Guidance for Using PROMIS® Measures in Total Knee and Total Hip Replacement Surgery

This guide includes 6 sections to assist you in implementing PROMIS in your organization.

Choosing a Measure | Guidance for IT Team | Guidance for Office Staff | Interpretation in Clinic | Quality Improvement & Research | Additional Resources

Why Use PROMIS?

Patient-Reported Outcomes Measurement Information System® (PROMIS) measures can be utilized to monitor the outcomes of total knee/hip replacement surgery (TKR/THR) for both informing individual patient care and evaluating care quality. PROMIS measures address pain, physical function, emotional and social well-being, and quality of life. PROMIS measures offer several advantages:

Comprehensive Measurement

- Appropriate for use across patient conditions, including all orthopaedic procedures and for patients with multiple comorbidities.
- Can precisely measure patient outcomes and symptoms across the full range of severity.
- Can precisely capture change (improvement or deterioration) in symptoms and outcomes, which is critical when patient-reported outcomes (PROs) are used to evaluate the quality of TKR/THR care.
- Provides independent scores for physical function, pain, and quality of life. Physical function and pain are correlated, but may follow independent longitudinal trajectories, which can have important treatment implications (Karayannis et al., 2017).
- Most measures are scored on a common metric and can be compared to those of the U.S. general population.
- Scores from all measures (e.g., computer adaptive tests, short forms of varying lengths) can be directly compared.

Easy for Patients to Complete

- Measures are brief; approximately 10 items can assess physical function and pain interference using computer adaptive tests or 16 items using static forms.
- Available in multiple languages.

Flexible and Efficient for Office Staff

- Multiple measures are available (e.g., computer adaptive tests, short forms of varying lengths) that are easy for office staff to provide to patients before and during office visits.
- Measures can be integrated into or viewed in multiple electronic health records and assessment platforms.

Effective for Quality Monitoring

- Consistent outcome measures to support comparisons across patient conditions and differing populations.

Choosing a Measure

PROMIS Measures for TKR/THR

In most cases, the most relevant patient-reported outcomes (PROs) to measure in TKR/THR patient care are physical function and pain interference. PROMIS Physical Function assesses self-reported ability to perform daily activities. PROMIS Pain Interference assesses self-reported pain-related disruption of usual activities.

Recommended PROMIS Measures

- PROMIS Physical Function v2.0 Computer Adaptive Test (CAT; 4-12 items) ***or*** PROMIS Physical Function v2.0 Short Form 10a (10 items)
- PROMIS Pain Interference v1.1 CAT (4-12 items) ***or*** PROMIS Pain Interference v1.1 Short Form 6a (6 items)

Total assessment:

- 1.5 to 4 minutes
- 8-24 items

Other Measures to Consider

PROMIS Global
The PROMIS Global scale (10 items) is widely used because of payer endorsements. The Global scale provides a summary of one's physical and mental symptoms and functions and is helpful in comparing groups of individuals, but it is *not* ideal for use with a single patient. PROMIS physical function and pain measures generate more specific estimates and are therefore preferred. Second, Global scores make it difficult to tease apart the contributions of specific domains like physical function, pain, or fatigue. It is also difficult to translate a Global Physical or Global Mental score into actionable information in a clinical encounter (Hays et al., 2009).

Pain Intensity
The PROMIS Numeric Rating Scale v1.0 – Pain Intensity 1a (1 item) measures pain intensity and may be required as a measurement of quality in registries. It is scored as a raw score from 0-10 unlike other PROMIS measures that provide a T-score.

Region-Specific Outcome Measures
HOOS-12/KOOS-12 are joint-specific measures that reflect symptoms in the hip and knee respectively but allow the clinician to assess each symptom separately. The measures have 12 items and generate pain, function (or ADL) and quality of life scores that are comparable to the full HOOS and KOOS measures (Gandek et al., 2019a, 2019b).

