such as administration of tranexamic acid in the peri-operative period	Total number of TKR/THR patients
d	Number of TKR/THR patients receiving measures to reduce infection such as administration of prophylactic antibiotics in the peri-operative period	Total number of TKR/THR patients
e	Number of TKR/THR patients receiving measures to maintain optimal blood sugar control in the peri-operative period	Total number of TKR/THR patients
3: Standards for ensuring rapid return to function		
a	Number of TKR/THR patients with documented physical therapy within 24 hours of surgery	Total number of TKR/THR patients
b	Number of TKR/THR patients with documented patient-reported measures of quality of life and musculoskeletal function six months following surgery (same as used as in standard 1b)	Total number of TKR/THR patients
c	Results of measures from 2b, specifically including responses to the questions identified in standard 1c (Quality of Life (Q2 and Q4) and Pain (P1, and P4-5) scores for KOOS Jr. and HOOS Jr. and questions regarding everyday physical activities (Question 7) and pain (Question 10) on the PROMIS-10 survey)	
4: Standards for the patient care experience		
a	Number of TKR/THR patients surveyed using HCAHPS	Total number of TKR/THR patients
b	Results of measures from 4a, specifically responses to Q6 and Q22 if HCAHPS is used	
5: Standards for patient safety and affordability		
a	Number of TKR/THR patients readmitted to the hospital within 30 days of discharge, all causes	Total number of TKR/THR patients
b	Number of TKR/THR patients readmitted to the hospital within 30 days of discharge for any of the nine complications included under the terms of the warranty	Total number of TKR/THR patients

References

¹ Summary of Technical Expert Panel (TEP) Evaluation of Measures: 30-Day Risk-Standardized Readmission Rate following Elective Total Hip and Total Knee Arthroplasty and Risk-Standardized Complication Rate following Elective Total Hip and Total Knee Arthroplasty. Prepared for CMS by Yale New Haven Health Services Corporation/Center for Outcomes Research and Evaluation. July 19, 2010. Link: http://www.cch-quality.com/Files/CMS_Hip.Knee_SummaryReport_TEP_7-19-10_FINAL_Hip.TKA.pdf

² Source material for definitions:

- High Value Health Care Collaborative - Ivan M. Tomek, Allison L. Sabel, Mark I. Froimson, George Muschler, David S. Jevsevar, Karl M. Koenig, David G. Lewallen, James M. Naessens, Lucy A. Savitz, James L. Westrich, William B. Weeks and James N. Weinstein. A Collaborative Of Leading Health Systems Finds Wide Variations In Total Knee Replacement Delivery And Takes Steps To Improve Value. Health Affairs, no. (2012): doi: 10.1377/hlthaff.2011.0935. (<http://content.healthaffairs.org/content/early/2012/04/30/hlthaff.2011.0935.full.html>)
- Integrated Healthcare Association, CA - (www.ihc.org) and personal communication with IHA staff;
- Meriter Health Plan, WI – personal communication with staff; and
- CMS Bundled Payment for Care Improvement Initiative: <http://innovation.cms.gov/initiatives/bundled-payments>.

³ Same as HVHC, IHA, and Meriter Health Plan TKR and THR bundle

⁴ Centers for Medicare and Medicaid Services. ICD-10 Clinical Concepts for Orthopedics. Available: <https://www.cms.gov/Medicare/Coding/ICD10/Downloads/ICD10ClinicalConceptsOrthopedics1.pdf>

⁵ 89% of all Total Hip Replacement (81.51) in Washington State were due to some type of principal diagnosis of Osteoarthritis (Data Source: CHARS, 2012 1st Quarter, 2011 4th Quarter, 2011 3rd Quarter, 2011 2nd Quarter); 97% of all Total Knee Replacement (81.54) in Washington State were due to some type of principal diagnosis of Osteoarthritis (Data Source: CHARS, 2012 1st Quarter, 2011 4th Quarter, 2011 3rd Quarter, 2011 2nd Quarter).

⁶ Same as HVHC, IHA, and Meriter Health Plan TKR and THR bundle.

⁷ The APM subgroup chose no upper age limit on the basis that it is best to defer to surgeons for the decision of whether surgery is appropriate for an older patient. Both IHA and Meriter uses an age cut off of 65 years old; HVHC uses 89 years old; the CMS requires patient to be a Medicare beneficiary (no upper limit).

⁸ APM subgroup agreed to adopt the complications list commissioned by CMS and adopted by HVHC. The APM subgroup also reviewed private payer utilization data on complications from TKR and THR produced and shared by payer subgroup members. Complications such as arrhythmia, congestive heart failure, and GI bleeding show up in private payer data analyses as complications but are omitted from HVHC list of complications. The APM subgroup agreed not to include these complications as they are not easily attributable to THR and TKR surgery.

⁹ The APM subgroup chose to adopt a warranty timeline model based on the study commissioned by CMS and adopted by HVHC. After reviewing Medicare and private payer data shared by payer subgroup members, the APM subgroup agreed that this model was preferred because it is specific, justified by the readmissions data, likely to capture procedure-related complications, protects purchasers, acceptable to providers, and endorsed by a highly respected group of orthopedists after a yearlong review process.

¹⁰ Centers for Medicare and Medicaid Services. Medicare Program; Advancing Care Coordination Through Episode Payment Models (EPMs); Cardiac Rehabilitation Incentive Payment Model; and Changes to the Comprehensive Care for Joint Replacement Model (CJR). January 3, 2017. Available: www.gpo.gov/fdsys/pkg/FR-2017-01-03/pdf/2016-30746.pdf