



This figure is based on the experience of 192 patients in Alberta who previously had surgery.

## Patient perspectives on EQ-5D-5L data visualization within an individualized decision aid for total knee replacement (TKA) in Alberta, Canada





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## **INTRODUCTION & METHODS**

Decision aids are intended to help patients set realistic expectations when making decisions. In this study, we explored alternative presentations to visualize patient-reported outcomes (EQ-5D-5L) data that summarizes expectations for a previously developed online individualized decision aid for patients considering total knee arthroplasty (TKA) to enhance its usability prior to implementation into routine clinical practice.

The original EQ-5D-5L output was modified using data visualization techniques to create 2 prototypes for 2 parts: (1) compared to patients like them pre-surgery and (2) how patients like them changed at 1-year post-surgery.

Patients from an urban orthopedic clinic were recruited. We collected feedback on comprehension, usefulness, and visual appeal using researcher-administered checklists. Data were analyzed using descriptive statistics and content analysis. A final version was generated through consensus for each part. The University of Alberta & University of Calgary Health Research Ethics Boards approved this study and all participants provided written informed consent.

**RESULTS** 

Additional comments

## Pre-surgery (Part 1) n=24 Final version **Original version** How do I compare to other patients considering knee replacement surgery? How do I compare to other patients who had knee replacement surgery? Before seeing a surgeon, each patient indicates their level of problems with mobility, self-care, usual activities, The following information comes from the Alberta Bone and Joint Health Institute. pain/discomfort, anxiety/depression, like you did previously. Before seeing their surgeon, patients from Alberta were asked to "please indicate which statement best described your health today." • The figure below is the percentage of female Albertans like you in age, height and weight who completed the previous Below we compare the responses of males similar to you in age, height, and weight, with what you just reported in the previous survey. questions as they were considering knee replacement surgery. We have presented the first two of five figures. Please click below to see the three additional figures. • The box represents where you fit today, so you can compare yourself to others like you considering knee replacement Pain/Discomfort Before Surgery: Before Surgery: PAIN/DISCOMFORT 51 out of 100 (51%) patients report having no problems with mobility 6 out of 100 (6%) patients report having no pain/discomfort 15 out of 100 (15%) patients report having slight pain/discomfort 23 out of 100 (23%) patients report having slight problems with mobility 6% had no problems 22 out of 100 (22%) patients report having moderate problems with mobility like you 46 out of 100 (46%) patients report having moderate pain/discomfort 33 out of 100 (33%) patients report having severe pain/discomfort like you reported 4 out of 100 (4%) patients report having severe problems with mobility 0 out of 100 (0%) patients report having extreme pain/discomfort 0 out of 100 (0%) patients report having extreme problems with mobility YOU 34% had severe problems 0% had extreme problems —— This figure is based on the experience of 192 patients in Alberta who previously had surgery. ? This figure is based on the experience of 575 patients in Alberta who previously had surgery. ? Help me understand this chart \* Each figure represents 2 people. Help me understand this chart 1-year post-surgery (Part 2) n=25 Final version **Original version** Will my pain or discomfort improve? Will my **PAIN/DISCOMFORT** improve? • The figure below is the different percentages of Albertans like you, in each of the 5 different levels of pain/discomfort If you do nothing, your pain or discomfort will likely worsen over time before surgery. You indicated that you have severe pain/discomfort today. • Of the female Albertans like you who reported severe pain/discomfort before surgery, they had the following outcomes: Knee Replacement Surgery Improve: Slight problems Evidence suggests that knee replacement surgery is likely to improve pain or discomfort in patients with moderate to severe Of the male Albertans like you who reported extreme pain or discomfort before surgery, 3-months after surgery: 36 out of 100 (36%) patients improved to have no pain/discomfort

Most participants demonstrated adequate **comprehension** for all versions (range 50-72%) and most participants commented that the instructions were clear.

While 50-60% of participants rated the content as **useful**, including knowing the possible outcomes of surgery, some participants found the information interesting only, were unsure how to use the information, or did not find it useful because they had decided on a treatment.

Participants rated **visual appeal** for all versions favorably but suggested improvements for readability, mainly larger font and image sizes and enhanced contrast between elements.

