

DECODE Dementia Clinical Prediction Models

Development and validation

Funded by
The Halpin Trust

Clinical Scenario

Imagine **you are a GP**. You need to **detect dementia** during brief consultations with older patients.

Mr Reed, a **78-year-old** patient comes to review his heart medication. He hasn't raised any cognitive complaints, but has several **risk factors for dementia** and his wife mentions he is experiencing more **difficulty managing his finances**.

What is the likelihood that Mr Reed has dementia? Would it be beneficial and appropriate to offer a dementia assessment?

This is a common and challenging scenario for clinicians. As a result, **dementia is often missed or misclassified** in primary care.

Objectives

- Identify patient characteristics associated with dementia status
- Develop and validate prediction models for use in a clinical decision support system

Method



Candidate predictors

125 variables are associated with dementia based on a review of 2,055 dementia-related systematic reviews. Of these, **42** were assessed as clinically relevant.



Model development cohorts

Data from population-based cohort studies of memory and aging with adjudicated dementia diagnosis in the US and Australia (N=1,564).



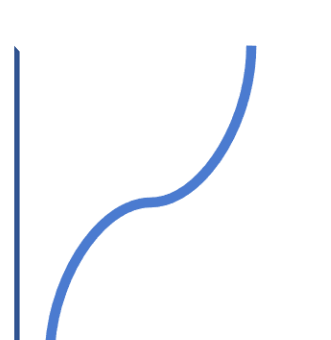
Variable and functional form selection

Bootstrapped fractional polynomial (FP) backwards logistic regression ($p > .05$ for removal). Missing data were multiply imputed with specified FPs.



Clinical prediction modelling

Variables consistently predictive in both cohorts were included in the final prediction models estimated using the pooled data.



Model validation and refinement

The prediction models will be externally validated and refined using the National Alzheimer's Coordinating Center memory clinic dataset (N~20,000).

