

# Guidance for Using PROMIS<sup>®</sup> Measures in Orthopaedic Surgery



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



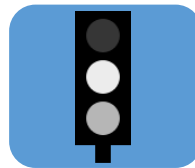
Choosing a Measure



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<sup>®</sup> (PROMIS) measures can be utilized to monitor the outcomes of orthopaedic surgery 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 orthopaedic surgery.
- 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 13-16 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.



### PROMIS Measures for Orthopaedic Surgery

In most cases, the most relevant patient-reported outcomes (PROs) to measure for orthopaedic surgery are [physical function](#) and [pain interference](#).

PROMIS Physical Function assesses self-reported ability to perform daily activities. Rather than PROMIS Mobility, PROMIS Physical Function is recommended even in lower extremity populations as it is a core measure used extensively in clinical settings, facilitating benchmarking and score interpretation. Physical Function also has a wider range of measurement, from very poor to exceptional function. PROMIS Upper Extremity includes a subset of physical function items that require the upper extremity and may be more sensitive for known/suspected upper extremity limitations. However, PROMIS Physical Function and Upper Extremity measures are scored on different metrics, and scores cannot be compared.

PROMIS Pain Interference assesses self-reported pain-related disruption of usual activities.

*Note.* Certain procedures (e.g., bunion surgery) may not address physical function or pain interference. This should be considered when using PROs for decision making and progress monitoring.

#### 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)  
**OR** PROMIS Upper Extremity v2.0 Computer Adaptive Test (CAT; 4-12 items) **or** [PROMIS Upper Extremity v2.0 Short Form 7a](#) (7 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

### Hip and Knee:

HOOS-12/KOOS-12 are joint-specific measures used for hip or knee osteoarthritis or arthroplasty. They 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).

The International Hip Outcome Tool (iHOT-12) is a 12-item measure of self-reported symptoms and function related to hip pathology in young, active patients (Griffin et al., 2012). PROMIS measures may be more efficient than the iHOT-12, but PROMIS Physical Function may be less responsive (Kollmorgen et al., 2019; Nwachukwu et al., 2020). The International Knee Documentation Committee (IKDC) Subjective Knee Evaluation is an 18-item knee-specific measure of self-reported symptoms, function, and sports activities (Irrgang et al., 2001). The Kujala Scoring Questionnaire (Kujala et al., 1933) is a 13-item measure of self-reported symptoms and function related to patellofemoral disorders. The PROMIS measures may be more efficient than the IKDC and Kujala and may be similarly responsive as knee-specific measures (Kenney et al., 2019). The Marx Activity Scale is a 4-item knee-specific scale of frequency of participating in sports-related activities while healthy (Marx et al., 2001). The Marx does not assess current functional status and can be used as an adjunct to PROMIS Physical Function.

### Foot and Ankle:

The Foot and Ankle Ability Measure (FAAM), Foot Function Index (FFI), and Foot and Ankle Outcome Score (FAOS) are region-specific self-reported measures. The FAAM (Martin et al., 2005) measures physical function and has a 21-item activities of daily living subscale and an 8-item sports subscale. The FFI (Budiman-Mak et al., 1991) is a 17- or 23-item measure with 3 subscales of pain, disability, and activity limitations. The FAOS (Roos et al. 2001) is a 42-item measure with 5 subscales of pain, other symptoms, activities of daily living, sports and recreation, and foot and ankle-related quality of life. These measures may be recommended for reporting in registries but may be less efficient.

### Hand and Upper Extremity:

The Quick Disabilities of the Arm, Shoulder, and Hand (QuickDASH) (Beaton et al., 2005) is a region-specific 11-item measure that assesses upper extremity symptoms and function. It is comparable to the full DASH (Gummesson et al., 2006) and may be recommended for reporting in registries. PROMIS Physical Function or Upper Extremity may provide similar measures of function while being more efficient (Beleckas et al., 2019; Hammert & Calfee, 2020).

For the wrist and hand, other potential region-specific measures include the Patient-Rated Wrist/Hand Evaluation, which has pain and function subscales (MacDermid, 2019), and the Brief Michigan Hand Questionnaire, which includes items related to symptoms, function, and satisfaction (Waljee et al., 2011).

