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INTRODUCTION

- 57 million people in the world had dementia in 2021¹
- Leading cause of death in UK²
- 7th leading cause of death in the world²
- 152 million people by 2050²
- 2 trillion dollars in healthcare and economic costs globally³
- Current resources do not allow long term support for all patients

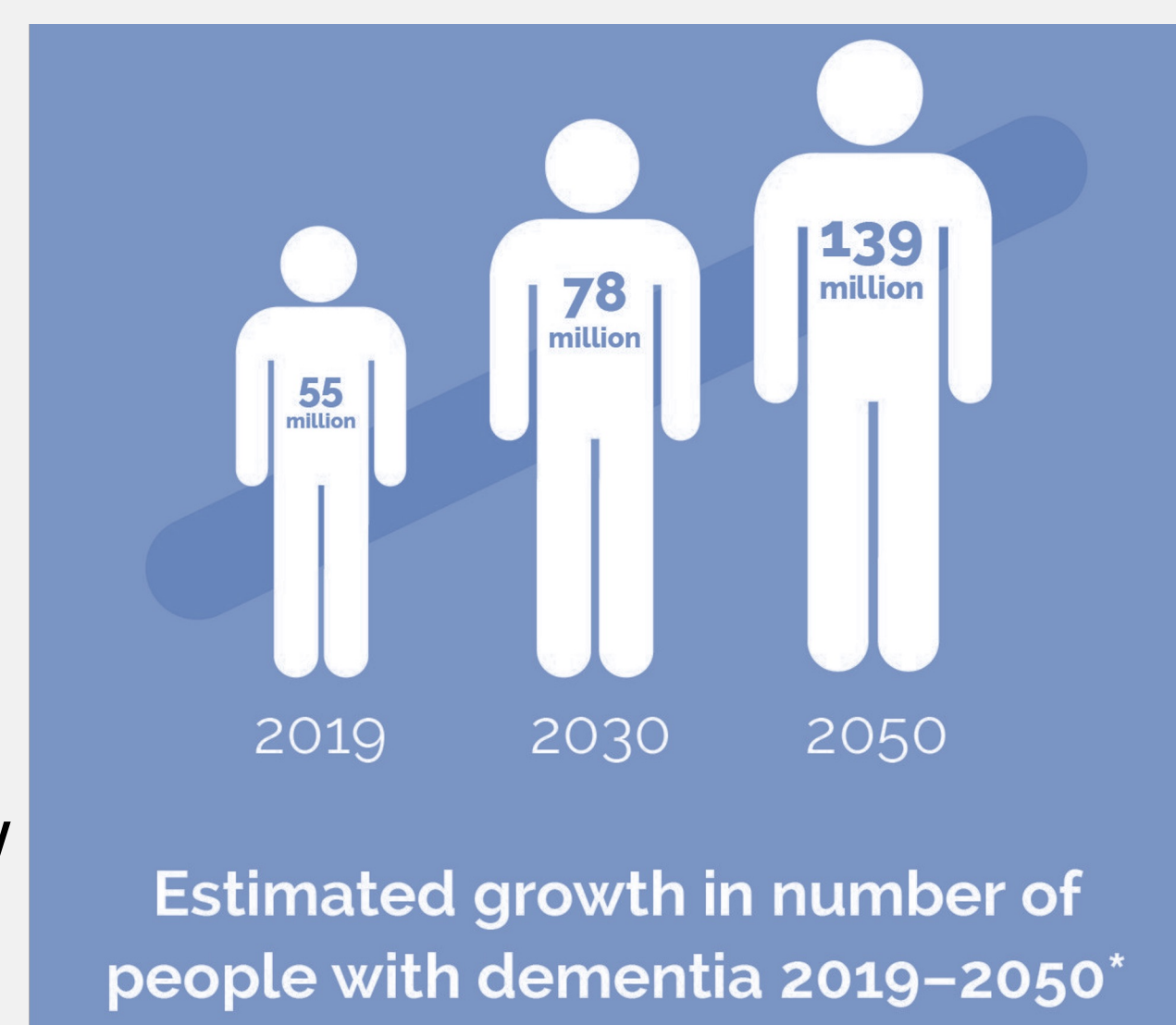


Fig 1 (Alzheimer's Disease International)