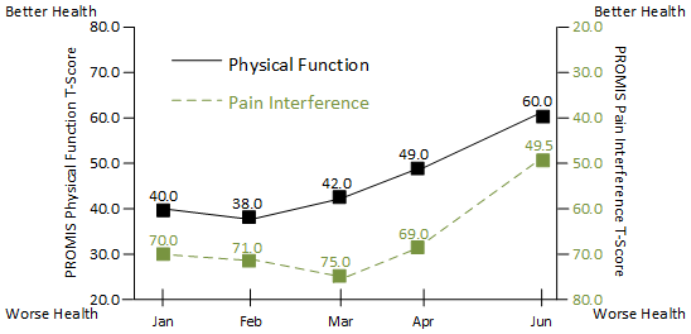
HOOS, JR./KOOS, JR. are also joint-specific measures that reflect symptoms in the hip and knee respectively, but they cannot address broader health impact. As with PROMIS Global, the JR scores are aggregate and do not allow the user to tease apart physical function, pain, or fatigue. This limits the translation of scores to actionable information in a clinical encounter (Lyman et al., 2016a, 2016b).

Guidance for Information Technology Team

Prepare the Electronic Health Record (EHR) for patients to complete PROMIS measures from home:

1. Determine PROMIS measures
   - Specify computer adaptive tests (CATs) or fixed length short forms.
   - Capture assessment date to report trends.
2. Define contextual variables and EHR capture
   - Specify EHR capture or patient report of clinical variables required for PROMIS interpretation in clinic (e.g., age, sex, surgery date).
   - Specify EHR capture of comorbid measures for use in quality analyses.
3. Define assessment time intervals and triggers
   - Program patient portal assessment to precede visit date (e.g., 1 week in advance).
   - Plan repeat reminders (e.g., 2 days before visit).
   - Program fixed follow-up assessment intervals to assess key treatment outcomes as long as needed for clinical care or quality (e.g., repeat PROMIS measures at 3, 6, and 12 months after surgery).
   - Program reminder emails for multiple contacts to increase patient response rate.
4. Define scoring algorithms and report criteria
   - Program PROMIS scoring (or use native EHR PROMIS scoring functions).
   - Determine report content and location in EHR for easy access in clinic.
   - Enable reporting of scores and dates over time (trends).
   - Develop graphic reports as feasible within the EHR. A sample report is provided to the left.

Sample report of PROMIS scores over time



Program EHR for PROMIS capture at visit:

1. Program EHR
   - Apply criteria for PROMIS capture from home for use when in the clinic setting.
2. Select hardware
   - Tablets, kiosks, and/or patient screens on exam room computers may be considered.

Program PROMIS management reports to guide capture and interpretation:

1. Reports for staff use
   - List of incomplete pre-visit assessments daily for each clinic to guide in-office PROMIS capture.
   - List of incomplete follow-up assessments to identify patients requiring reminders to complete the assessment.
2. Reports for clinical management use
   - Dashboard of completion rates (by clinic, surgeon, or other meaningful groups).
   - Descriptive statistics of aggregate PROMIS completers (vs. non-completers) by assessment (e.g., pre-surgery).
3. Reports for clinician use
   - Score descriptors (e.g., WNL, mild, moderate, severe) and trajectories for individual patients.
4. Reports for quality outcome use
   - Define reporting formats for mean PROMIS scores before and after treatment (e.g., before and at 6 months after surgery) for all patients and for individual surgeons.

Guidance for Office Staff

Patient-reported outcome (PRO) collection should be integrated into routine office procedures with clear staff accountability.

Before the Office/Virtual Visit

Integrate PROMIS collection into pre-visit procedures already in place.

1. Enable patients to complete PROMIS measures, preferably electronically, before the office/virtual visit. Maximizing complete assessments prior to the visit minimizes disruption in the office.
2. Include a letter from the patient's physician with the electronic (or mail) invitation to encourage patients to complete the assessment prior to the visit.
3. Provide a script to staff explaining the value of PROMIS data to patient care decisions.

At the Office Visit

Enable PROMIS collection into the clinical visit, either in the waiting room or exam room, for those patients who do not complete the assessment from home.

