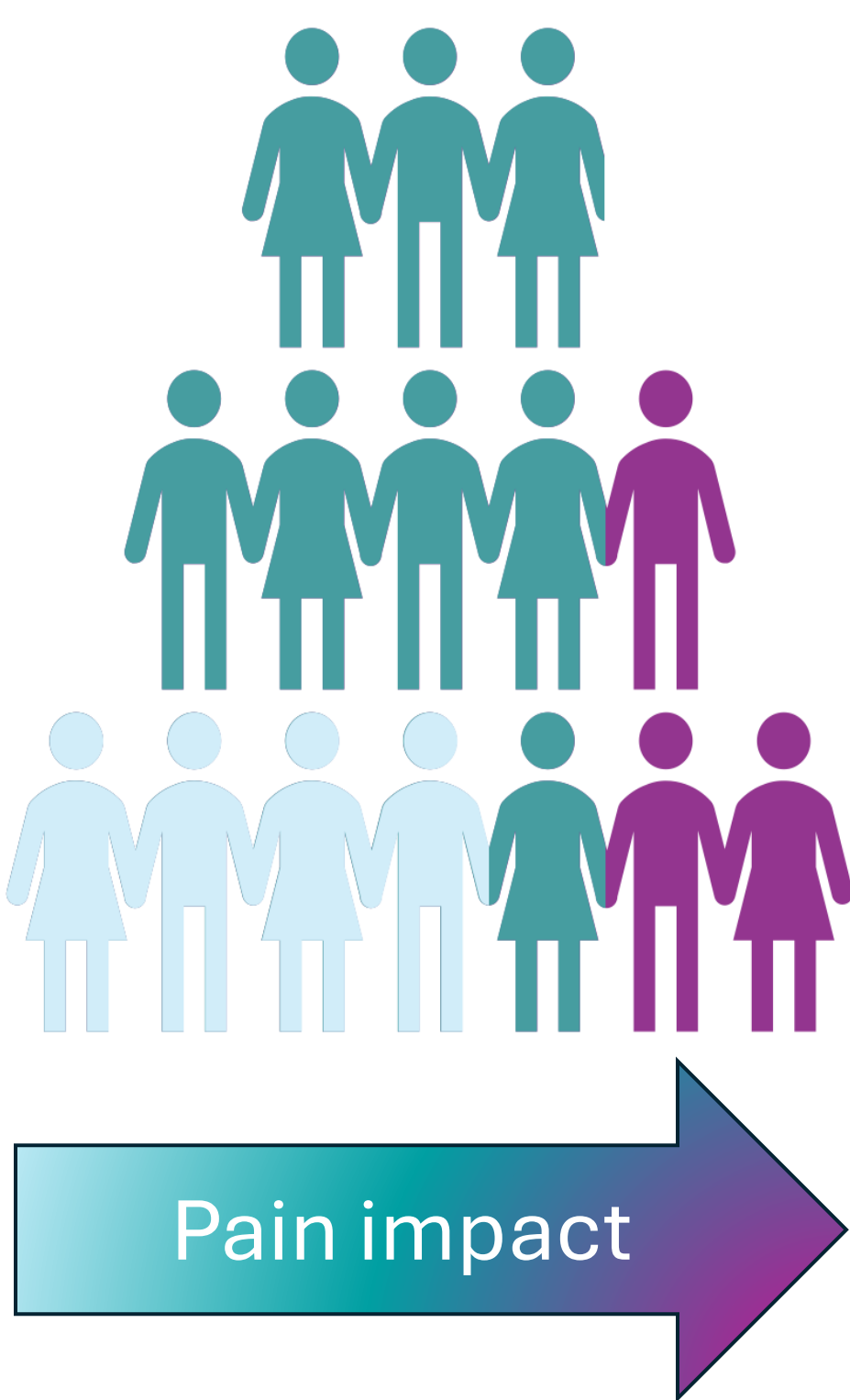


# Identifying High Impact Pain in the UK Biobank 2019 Experience of Pain Survey

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## Introduction

- Approximately 50% of adults in the UK have pain that lasts longer than three months (i.e., *chronic pain*)<sup>1</sup>
- Around ¼ report their pain has far-reaching, negative impacts on their lives<sup>2</sup>, (i.e., high impact chronic pain (HICP))