For the shoulder and elbow, the American Shoulder and Elbow Surgeons (ASES) Shoulder Score is a shoulder-specific measure that includes pain intensity and self-reported activities of daily living. It may be recommended for reporting in registries. While PROMIS measures may be more efficient than the ASES, they



## Choosing a Measure



may not be effective replacements for all shoulder conditions (Hammert & Calfee; Fu et al., 2019; Patterson et al., 2018). Another common shoulder assessment is the [Simple Shoulder Test](#), but the ASES may be recommended if selecting a region-specific measure (Baumgarten & Chang, 2020). Potential elbow-specific measures include an elbow version of the ASES and the 12-item [Oxford Elbow Score](#) (Dawson et al., 2008). For the overhead athlete, the [Kerlan-Jobe Orthopaedic Clinic \(KJOC\) Shoulder and Elbow score](#) (Alberta et al., 2010) may be more specific and may experience fewer ceiling effects than other upper extremity measures. As the KJOC items are sports-specific, the KJOC can potentially be used in conjunction with the PROMIS Physical Function or Upper Extremity to reflect different dimensions of function.

### Spine:

The [Oswestry Disability Index](#) (ODI; 10 items) and [Neck Disability Index](#) (NDI; 10 items) are region-specific measures of the low back and neck respectively. The measures assess pain and function, such as personal care and sleeping. The NDI also includes items specific to headaches and concentration (Fairbank & Pynsent, 2000; Vernon, 2008). The ODI and NDI may be less efficient than the PROMIS Pain Interference or Physical Function CATs (Bhatt et al. 2019, Boody et al., 2018; Patel et al. 2019; Tishelman et al., 2019). However, they may measure aspects, such as headache by the NDI, not captured in PROMIS Physical Function. They may also be recommended for reporting in registries.



## 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 each 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.

## 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).

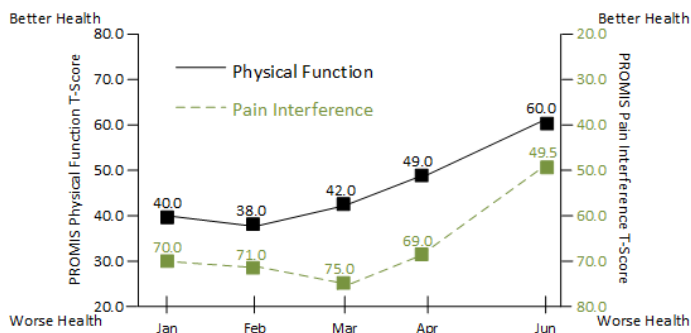
### 3. Reports for clinician use

- 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.

Sample report of PROMIS scores over time





**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.

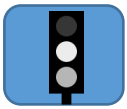
## After the Office Visit

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.

## 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.



## Using PROMIS Scores in Clinic for Individual Patients

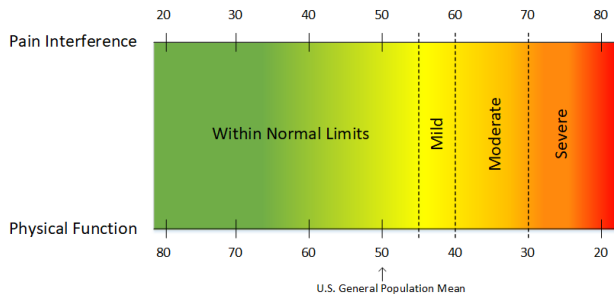
### Pain Interference and Physical Function (or Upper Extremity)

- 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 (general or upper extremity) = **better** self-reported ability to perform daily activities

*Note.* PROMIS Physical Function and Upper Extremity measures are scored on different metrics, and scores cannot be compared.



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 other musculoskeletal conditions, diabetes, treatment history, opioid use, and perioperative complications as relevant.
  - 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 (e.g., aim for a minimum 70% completion rate of pre- and post-operative PROs as recommended by the International Society of Arthroplasty Registries).

### 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.
- 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.





Download PROMIS measures at [HealthMeasures.net](https://www.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)

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](#).

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](#).

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**Feedback on this guide? Questions or suggestions related to implementation of PROs in orthopaedic surgery?** Contact us at [PROimplementation@northwestern.edu](mailto:PROimplementation@northwestern.edu).



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