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Exploring Heterogeneity in Preferences for Attributes of Pharmaceutical Treatments for Osteoarthritis and Chronic Low Back Pain in the United Kingdom: A Latent Class Approach

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Presented by Marco Boeri

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Authors and Disclaimer

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Study Overview

- Objective

- Quantify patients’ preferences for attributes of pharmaceutical treatments for chronic pain (OA and CLBP)
- Explore preference heterogeneity

- Methods

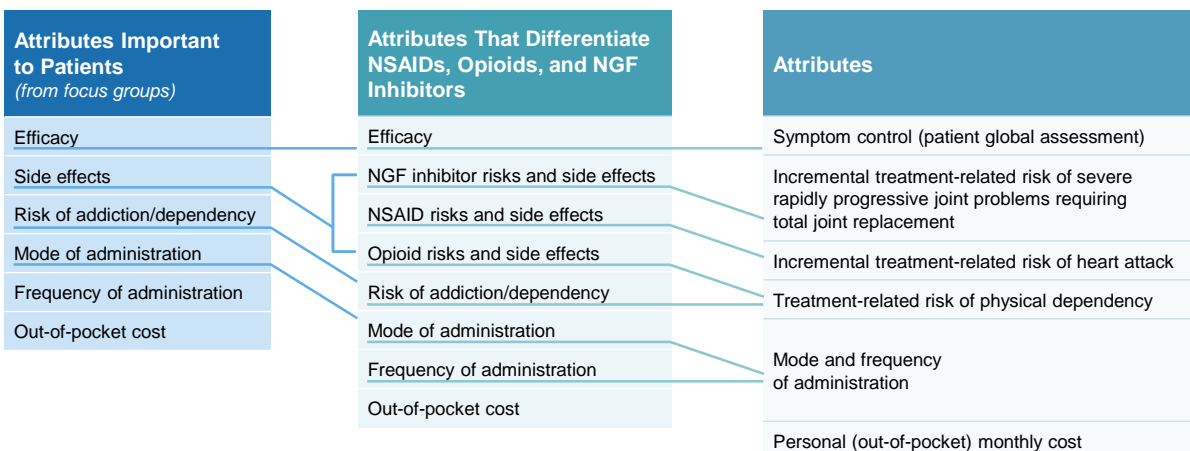
- Discrete-Choice Experiments (DCE)

- Patients (N = 437)

- Adults in the UK with chronic pain associated with OA of the hip or knee or CLBP
- Self-reported moderate-to-severe pain defined as a self-assessed rating of 5 or greater on average in the past week on an 11-point numeric pain scale ranging from 0 (no pain) to 10 (worst possible pain)
- Have taken or tried 3 or more classes of pain treatment in the past 2 years or have taken or tried 2 prior classes of pain treatment and for whom nonsteroidal anti-inflammatory drugs are contraindicated or were unwilling to take opioids

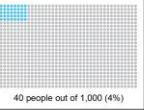
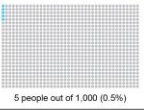
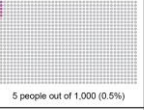
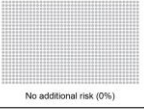
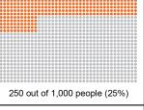
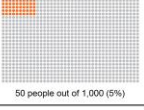


CLBP = Chronic low back pain; DCE = discrete-choice experiment; OA = osteoarthritis.

DCE Attributes Identification From Focus Groups



DCE Questions

- Experimental design generated in SAS
 - 48 choice questions split into 6 blocks of 8 hypothetical choice questions
 - Respondents were randomly assigned to 1 block of questions
 - Each choice question contained 2 hypothetical treatments
 - Questions were randomly ordered to avoid ordering effects and not repeated across blocks