- Research is needed to understand the factors contributing to HICP so targets for intervention can be implemented
- The 2019 UK Biobank (UKB) experience of pain (EOP) survey<sup>3</sup> is a uniquely rich and large resource for potential pain research
- Due to a coding error, participants with chronic pain all over the body (i.e., *widespread (WS) pain*) did not answer questions about their pain impact (from the Brief Pain Inventory (BPI))
- There are no other measures of pain impact available
- This limits the generalisability of pain impact-based analyses in the EOP survey

## Aims

**CHIPP (the Chronic High Impact Pain Project)** aims to estimate the prevalence of HICP in the general population, to identify novel patterns of impact, examine causes of onset and resolution of HICP and identify treatment targets

**This analysis** investigates the suitability of the EuroQol 5 Dimension 5 Level index (EQ-5D-5L) as a measure of pain impact in the EOP survey



- The UKB EOP survey was completed online between 2019 and 2020 by 167,112 participants
- There are 129 items, about medical history, pain status, location & type of pain, impact of pain, quality of life, depression & fatigue
- 94,011 (56.26%) of the participants in the survey reported chronic pain

## Methods

Table 1: Chronic pain (CP) status of EOP participants

	No CP	WS CP*	Other CP	Missing
N	72691	9876	84135	410
%	43.5	5.91	50.35	0.25

\*Were not asked questions from the BPI Scale

- After removal of missing data in the BPI, there were 83,933 (>99%) participants included in analysis
- The five EQ-5D-5L items were weighted according to the values for England<sup>4</sup> and combined into a single index
- The mean of the seven BPI interference scores was taken as advised<sup>5</sup> to form the BPI scale
- "Severe pain impact" was defined as a BPI scale cut-off  $\geq 5$  as suggested elsewhere<sup>6</sup>

