Hip and Knee Osteoarthritis
Decision Quality Instrument User Guide

I. Purpose:
To measure the extent to which patients are informed, involved in the decision making process and receive treatments that match their goals and preferences.

II. Versions:

- Hip Osteoarthritis Decision Quality Instrument v2.0, ©2010 [updated 2016, Last reviewed, 2024].
- Knee Osteoarthritis Decision Quality Instrument v2.0, ©2010 [updated 2016, Last reviewed, 2024].
- Decision Quality Worksheet: Treatments for Hip Osteoarthritis v2.0, ©2010 [updated 2016, Last reviewed, 2024].
- Decision Quality Worksheet: Treatments for Knee Osteoarthritis v2.0, ©2010 [updated 2016, Last reviewed, 2024].
- Hoja de Trabajo Sobre La Calidad de Decision en Tratamientos de Osteoartritis de Cadera v.2.0 ©2012 [updated 2016, Last reviewed 2024] [Spanish version of Hip worksheet].
- Hoja de Trabajo Sobre La Calidad de Decision en Tratamientos de Osteoartritis de Rodilla v.2.0 ©2012 [updated 2016, Last reviewed 2024] [Spanish version of Knee worksheet].

III. Timing
The decision quality instrument version is designed to be administered after a decision has been made. Modifications are required (e.g. to instructions and tenses of items) if it is to be used before a decision has been made.

The shorter worksheet version is worded to be used during the decision making process. The knowledge items and goals can be administered at any time, e.g. before or after a visit, before or after a decision aid. The decision process items need to be administered after a provider consult.

IV. Scoring:
The Hip and Knee Osteoarthritis Decision Quality Instruments (DQI) are almost identical, with "hip" being replaced with "knee," and they are scored identically. The survey contains three sets of items and results in three scores, a total knowledge score, a concordance score and a decision process score.

1. Knowledge Score: The items are located in "Section 2: Facts About Knee [Hip] Osteoarthritis." For each fact, a correct response receives one point (see Table 1). Questions with multiple parts (e.g. items 2, 7 and 9 in Table 1) are scaled to total 1 point per item. Missing

responses receive 0 points. A total score is calculated for all patients who complete at least half of the items. Total scores are scaled from 0-100%.

Note: "I don't know" ("no estoy seguro" in Spanish version) can be added as a response to knowledge items. An "I don't know response" receives 0 points (see feasibility section for considerations with including this response option).

Table 1: Facts (# indicates items in the worksheet version)

Question	Correct response
1. Over time, without hip/knee replacement surgery, what usually happens to hip/knee pain?	Gets worse
2a. Can exercise help some people relieve hip/knee pain?	Yes
2b. Can physical therapy help some people relieve hip/knee pain?	Yes
2c. Can calcium pills help some people relieve hip/knee pain?	No
2d. Can over-the-counter pain medicine help some people relieve hip/knee pain?	Yes
#3. Which treatment is most likely to provide relief from hip/knee pain caused by osteoarthritis?	Surgery
# 4. After hip/knee replacement surgery, about how many months does it take most people to get back to doing their usual activities?	2 to 6 months
# 5. If 100 people have hip/knee replacement surgery, about how many will need to have the same hip/knee replaced again in less than 20 years?	Less than half
# 6. If 100 people have hip/knee replacement surgery, about how many will have less hip/knee pain after the surgery?	90 (hip); 80 (knee)
7a. Is high blood pressure a possible complication of hip/knee replacement surgery?	No
7b. Is a blood clot in the leg a possible complication of hip/knee replacement surgery?	Yes
7c. Are migraine headaches a possible complication of hip/knee replacement surgery?	No
7d. Is an infection of the artificial hip/knee a possible complication of hip/knee replacement surgery?	Yes
# 8. Serious complications can happen after hip/knee replacement surgery including life threatening blood clots, infections, heart attacks, and even death. If 100 people have hip/knee replacement surgery, about how many will have a serious complication within 3 months after surgery?	4
9. For each of the following, mark whether or not it is a possible side effect of using over-the-counter pain medicine for a long time. These can include medicines you can buy without a prescription like Advil, Aleve, or aspirin.	
9a. Is a stomach ulcer a possible side effect of using over-the-counter pain medicine for a long time?	Yes
9b. Are migraine headaches a possible side effect of using over-the-counter	No

pain medicine for a long time?	
9c. Are kidney problems a possible side effect of using over-the-counter pain medicine for a long time?	Yes
9d. Is excessive bleeding a possible side effect of using over-the-counter pain medicine for a long time?	Yes

2. Concordance score: In "Section 1: What Matters Most To You," patients rate their goals and concerns on an 11-point scale from 0 (not at all important) to 10 (extremely important). These questions and one question about patient's treatment preference can be used to calculate a concordance score. There are multiple approaches to calculate a concordance score, we describe two below. Note: for those who use the worksheet version, there must be some way to track the treatment that patients received to complete this calculation.