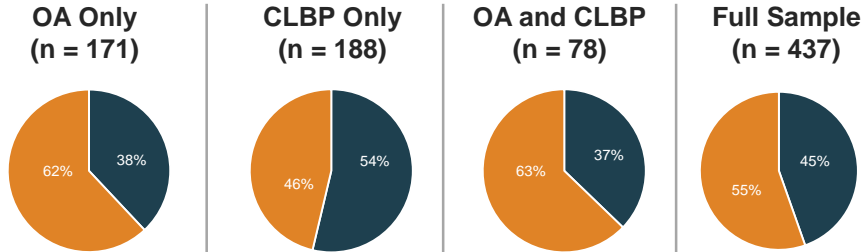
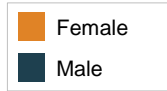
Medicine Feature	Medicine A	Medicine B
Symptom control: Symptom control while you are taking the medicine	GOOD mild symptoms; no limitations on normal activities	VERY GOOD no symptoms; no limitations on normal activities
Additional risk of severe joint problems: Additional risk each year of having joint problems that are severe enough that you would need a total joint replacement while you are taking the medicine or within 6 months of stopping the medicine	 40 people out of 1,000 (4%)	 5 people out of 1,000 (0.5%)
Additional risk of heart attack: Additional risk each year of having a heart attack while you are taking the medicine	 5 people out of 1,000 (0.5%)	 No additional risk (0%)
Risk of physical dependence: Risk each year of becoming physically dependent on the medicine	 250 out of 1,000 people (25%)	 50 people out of 1,000 (5%)
How you take the medicine	 Oral pills once a day	 Injection every 8 weeks (about every 2 months)
Cost: Personal cost of the medicine to you every month	£0 every month	£30 every month
Which medicine would you choose if these were the only 2 medicines available?	<input type="radio"/>	<input type="radio"/>

Discrete-Choice Experiment Data Modeling

- The chosen alternative yields higher utility than the alternative that was not chosen
 - The utility of each alternative in a choice question is a function of the attribute levels defining that alternative
- Random parameters logit (RPL)
 - Controls for preference heterogeneity by also estimating a continuous (e.g., normal) distribution across the sample for each preference weight
- Latent Class Analysis (LCA)
 - Controls for preference heterogeneity by assuming discrete distribution of preferences
 - Assumes that there is heterogeneity between classes (or segments) but not within each class
 - Each preference weight is the mean preference weight for the class (or segment)
- Attribute levels were effects coded
 - Estimates a separate preference weight for each attribute level

The Sample: Demographic Characteristics

Gender



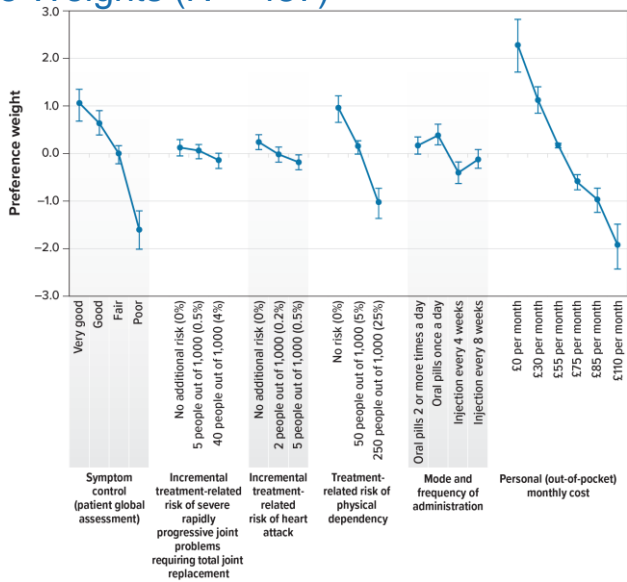
Age (in years)

	OA Only (n = 171)	CLBP Only (n = 188)	OA and CLBP (n = 78)	Full Sample (n = 437)
Mean (SD)	60.1 (11.5)	46.6 (14.0)	61.0 (11.2)	54.4 (14.3)
Median	62	45	63	56
Min, max.	18, 79	18, 76	35, 91	18, 91

Max = maximum; Min = minimum; SD = standard deviation.