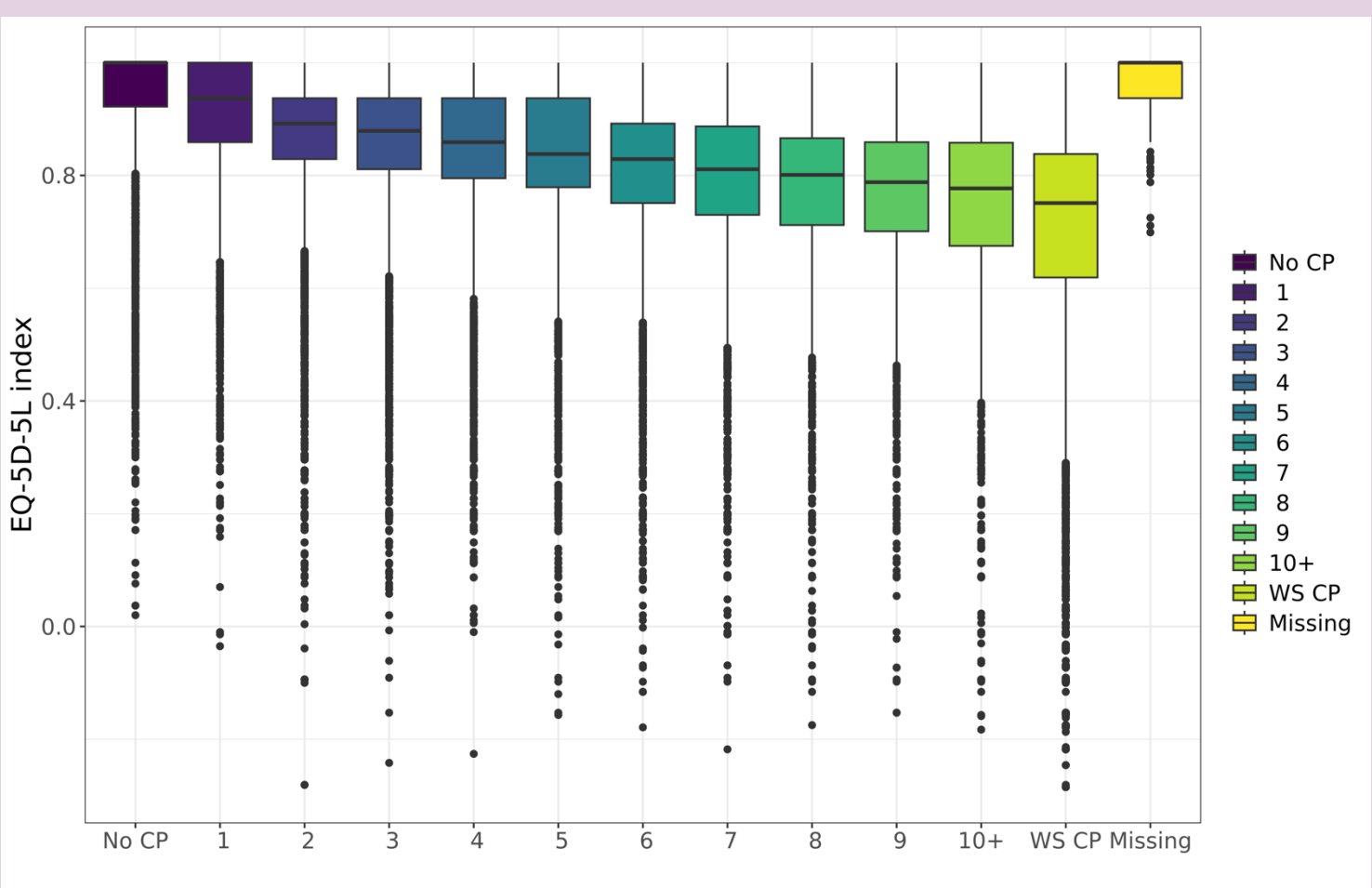


Fig 1: EQ-5D-5L index by number of pain locations

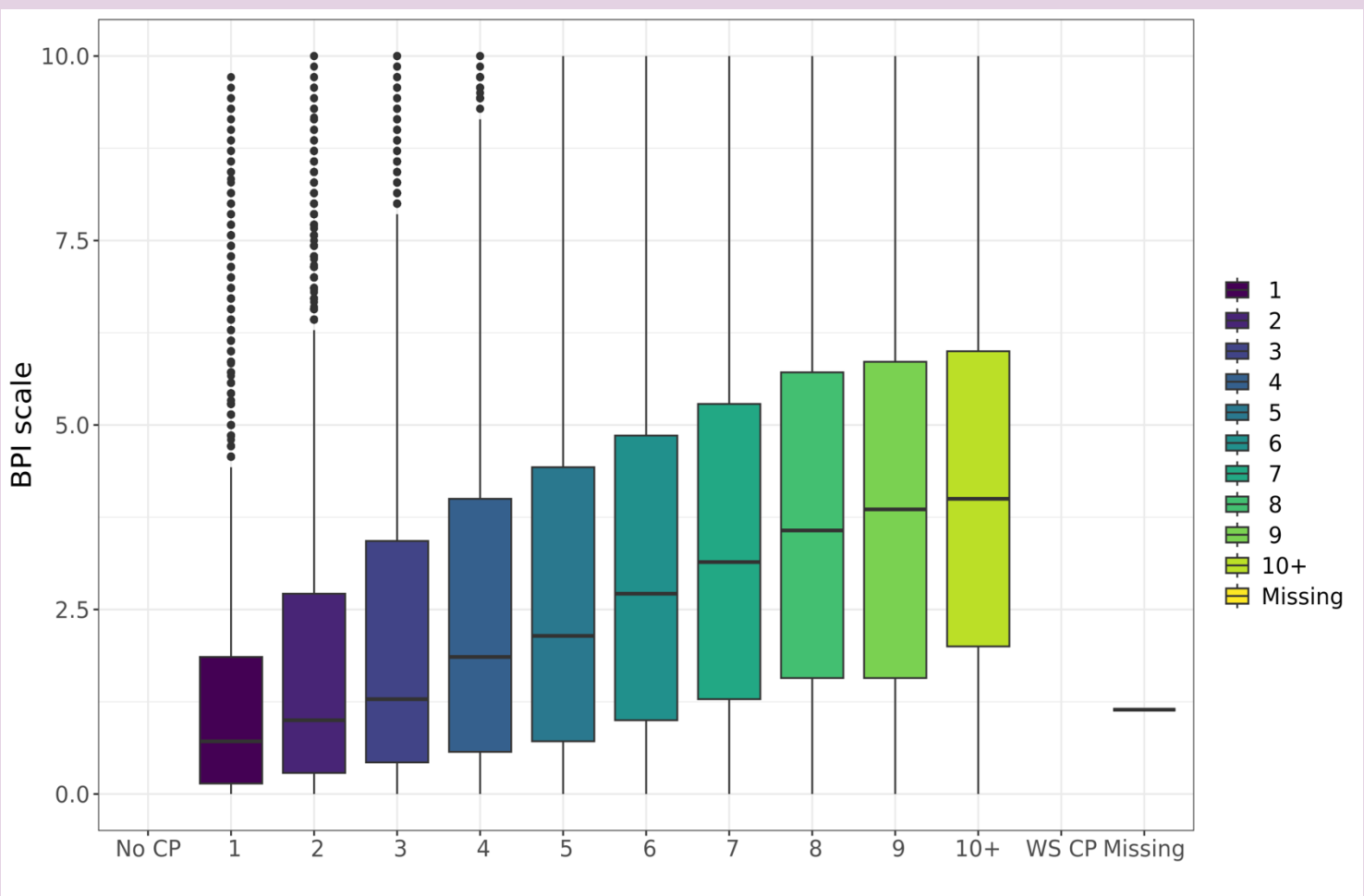


Fig 2: BPI scale by number of pain locations

- To assess if the EQ-5D-5L index can predict severe pain impact, out of bag estimates were calculated from 1000 bootstrapped samples using the "cutpointr"<sup>7</sup> package for:
  - Receiving operator characteristic (ROC) curves