CURRENT MODEL

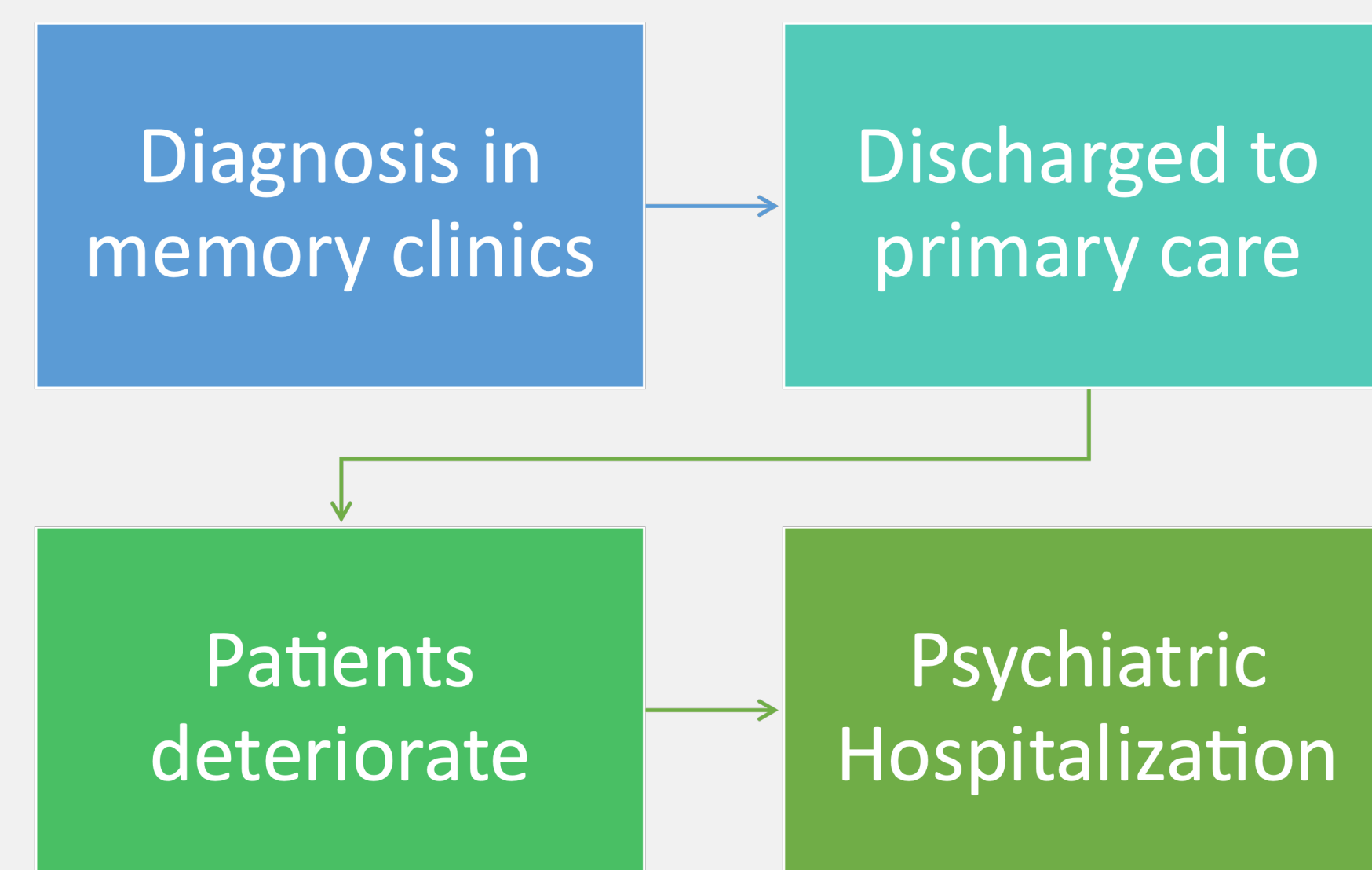


Fig 2

AIM

Our previous work from two United Kingdom sites found that younger, male patients, and those with impaired cognition were at risk of deteriorating. In this study, we aimed to create mathematical models of risk and use the results to develop a mobile application that is ready for clinical use.