1. Work with IT to generate a list of patients with that day's visits who did ***not*** complete the assessment beforehand.
2. Determine which front-line staff member will ensure PROMIS measures are completed and data are available for review in the visit.
3. Determine where and how patients will complete measures (e.g., kiosk in waiting room, tablet in exam room). Establish a disinfection protocol for shared devices.
4. Enable easy access to PROMIS scores for the clinical team to facilitate use during the office visit, such as opening the EHR view to the results when rooming the patient.
5. Repeat these procedures for each visit to monitor PROMIS score change over time.

Reliance on patients to log into the patient portal is insufficient.

- Not all patients maintain portal accounts.
- Many patients will require technical assistance (e.g., need to retrieve a lost password).
- Greatest success is achieved through **multi-modal strategies** to collect PROMIS measures:
  - Before the clinic visit.
  - In clinic.
  - After clinic using reminders and phone prompts as needed.
- In the future, as patients are routinely technology savvy and easy-to-use information technology options expand, e-PROMIS collection will be the standard.

After the Office Visit

Implement a workflow that is independent of a clinical/virtual visit to collect PROMIS measures at routine follow-up intervals.

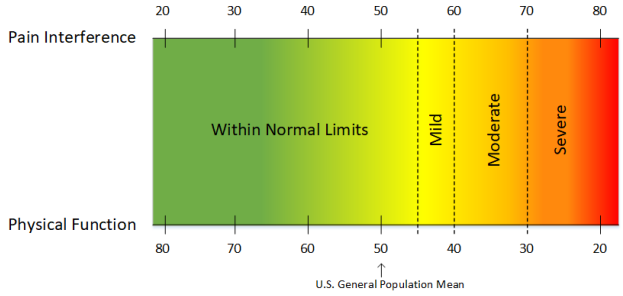
1. Define guidelines regarding the time interval appropriate for the post-visit PRO as well as the collection mechanism to be used (e.g., repeat EHR patient portal messages).
2. Collaborate with IT to generate a list of patients due for a PROMIS follow-up assessment within the desired time interval.
3. Consider multi-modal methods to collect the follow-up PROMIS measures, including during a post-treatment visit, through the patient portal, or via a personal phone call.
4. Include a clinician message in the request so patients understand that PROMIS measures are important to their follow-up clinical care.
5. Identify staff responsible for follow-up PROMIS collection.

Interpretation in Clinic

Using PROMIS Scores in Clinic for Individual Patients

Pain Interference and Physical Function

- Mean = 50 in the U.S. general population
- Standard deviation = 10
- Range generally 20 – 80
- T-score



Higher Scores = "More" for Each Domain

- Higher pain interference = **worse** pain-related disruption of usual activities
- Higher physical function = **better** self-reported ability to perform daily activities

Measure	Within Normal Limits	Mild	Moderate	Severe
Pain Interference	≤55	56 - 60	61 - 70	≥71
Physical Function	≥45	40 - 44	30 - 39	≤29

Change Scores

- Change in scores over time indicates symptom improvement or decline.
- Look for scores to improve after treatment (e.g., medications, surgery).
- Worsening scores (change of 5-10 points) often indicate new treatment alternatives should be explored.
- Refer to the "Meaningful Change" page on the HealthMeasures website for additional information on interpreting meaningful change for PROMIS scores.

Using Scores for an Individual Patient

- Reviewing scores can inform where to start a clinical interview. E.g.,:
  - "It looks like pain is presenting a significant challenge for doing the things you usually do. Tell me about that."
- Interview can aid in interpreting PRO scores for baseline status and change over time.
- Integrate PROMIS scores in the context of other clinical factors.
  - Many other factors can influence pain and physical function scores. Consider a patient's unique history and how this is contributing.
  - Some factors include musculoskeletal conditions in other weight-bearing joints, chronic low back pain, treatment history, and depressive symptoms.
  - A biopsychosocial perspective can be incorporated using other PROMIS measures (e.g., PROMIS Depression Short Form 4a or PROMIS Anxiety Short Form 4a).
- PRO scores can be supplemented with other information such as a global rating of health or the Patient Acceptable Symptom State (PASS) for clinical decision making.