  - Area under the curve (AUC)
  - Optimal cutpoint (OC)
  - Sensitivity, specificity & accuracy
- All analyses were performed in R version 4.4.0

## Results

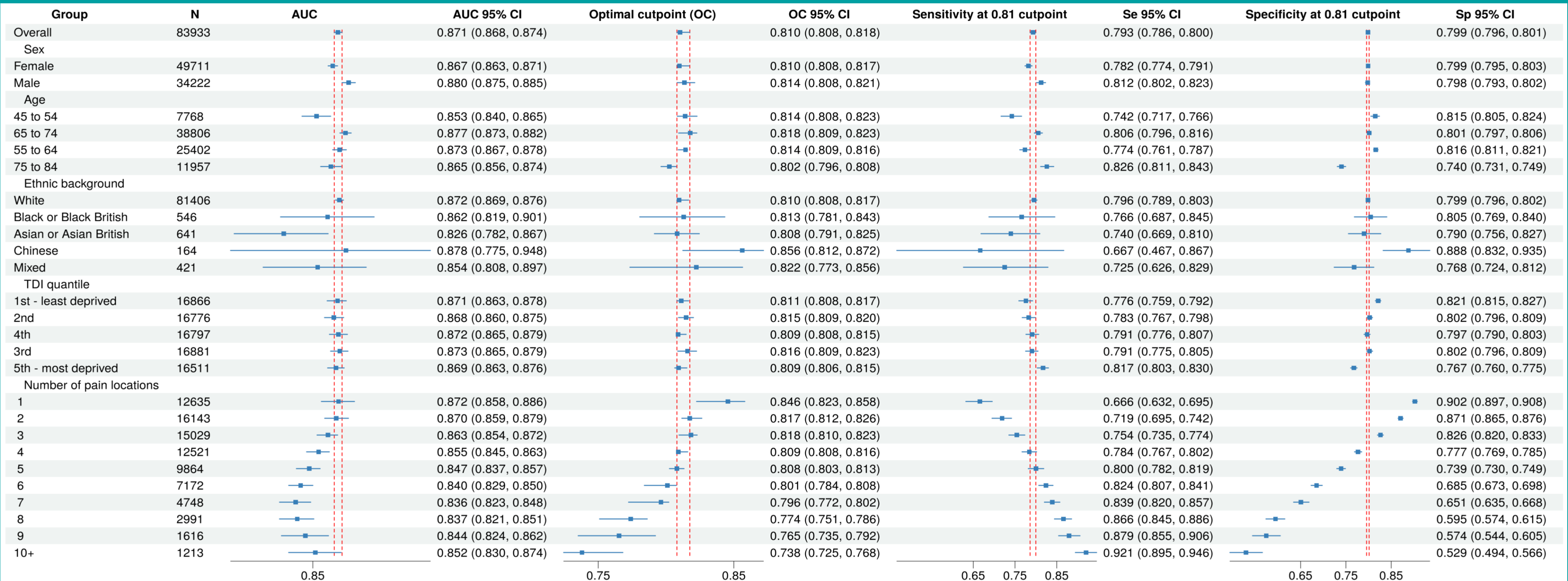


Fig 3: Estimates for AUC, OC, sensitivity and specificity of EQ-5D-5L for predicting severe pain impact, stratified by demographic factors and number of pain locations