METHOD

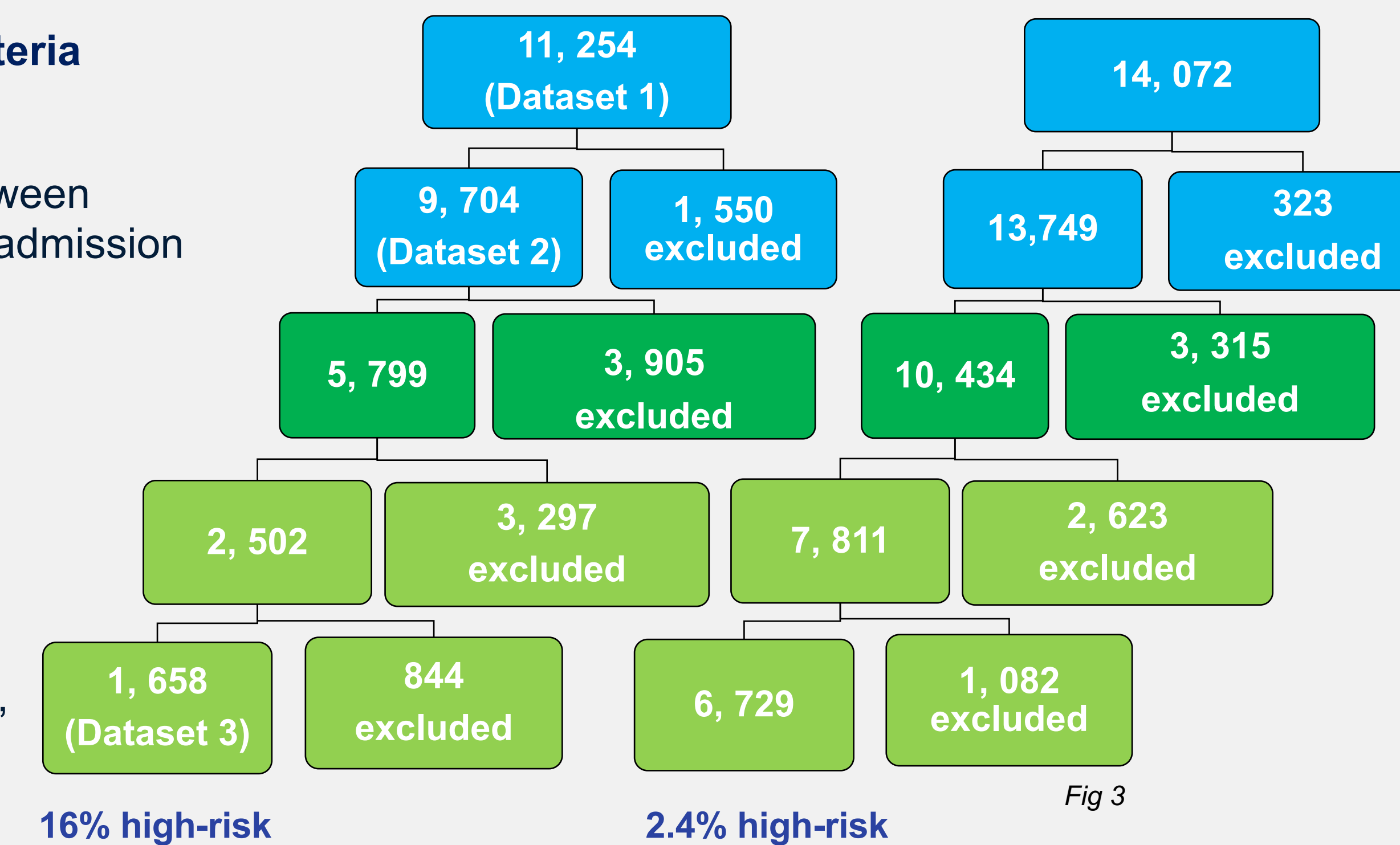
Exclusion Criteria

<6 months between diagnosis and admission

HoNOS >93 days

ACE/MMSE >93 days

missing values, diagnosed <40



16% high-risk

2.4% high-risk

Fig 3

VARIABLES

Diagnosis codes	Demographics	Cognitive scores & HoNOS
- Alzheimer's disease, - Vascular dementia - Dementia unspecified - Mild cognitive impairment - Dementia other - Stress - OCD - Anxiety - Depression - Severe mental illness - Delirium	- Age - Gender - Ethnicity - Marital Status - Deprivation index	- ACE/Mini-ACE - MMSE - MoCA - HoNOS

Using on our retrospective cohort study ($n=25,3260$) we have identified several epidemiological, and behavioural factors that showed the highest association with subsequent need for enhanced care.