Preference Analysis

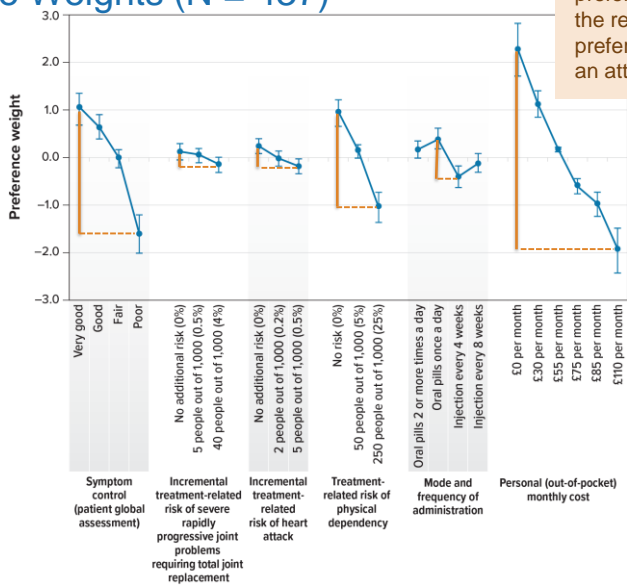
Preference Weights (N = 437)



9 Note: the vertical bars surrounding each mean denote the 95% confidence interval (computed by the delta method).

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Preference Weights (N = 437)



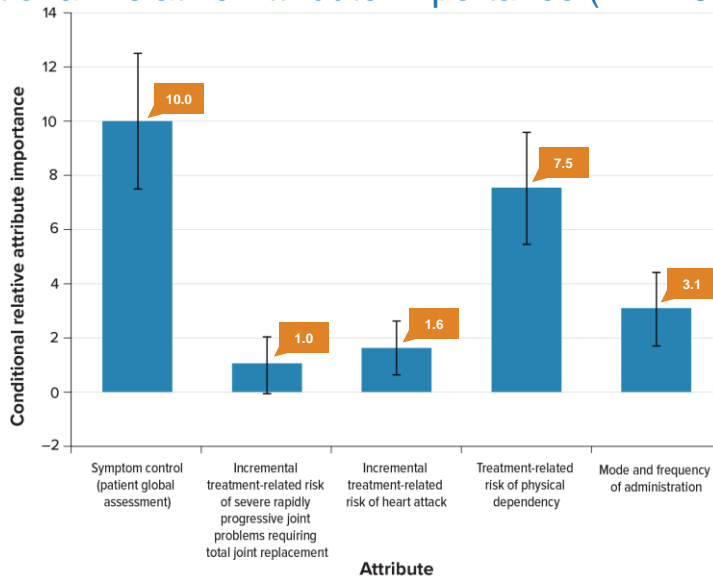
The vertical distance between preference weights indicates the relative strength of preference for changes within an attribute.

The results indicate that respondents prefer no symptoms (“Very good” symptom control as defined in the patient global assessment), lower adverse event risks, and lower monthly out-of-pocket costs.

10 Note: the vertical bars surrounding each mean denote the 95% confidence interval (computed by the delta method).

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Conditional Relative Attribute Importance (N = 437)



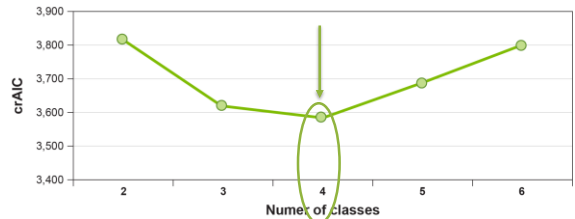
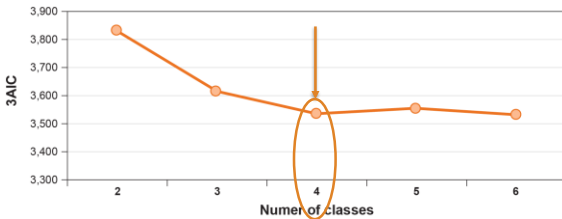
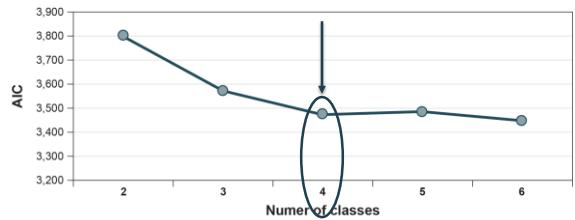
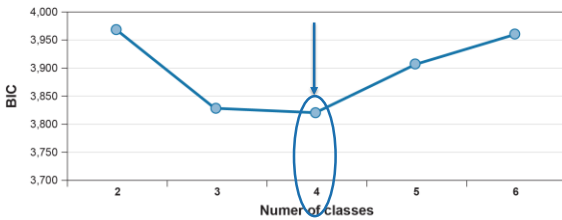
The most important attributes are symptom control and treatment-related risk of physical dependency.