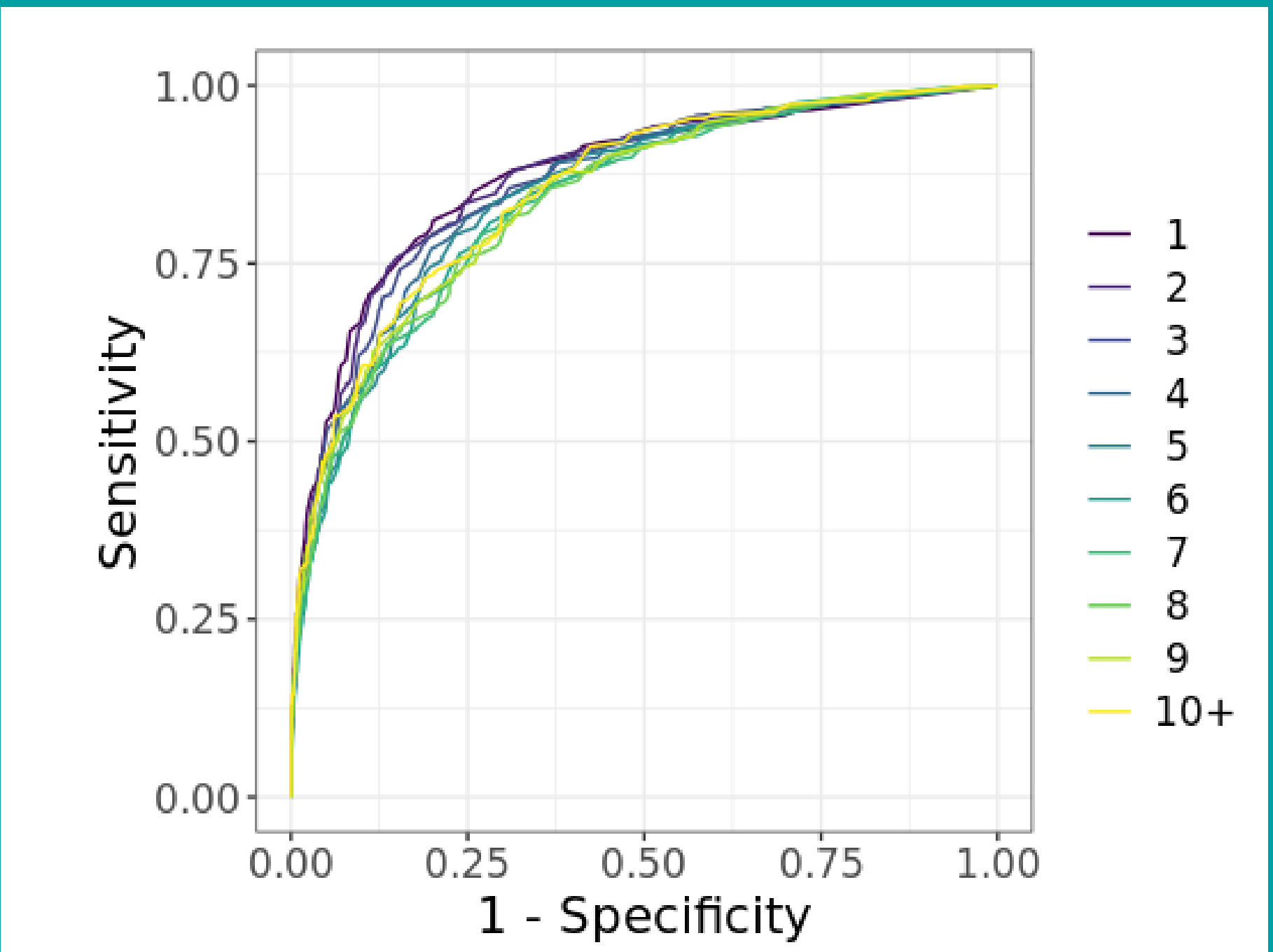


Fig 4: ROC curves of EQ-5D-5L for predicting severe pain impact, stratified by number of pain locations