Fig 4

RESULTS

VARIABLE CONTRIBUTION

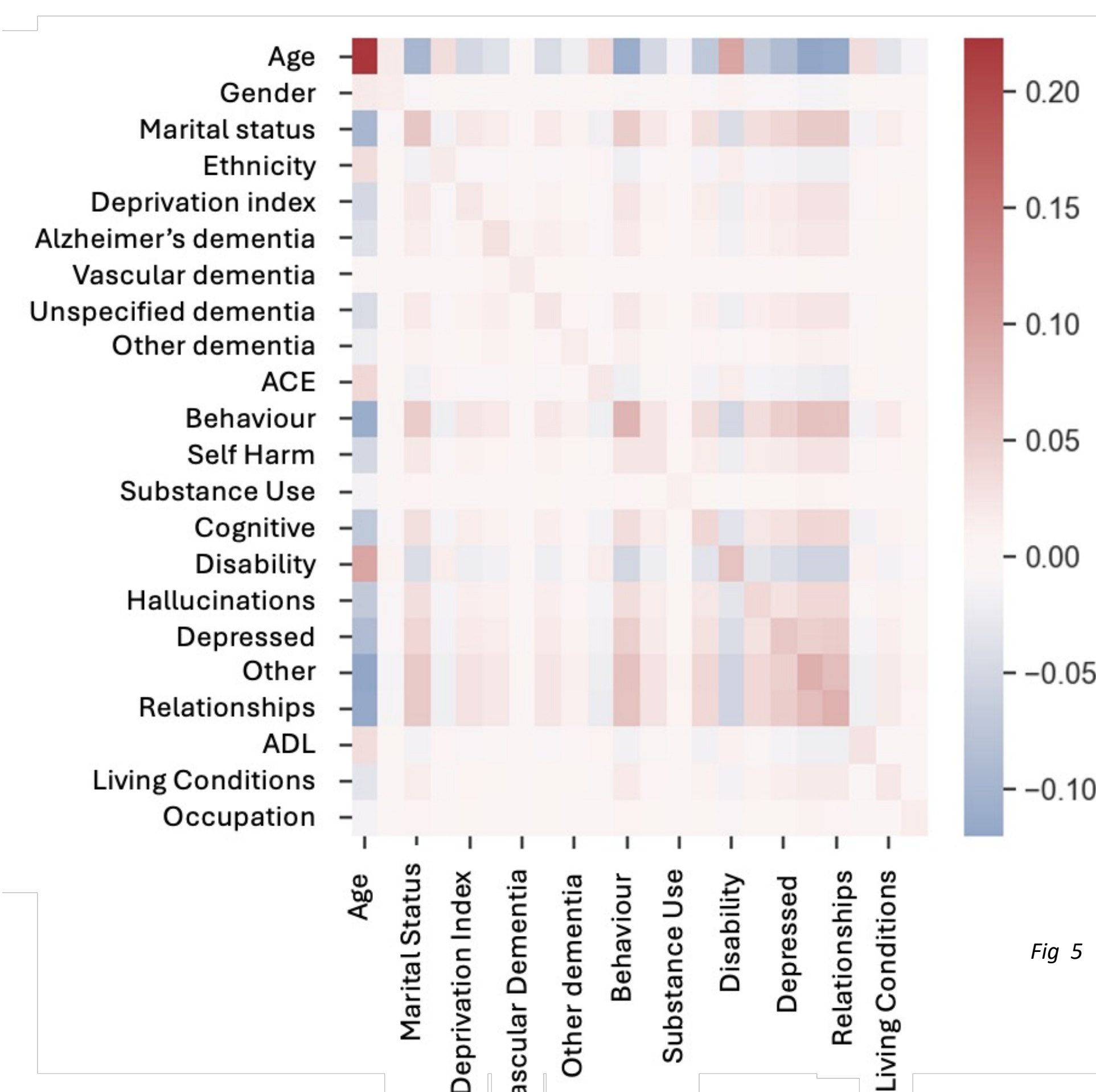


Fig 5

Metric tensor interpretation: the higher the value, the more contribution the feature (diagonal values) or the interaction of the two features (non-diagonal values) to the classification task