Symptom control is approximately 1.3 times as important as the risk of physical dependency (10/7.5), 6 times more important than the risk of heart attack (10/1.6), and 10 times more important than the risk of severe rapidly progressive joint problems requiring total joint replacement (10/1).

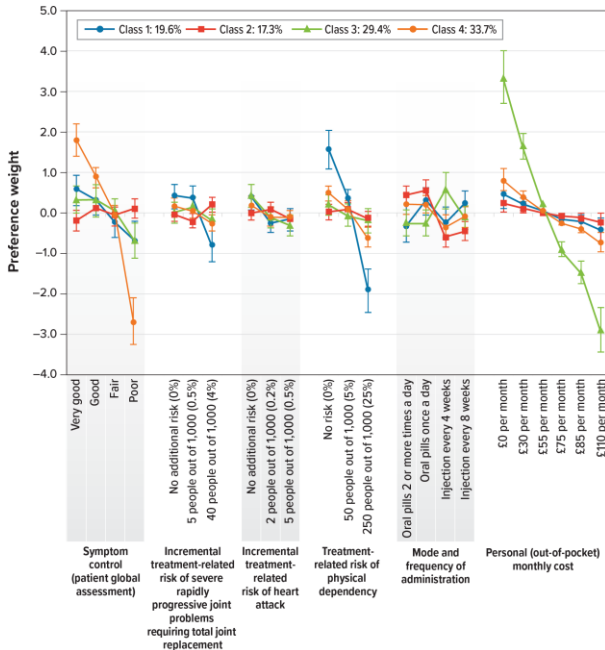
11 Note: the vertical bars surrounding each mean denote the 95% confidence interval (computed by the delta method).

Latent Class Model: Optimal Number of Classes

We considered the BIC, the AIC, the 3AIC, and the Corrected AIC (crAIC) to determine the optimal number of classes for the data.



12 AIC = Akaike information criteria; BIC = Bayesian information criteria; crAIC = Corrected Akaike information criteria.



Latent Class Model (N = 433)^a

- **Class 1 (blue, 19.6%):** was strongly concerned with the treatment-related risk of physical dependency
- **Class 2 (red, 17.3%):** not particularly focused on a single attribute, but strongly preferred taking oral pills daily to injections every 4 or 8 weeks
- **Class 3 (green, 29.4%):** was strongly averse to paying a personal (out-of-pocket) cost for the treatment
- **Class 4 (orange, 33.7%):** strongly preferred better efficacy (symptom control) in terms of improvement from “Poor” on the patient global assessment scale

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Note: the vertical bars surrounding each mean preference weight denote the 95% confidence interval (computed by the delta method).
^a Four respondents did not answer the questions used to model the membership probability function and were excluded from this LCA.

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Summary of Key Results

- On average, the two most important attributes over the full sample were improvements in symptom control and treatment-related risk of physical dependency
- Improving symptom control was approximately 1.3 times as important as avoiding the risk of physical dependency, 6 times more important than avoiding the risk of heart attack, and 10 times more important than avoiding the risk of rapidly progressive severe joint problems
- Preference heterogeneity was found to be important in the sample
 - 4 distinct segments of patients were identified in the LCA
 - 1 class of patients focused on symptoms control (33.7%)
 - 1 class focused on cost (29.4%)
 - 1 class focused on avoiding risk of physical dependency (19.6%)
 - 1 class did not appear to focus on one attribute, but preferred taking oral pills daily to injections every 4 or 8 weeks (17.3%)

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Conclusions

-  It is important to recognize that not everyone has the same preferences, and analysis should explore preference heterogeneity
-  The LCA indicated that there are patients with distinct preferences in the sample
-  The LCA results do not tell us which patient is likely to be in which segment (i.e., the class membership probability is not explained by clinical or demographic characteristics of the respondents)
-  The preference heterogeneity found in these data suggests that not all patients will agree on treatment options for chronic pain
-  It is important for physicians to discuss options with patients and to try to find the treatment plan that is most consistent with the patient's preferences



Thank You Questions?



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