The first is a simple match, and in this direct approach, we use patients' preferred treatment (assessed with a single item, "Which treatment did you want to do to treat your knee [hip] osteoarthritis?") and then compare with treatment received to determine whether they match. Patients who are unsure are not considered to have treatment that matches. A summary score (0-100%) indicating the percentage of patients who received treatment that matched their stated preference can be generated.

The second approach uses patients' ratings of the importance of salient goals and concerns on a 0 to 10 scale in a multiple logistic regression model to generate a predicted probability of surgery. The dependent variable is binary: Surgery versus No Surgery and the independent variables that remained significant in multivariable analysis were: two goals (not be limited in what you can do and avoid surgery) and joint (hip/knee). Table 2 presents the parameter estimates for the model published in Sepucha et al 2011. Patients with a predicted probability >0.5 and who had surgery for hip/knee osteoarthritis or those with a predicted probability $\leq$ 0.5 and who did not have surgery, were classified as having treatments matching their goals. A summary score (0-100%) can be generated to reflect the percentage of patients in the sample who received treatments that matched their goals.

Table 2: Concordance model: analysis of maximum likelihood estimates

Parameter		DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept		1	-4.2500	1.1940	12.6705	0.0004
Not be limited in what you can do (0-10)		1	0.5844	0.1219	22.9774	<.0001
Avoid surgery (0-10)		1	-0.2290	0.0369	38.5472	<.0001
Joint (Hip=1, Knee=0)	Hip	1	0.9681	0.2514	14.8343	0.0001

3. SDM Decision Process Scale: These questions are located in the Decision Quality Instrument in "Section 3: Talking with your Health Care Provider" and in the Decision Quality Worksheet in "Section 3: Making Choices." Patients are asked about whether they were offered a choice, how much the pros and cons were discussed, and whether the health care provider asked for their preferences.

In 2020, the scoring for the SDM Process scale was revised to provide partial credit for responses of 'some' = 0.5. The scoring is detailed in Table 3. Participants receive 1 point for a response of "yes" or "a lot", 0.5 point for "some", and 0 point for all other responses. The total points are summed and result in total scores from 0-4, with higher scores indicating more shared decision making.

For missing data, we recommend using a mean replacement for those items for those individuals who have missing data on 1 item. Surveys with more than 1 missing item do not get a total score.

Table 3: SDM Process items and scoring for response options

SDM Element	SDM Process Items	Responses and Scoring
Options	Did any of your healthcare providers talk about *non-surgical treatments* as an option for you?	1 = Yes 0 = No
Pros	How much did you and your healthcare providers talk about the reasons you might want to have *hip replacement* surgery?	1 = A lot 0.5 = Some 0 = A little 0 = Not at all
Cons	How much did you and your healthcare providers talk about the reasons you might **not** want to have *hip replacement* surgery?	1 = A lot 0.5 = Some 0 = A little 0 = Not at all
Preferences	Did any of your healthcare providers ask you what you wanted to do to treat your *hip* pain?	1 = Yes 0 = No

**Italicized items can be customized for the specific clinical context*

V. Informed, Patient Centered Hip and Knee Replacement Surgery (PQM Measure #2958): In 2016, the National Quality Forum (NQF) endorsed a measure that is derived from patient responses to the Hip or Knee Decision Quality Instruments (#2958). NQF recertified the measure in 2022 and then transitioned oversight of all their measures to the Partnership for Quality Measurement in 2023 (https://p4qm.org/measures?combine=2958). The target population is adult patients who had a primary hip or knee replacement surgery for treatment of hip or knee osteoarthritis.

- **Numerator Statement:** The numerator is the number of respondents who have an adequate knowledge score (60% or greater) and a clear preference for surgery.

- **Denominator Statement:** The denominator includes the number of respondents from the target population of adults who have undergone primary knee or hip replacement surgery for treatment of knee or hip osteoarthritis.
- **Denominator Exclusions:** Respondents who are missing 3 or more knowledge items do not get a total knowledge score and are excluded. Similarly, respondents who do not indicate a preferred treatment are excluded. No other exclusions as long as the respondent has the procedure for the designated condition.

Sampling: Patients of a particular surgeon or at a particular clinical site (which could be a group of providers or a hospital or other surgical site) who had a primary knee or hip replacement surgery are identified from medical records, claims or in some other way. Sampling should allow time for immediate recovery, while attempting to survey shortly after the procedure, for example, by sampling eligible patients 1- 6 months after the procedure. Patients can be sampled sequentially, or a pool of such patients who had the procedure in a particular time period (e.g. in the last 3 months) can be created and sampled at a rate that produces the desired number of potential respondents.

The measure can also be calculated from a population-based sample, such as a sample of a population in a geographic area. Eligible respondents could be identified from claims (such as Medicare claims files) or based on patient self- reports of having had the procedures within some time frame.

A sample size of about 150 would be needed to detect differences in proportions of 15% for the measure (e.g. from 25% to 40%) with 80% power. This size difference is what we have observed between sites that do and do not make an effort to do shared decision making.

Proxy respondents are not permitted. The patients who receive the procedure should answer the survey questions.