MATHEMATICAL MODELS PREDICT RISK

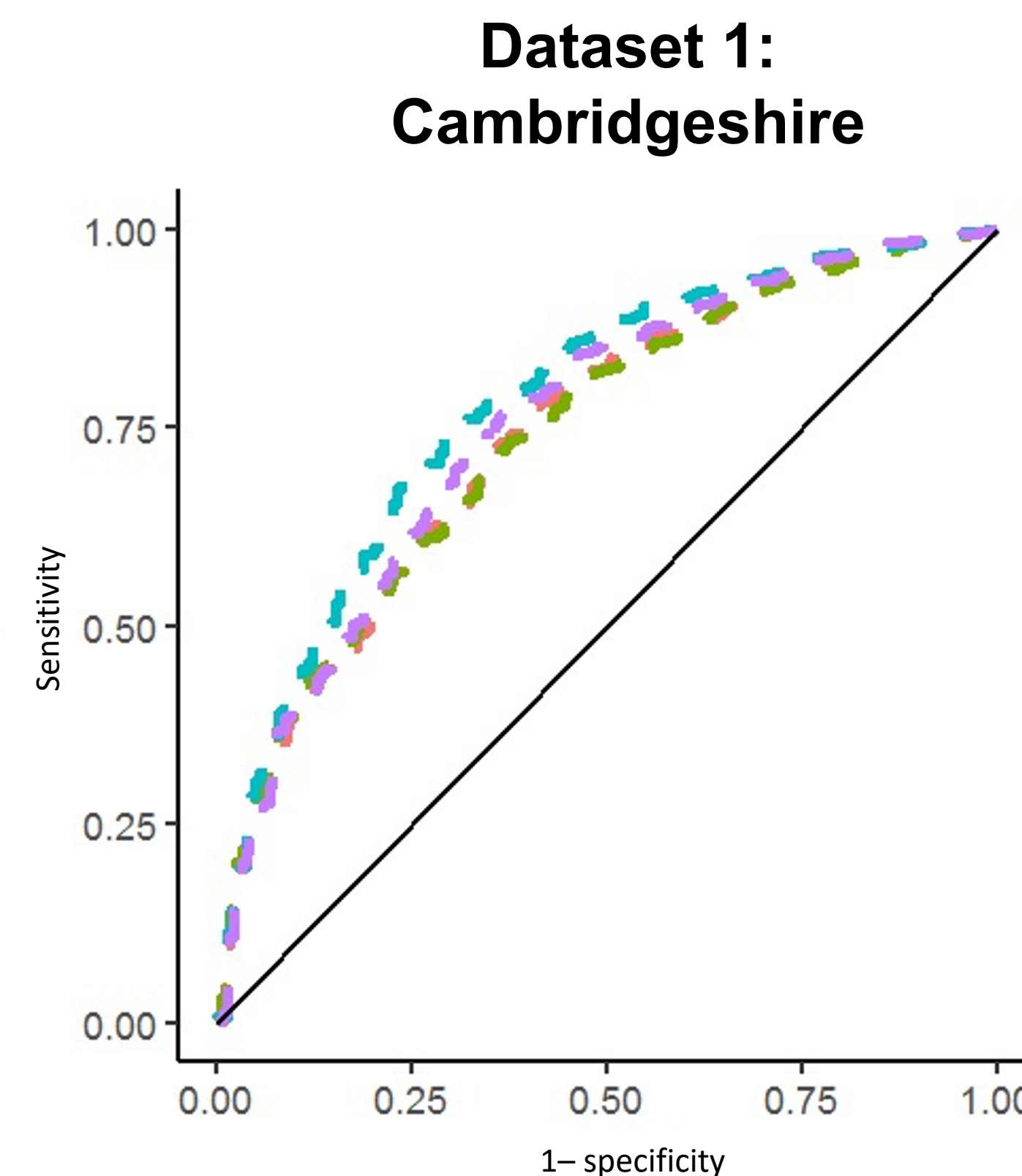


Fig 6

AUC curves shown above in Cambridgeshire and second data set for validation from South London, respectively. The same threshold was used for classifying patients into the high and low risk groups as in our previous retrospective study.

The AUC was 0.74-0.79 for 1 to 4 years after diagnosis in Cambridgeshire with a similar AUC of 0.74 in the validation dataset in London.