Using PROMIS in Quality Improvement and Value-Based Payment

When using PROMIS measures to monitor clinical outcomes or report to regulatory agencies or payers, the following additional considerations are important. Comparable patient data are particularly important when outcome comparisons will be made across health systems.

1. Ensure complete and consistent PRO data to minimize bias.
    - Consult quality improvement/regulatory guidance on PRO measures, required time frames, population definitions, and pre/post assessment requirements.
    - Ensure that the PRO measure selection, patient population criteria, and time intervals for collection match the external expectations.
    - Maximize data capture for stable estimates of quality. The International Society of Arthroplasty Registries recommends 70% completion of pre- and post-operative PROs.

2. Collect patient comorbid conditions and other clinical data used in comparative analyses.
    - CMS and other payers specify if administrative codes (e.g., ICD10, CPT) and/or clinical and demographic variables (e.g., age, sex, BMI, smoking) are used when risk adjusting outcome data.
    - Review the regulatory documents for key metrics. For example, CMS offers guidance for patient-reported risk measures to be collected and reported with PROs within their Comprehensive Care for Joint Replacement Model (section III.D.3.a of the CJR final rule and 42 CFR § 510.400(b)).
    - Registries used for quality reporting may also have specific data capture requirements for risk adjustment.

Using PROMIS in Research

To date, hundreds of **published research papers** from investigators across the globe use PROMIS measures as the primary outcome. PROMIS measures are an important example of standardized data captured for clinical care that can be readily translated to new knowledge in a learning health system.

Additional Resources

Download PROMIS measures at HealthMeasures.net through Search & View Measures

Score Measures

PROMIS measures are automatically scored in some EHRs and assessment platforms (e.g., REDCap). If automated scoring is not enabled, scoring instructions are included in PROMIS Scoring Manuals on HealthMeasures.net. Learn more on HealthMeasures.net about Scoring Instructions.

Health System Implementation Guidance

The ePROs in Clinical Care and HealthMeasures websites provide additional guidance for health system implementation.

- Governance of ePROs within a health system
- Implementation planning guide and decision log (Nelson et al, 2020)
- Guidance on integration in clinical settings
- Recommendations for workflow design
- Strategies for patient engagement

Information Technology PRO Implementation

- Guidelines for health information technology
- Checklists for planning and implementing IT
- Guidelines for PRO score report design and function
- Tools for integrating PROMIS CATs in specific EHRs including Epic (see the Epic PROMIS CAT app), OpenEMR, and SMART on FHIR apps

PROs for Assessing Healthcare Quality (Performance Measurement)

Ayers DC, Fehring TK, Odum SM, Franklin PD. Using joint registry data from FORCE-TJR to improve the accuracy of risk-adjustment prediction models for thirty-day readmission after total hip replacement and total knee replacement. J Bone Joint Surg Am. 2015 Apr 15;97(8):668-71. doi: 10.2106/JBJS.N.00889. PMID: 25878312.

Cella D, Hahn EA, Jensen SE, Butt Z, Nowinski CJ, Rothrock N, Lohr KN. Patient-Reported Outcomes in Performance Measurement. Research Triangle Park (NC): RTI Press; 2015 Sep. doi: 10.3768/rtipress.2015.bk.0014.1509. PMID: 28211667.

CMS Comprehensive Care for Joint Replacement: https://innovation.cms.gov/innovation-models/cjr

The guide's structure is based on:

Franklin PD, Bond CP, Rothrock NE, Cella D. Strategies for effective implementation of patient-reported outcome measures in arthroplasty practice. J Bone Joint Surg Am. 2021 Jun. doi: 10.2106/JBJS.20.02072. Epub ahead of print. PMID: 34143757.

Feedback on this guide? Questions or suggestions related to implementation of PROs in arthroplasty? Contact us at PROimplementation@northwestern.edu.

Additional Resources

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Related Publications

Amtmann D, Cook KF, Jensen MP, Chen WH, Choi S, Revicki D, Cella D, Rothrock N, Keefe F, Callahan L, Lai JS. Development of a PROMIS item bank to measure pain interference. Pain. 2010 Jul;150(1):173-82. doi: 10.1016/j.pain.2010.04.025. PMID: 20554116.

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