Results

Predictors of dementia in the US and Australia

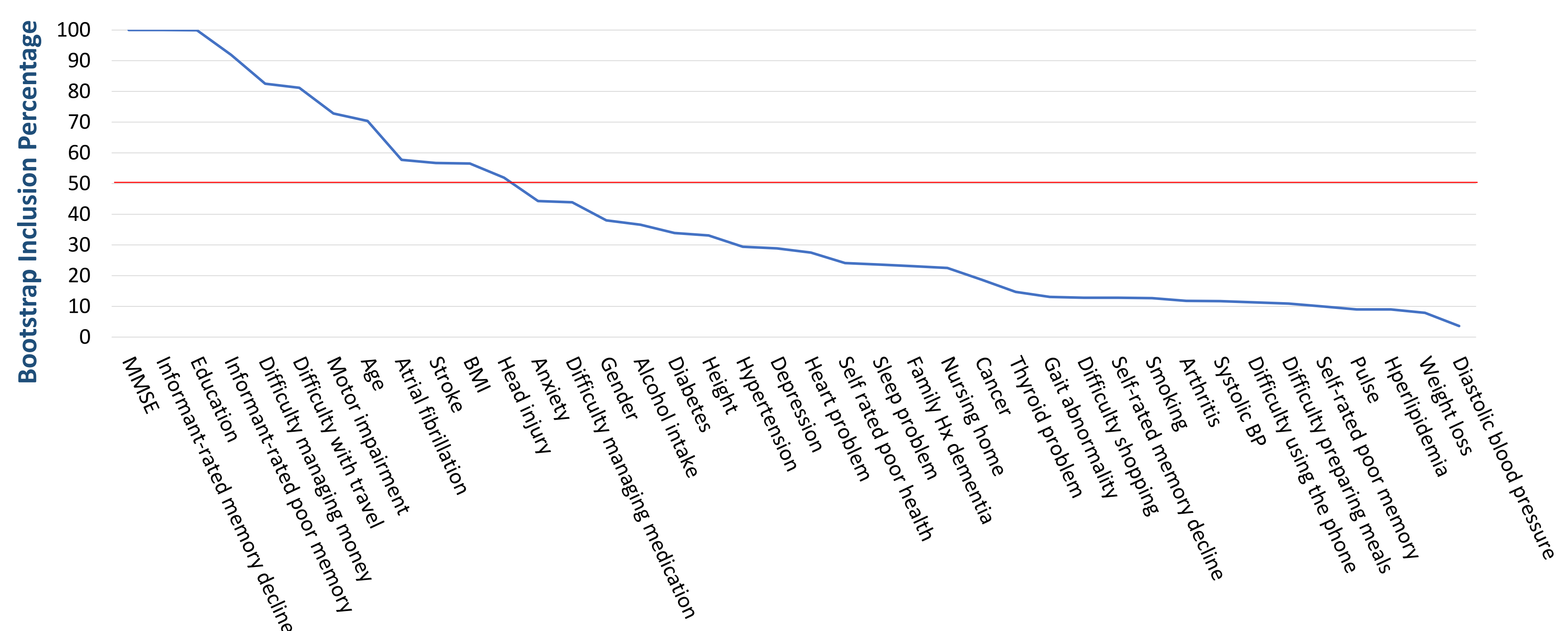


Figure 1. Relative importance of candidate predictors in the pooled data bootstrapped prediction models.

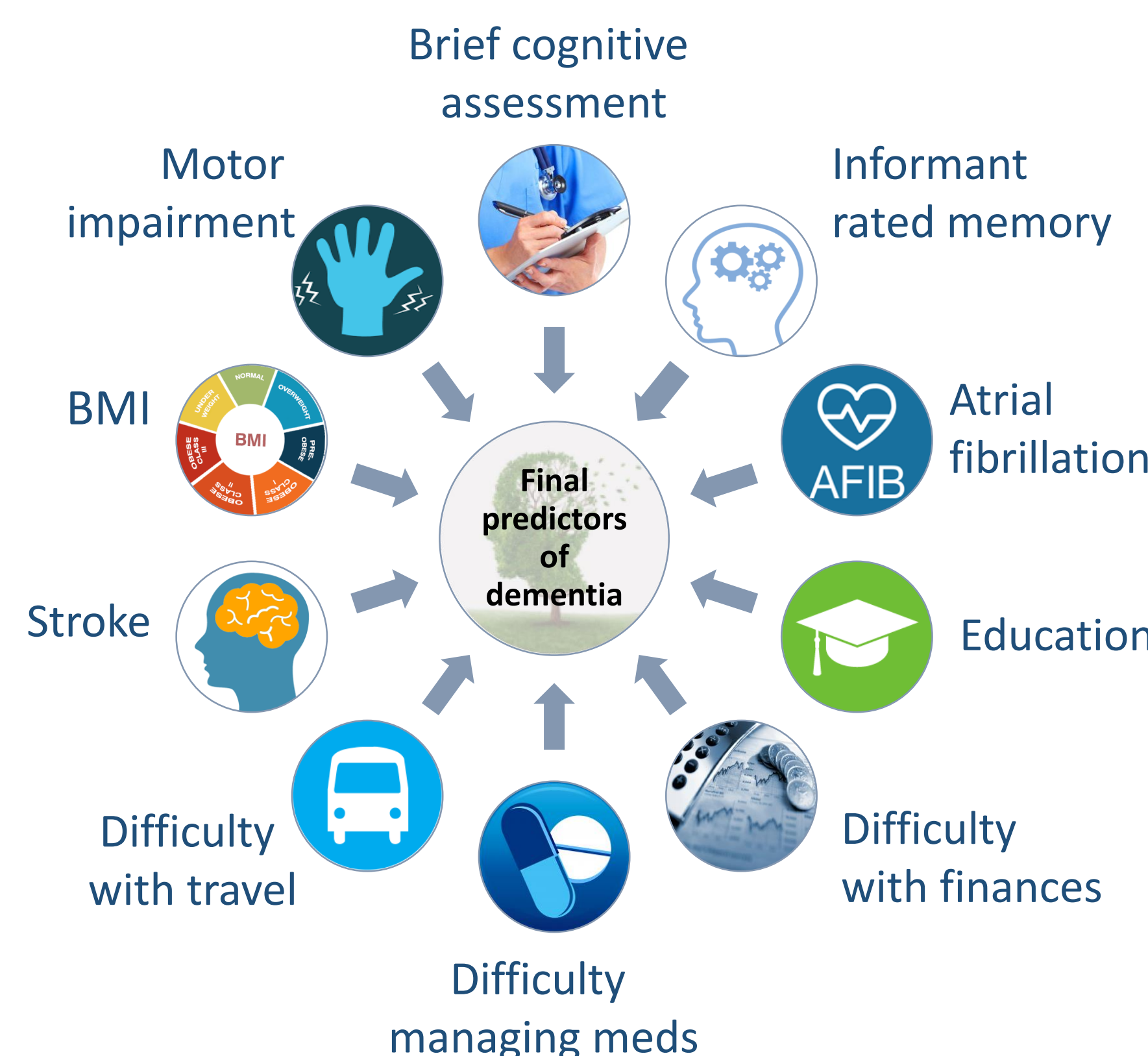


Figure 2. Variables selected for the final prediction model.