VI. Development Process:
This has been described in detail in Sepucha et al (2008), briefly to generate the survey we:

- Conducted a review of the clinical evidence & of focus groups and interviews with patients to generate a candidate set of facts and goals salient to the decision
- Surveyed a convenience sample of patients (n=88) and a multidisciplinary group of clinical experts (n=51) to rate the facts and goals for importance, completeness, and accuracy.
- Drafted the instrument and then conducted cognitive interviews with patients who had knee or hip osteoarthritis (n=10) to evaluate items for acceptability and comprehension
- Conducted field test to evaluate the instruments

Five studies provide evidence of psychometric properties:

- A cross-sectional study with 382 adults with knee or hip osteoarthritis in the U.S.
- A survey of 45 primary care providers and specialists in the U.S.

- A randomized controlled trial comparing use of knee and hip osteoarthritis decision aids to control with 127 patients in Canada
- A prospective cohort study that evaluated the implementation of decision aids for hip and knee osteoarthritis into routine care (Sepucha 2017).
- A multi-site randomized controlled trial comparing two different decision aids for 1124 patients with hip or knee osteoarthritis decision aids (Sepucha 2019).

In 2020, the investigators conducted a meta-analysis of the scores across a range of surgical decisions (Valentine 2021). The findings suggested that a slight modification to the scoring would result in better performance for the scale. The new scoring was updated in the 2024 User Guide.

VII. Psychometric Properties:

These data are taken from Sepucha et al (2011).

Feasibility: The survey was feasible and had very low missing data. Note: "I am not sure" was a response category for the knowledge items in the field test. We took it out of these versions as we felt that it was better to force respondents to guess; however, removing this response may increase missing items.

Acceptability: The survey was acceptable with high response rates when administered by mail and by phone, and took about 5 minutes to complete.

Reliability:

- Knowledge score short term (~4 week) retest reliability ICC = 0.83 (95% CI 0.75, 0.89), n=91.
- The short term (~4 week) retest reliability for the goals were ICC > 0.72 for all except "avoid treatment that has a long recovery time" (ICC=0.55).
- SDM Process scale: internal consistency Cronbach alpha=0.78 and short term (~4 week) retest reliability ICC=0.78 (95% CI 0.67, 0.86)

Note: We did not calculate the internal consistency of the knowledge score because the items do not draw from a single underlying construct.

Validity

- Discriminant validity:
    - The total knowledge score discriminated between patients and providers mean differences of 19%, 95% CI (13%, 25%), p<0.001 for knee and 15%, 95% CI (9%, 21%), p<0.001 for hip
    - The total knowledge score also discriminated between patients who had seen a decision aid and those who had not, mean difference of 14%, 95%CI (8% to 21%), p<0.001.
    - The concordance model was able to discriminate among patients who stated a preference for surgery, those who were unsure and those who stated a preference for non-surgical options (model predicted probability of surgery 0.74 vs. 0.59 vs. 0.40, respectively, p<0.001 for all comparisons).
- Content validity was confirmed through the extensive feedback from patients and providers in the development process as well as in the field test.

- Predictive validity: For the retrospective sample, patients who had concordant care had higher decision confidence and less regret compared to those who did not have concordant care. In the DA comparative effectiveness RCT, patients with concordant care reported higher decision confidence, less regret, and less pain, and higher satisfaction with the treatment option compared to those who did not have concordant care. [Sepucha JBJS 2019]

Knowledge score: Worksheet version (5 items)
Reliability: Short term (~4 week) retest reliability ICC=0.80 (95% CI 0.69 to 0.87), n=91
Validity: The short knowledge score also discriminated between patients who had seen a decision aid and those who had not, (67% (SD 21.2%) vs. 51% (SD 24.9%), p<0.0001. The knowledge score also discriminated between patients who reviewed a shorter DA and those who reviewed a shorter one, mean difference of 9%, 95%CI (6% to 12%), p<0.001. [Sepucha JBJS 2019]

Reproducibility: The short knowledge score had high reproducibility R=0.92 p <0.001

VIII. Appropriate Use

The DQIs are protected by copyright. They are available to use at no cost, provided that you:

- Cite the reference in any questionnaires or publications
- Do not charge for or profit from them
- Do not alter them except for customization for a specific condition and reformatting

Suggested Citations for the DQIs:

Sepucha KR. Knee [or Hip] Osteoarthritis Decision Quality Instrument v.2.0. ©Massachusetts General Hospital, 2010 [updated 2016, Last reviewed 2024].

Sepucha KR. Decision Quality Worksheet: Treatments for Knee [or Hip] Osteoarthritis. v.2.0. ©Massachusetts General Hospital, 2010 [updated 2016, Last reviewed 2024]. Downloaded from: https://mghdecisionsciences.org/tools-training/decision-quality-instruments/.

Suggested Citation of the User Guide:

Sepucha KR and Feibelmann S. Hip and Knee Osteoarthritis Decision Quality Instrument User Guide. © 2017. Available from: https://mghdecisionsciences.org/tools-training/

IX. Selected References

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X. Questions or comments? Please contact us at decisions@partners.org or visit our website at http://www.mghdecisionsciences.org .