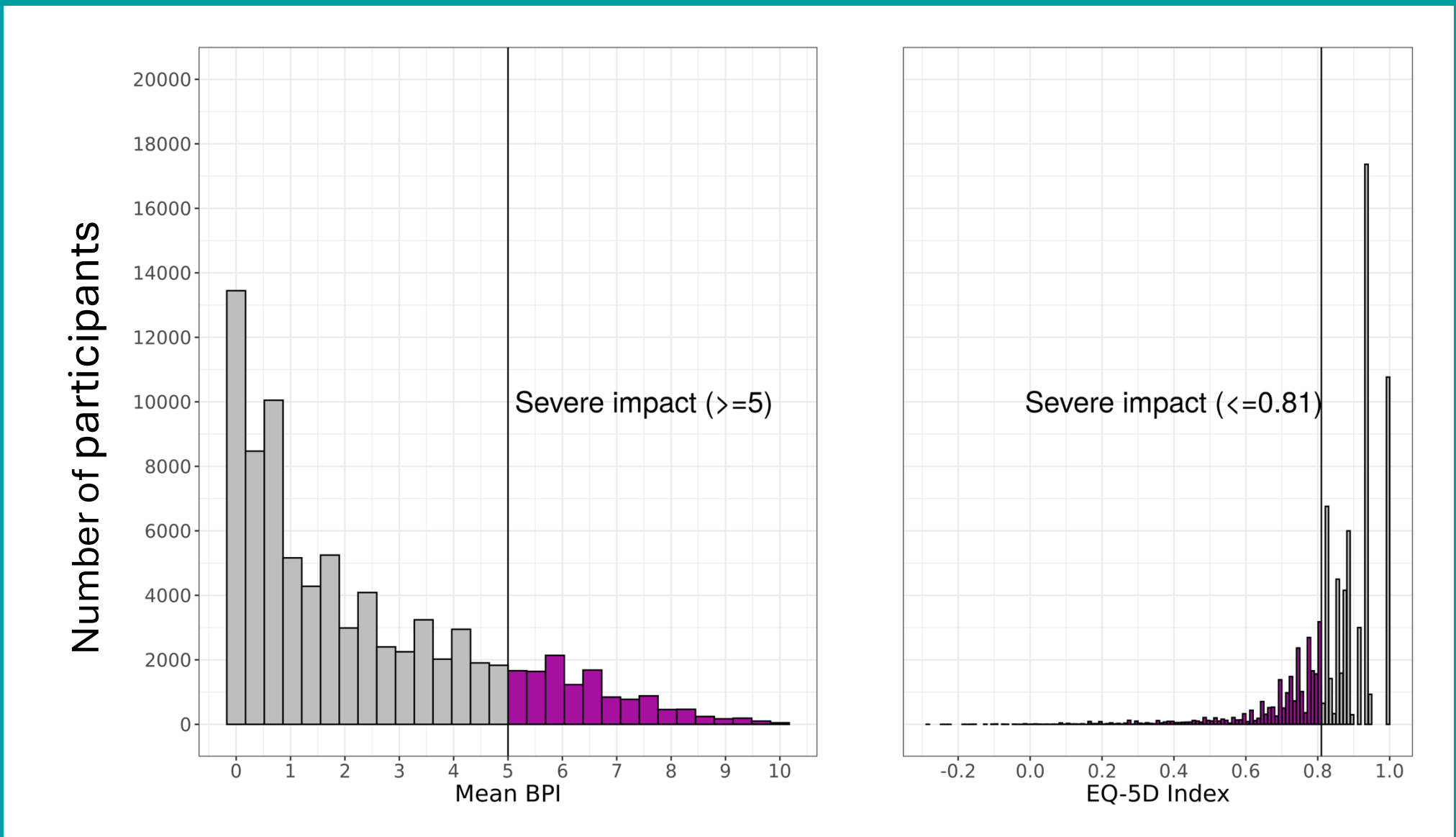


Fig 5: Distribution of the EQ-5D-5L index and BPI scale, with pain impact thresholds

## Conclusions

- We present a solution for defining the impact of pain in the UK Biobank EOP survey using the EQ-5D-5L index as an alternative to the BPI interference scale
- The EQ-5D-5L index had *very good* predictive ability when used to estimate the mean BPI scale cut-off for severe pain impact
- Performance remains similar over different demographic groups, but varies considerably depending on the number of pain locations

## Acknowledgements

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