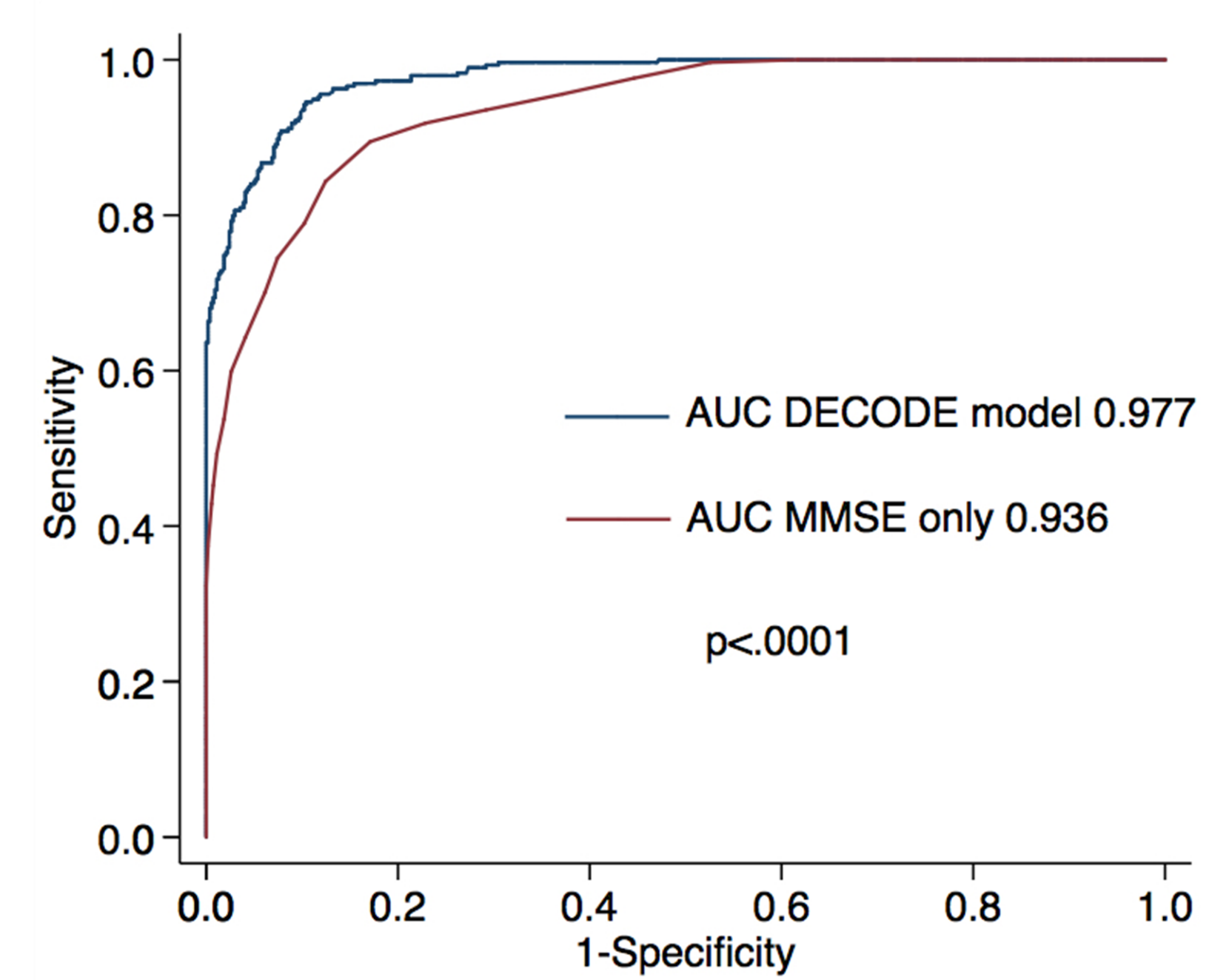


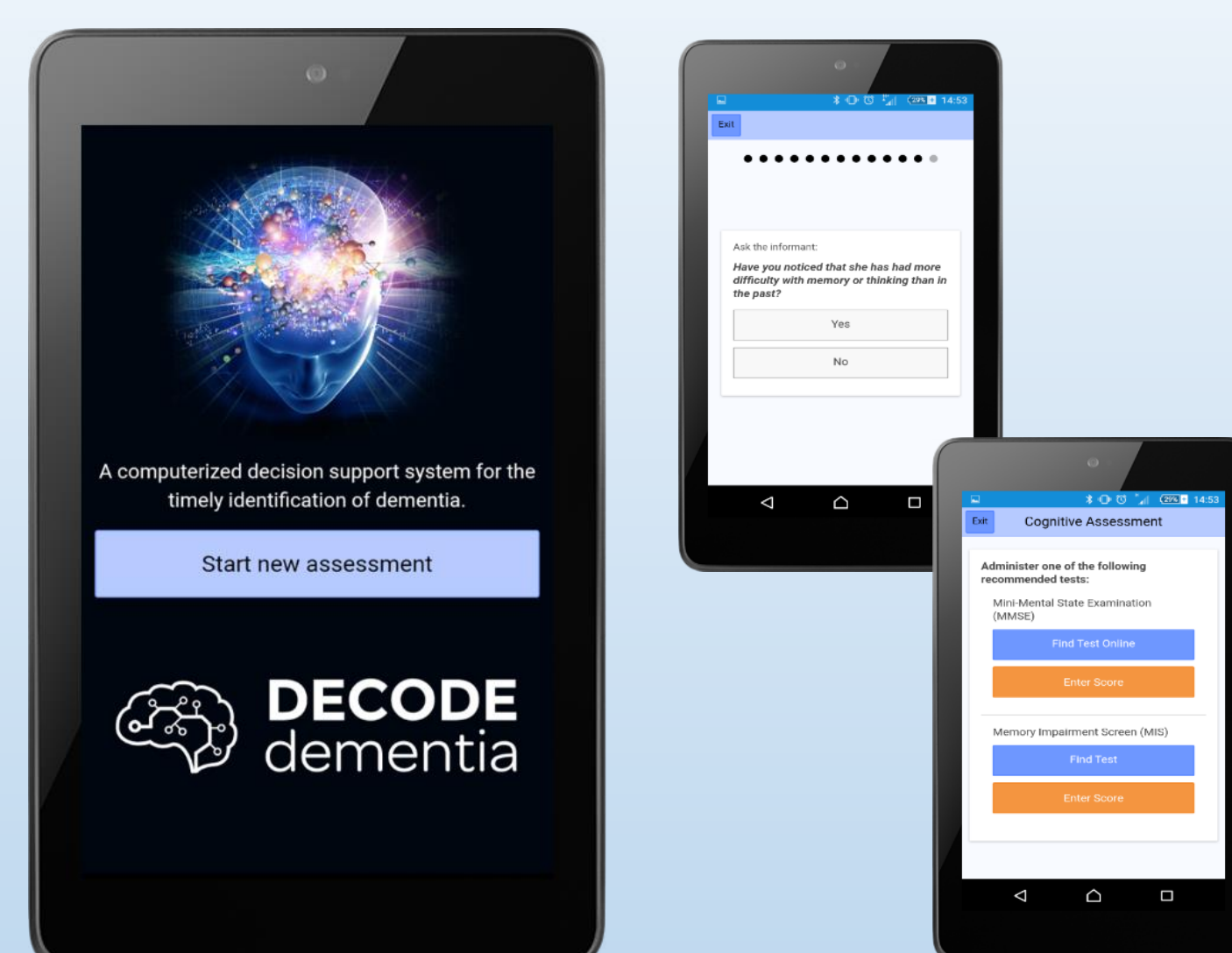
Figure 3. The DECODE model is significantly more predictive than the MMSE brief cognitive assessment alone.

Clinical Impact

Research meets practice

By combining information readily available in primary care, DECODE has the potential to help clinicians identify dementia more accurately and improve health services.

The prediction models have been implemented in DECODE clinical software. **Multi-site NHS feasibility trials** will be conducted in Mid Devon primary care consultations and South Devon memory clinics.



Devon Partnership
NHS Trust