We provide a detailed summary of modifications and rationale for changes from the original to final versions in **Table 1**.

Table 1: Summary of modifications & rationale for changes from original to final versions

|            | Original Versions   | Finalized Versions  |
|------------|---|---|
| Com        | prehension  |   |
| Both Parts | Redundant text  | Simplified text by removing redundant messaging and/or unnecessary words.  "5 different levels" changed to "5 levels".  |
|            | Repetition of words   | Removed repetitive words/content. e.g., "You can see" removed.  |
|            | Used written numeracy (e.g. 51 out of 100) and proportions (e.g. 51%)   | Used proportions (e.g. 51%) only for simplification.  |
|            | Use of Jargon/ Scientific / Academic language   | Used "plain language".<br>Simplified text e.g., Removed "5 dimensions of health" for simplicity.  |
|            | Inconsistent use of terms   | Used consistent terms matched to EQ-5D-5L scale.  |
|            | Long sentence structure   | Uesed simple sentence structure.  |
|            | Limited instructions. Part 1 instructions on how to understand the figure hidden. Patients needed to click on the link labelled, "? Help me   | Part 1 instructions on how to understand the figure placed in the narrative above the figure  |
|            | understand this chart" to reveal the information on interpretation.   | Part 2 added instructions on how to interpret the visualized change in levels or categories of problems before and after surgery.   |
|            | Part 2 had limited instructions on how to interpret the visualized change in  |   |
|            | levels or categories of problems before and after surgery.  | Recommended to emphasize "like you" in the instructions to clarify the individualization the data. Used bold font for "people like you".  |
|            | Icons shown separate from the text that described the levels or categories of problems.   | Icons linked to the text describing levels or categories of problems for easy understanding   |
|            | Two boxes used: One box used in the text/narrative and a second box used  | One box used around the icons and text. Identification of current level of problems using a box with the star was preferred.  |
| Part 1     | in figure.  | Included instructions on how to interpret the information in the box.   |
| Ь          | No instructions on how to interpret the information in the box.   | included instructions on now to interpret the information in the box.   |
|            | No star icon present to direct attention to current level of problems.  | Identification of their current level of problems using a box with the star was preferred.  |
|            | Two lines of icon used, making it difficult to discern count and levels or categories of problems (i.e. proportions) spread over 2 lines in the figure.   | One line of icons understood and preferred. Footnote remains.   |
|            | No headings existed.  | Deleted "before surgery" heading and used box labelled "people like you today". Replace "after surgery" heading with "possible outcomes after surgery".   |
| Part 2     | Use of icons (i.e. cross-sectional) made it difficult to discern change in levels or categories of problems before and after surgery; implies a static categorization.  | Removed icons.  Used Sankey Chart. Preferred explicit before-surgery stacked bars of Version 2, to describ level of problems for comprehensive information.  Slope of curves to indicate magnitude of change: No obvious preference; considered unmodifiable as is data dependent on before surgery response of level of problem (e.g. severe). |
|            | There was no recall of a patient's EQ-5D-5L data on the level or category of problems before surgery. This limited people's ability to assess their potential probability of change from before to after surgery. | Used visual recall for comprehension of message, before- and after-surgery levels of problems. Programming competencies to be considered to address this.   |
| Visu       | al appeal   |   |
| £          | Used internationally accepted 'Male' icon for figure.   | Used gender-neutral icons in Part 1. Increased size of icons.   |
| Tuca:      | Difficult to discern change of level or category with current colors of icons   | Use maximum color contrast between icons.   |
| Both       | Original default colors   | Used ABJHI Branding (i.e. color palette).   |
| 8          | Additional comments   | Recommended to have larger visuals and fonts  |

## **SUMMARY**

Recommended to have larger visuals and fonts.

Based on patient feedback, we produced an enhanced presentation of EQ-5D-5L data for both parts. Key improvements were linking text to icons in Part 1 and the use of Sankey to depict change in Part 2. These improvements will be tested, along with the entire decision aid, in further usability testing and refinements made before implementing the decision aid in routine clinical practice.

Our results on patients' perspectives on the presentation of EQ-5D-5L data to support decision making for TKA treatments contributes to the knowledge on EQ-5D-5L applications within healthcare systems for clinical care.