Dataset 2: South London

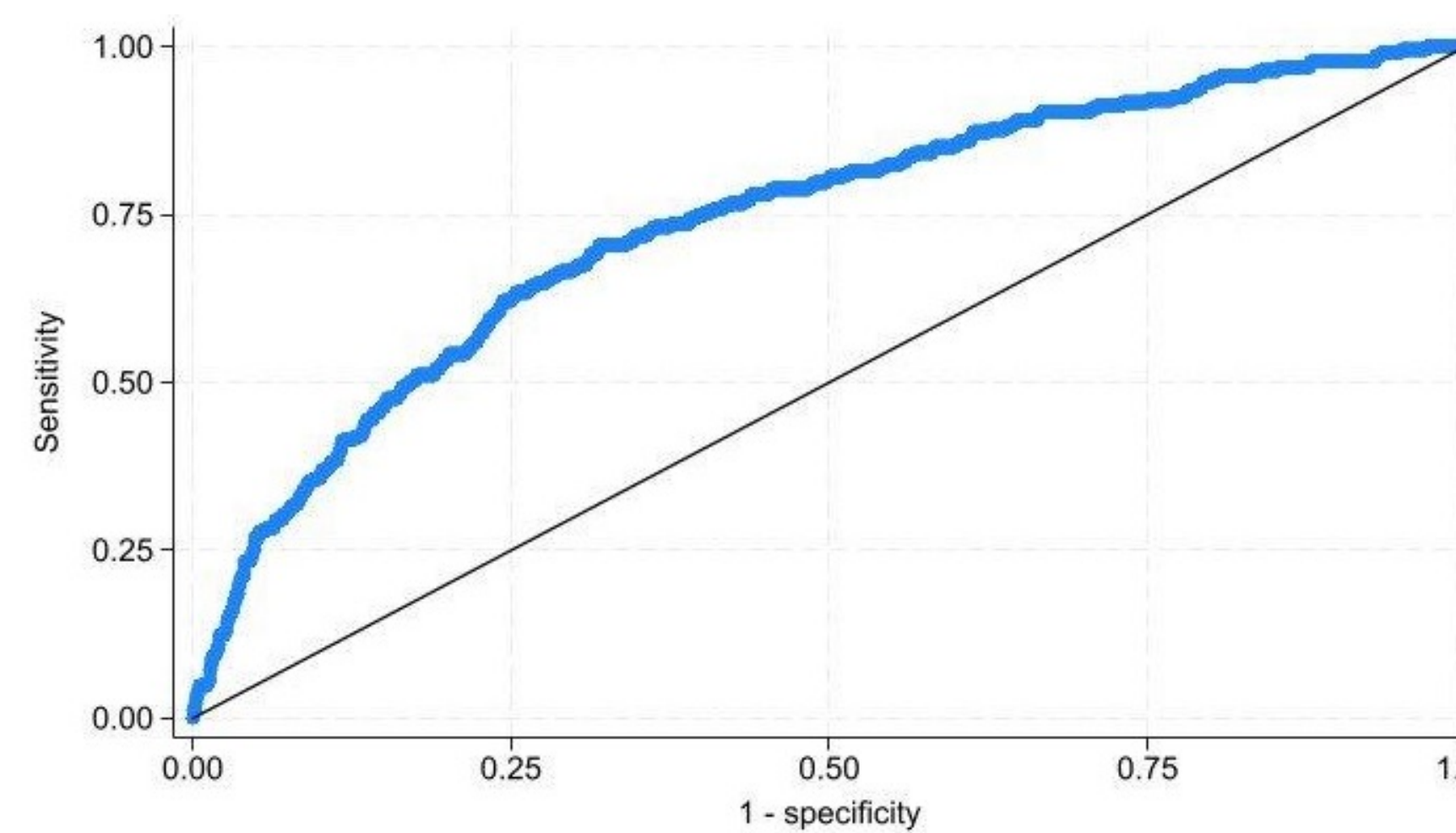


Fig 7

VALIDATION

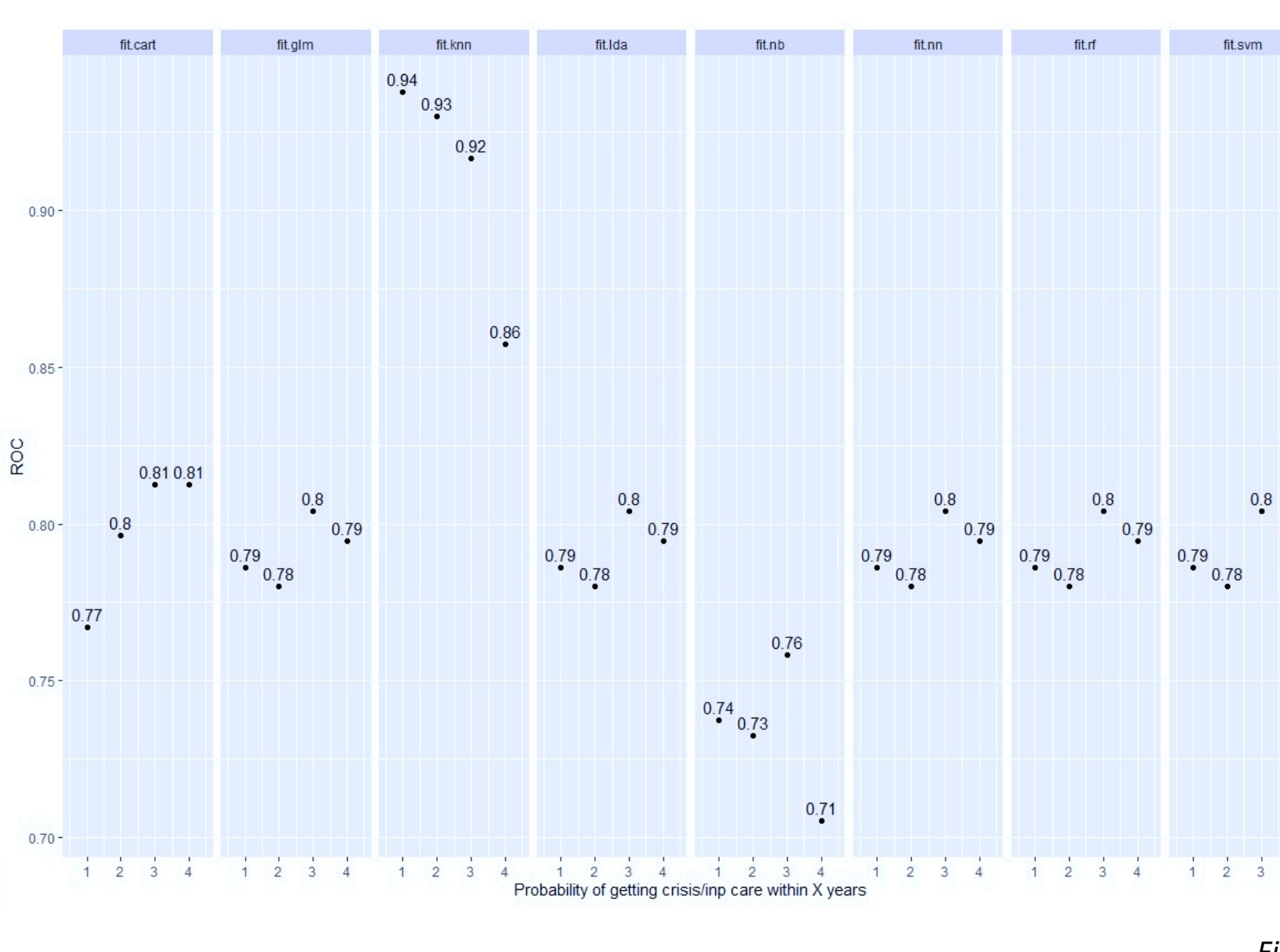


Fig 8

The models were externally validated in a dataset of 1,627 patients in Camden and Islington. This allowed us to use a diverse, independent dataset that was not used in the original models.

The AUC was 0.78-0.8 in Camden and Islington for logistic regression and >0.7 for seven other models examined.

CONCLUSIONS

MOBILE APPLICATION DESIGN

Dementia Assessment

Patient Information

Age:

Gender:

Married? ☒ Yes ☐ No

Type of Dementia:

Summary

Patient Summary:

Age:
Gender: Male
Married: Yes
Type of Dementia: Alzheimer's

HoNOS Cognitive Test Scores:
Behavior: 0
Hallucinations: 0
Cognitive: 0
Disability: 0
Other: 0

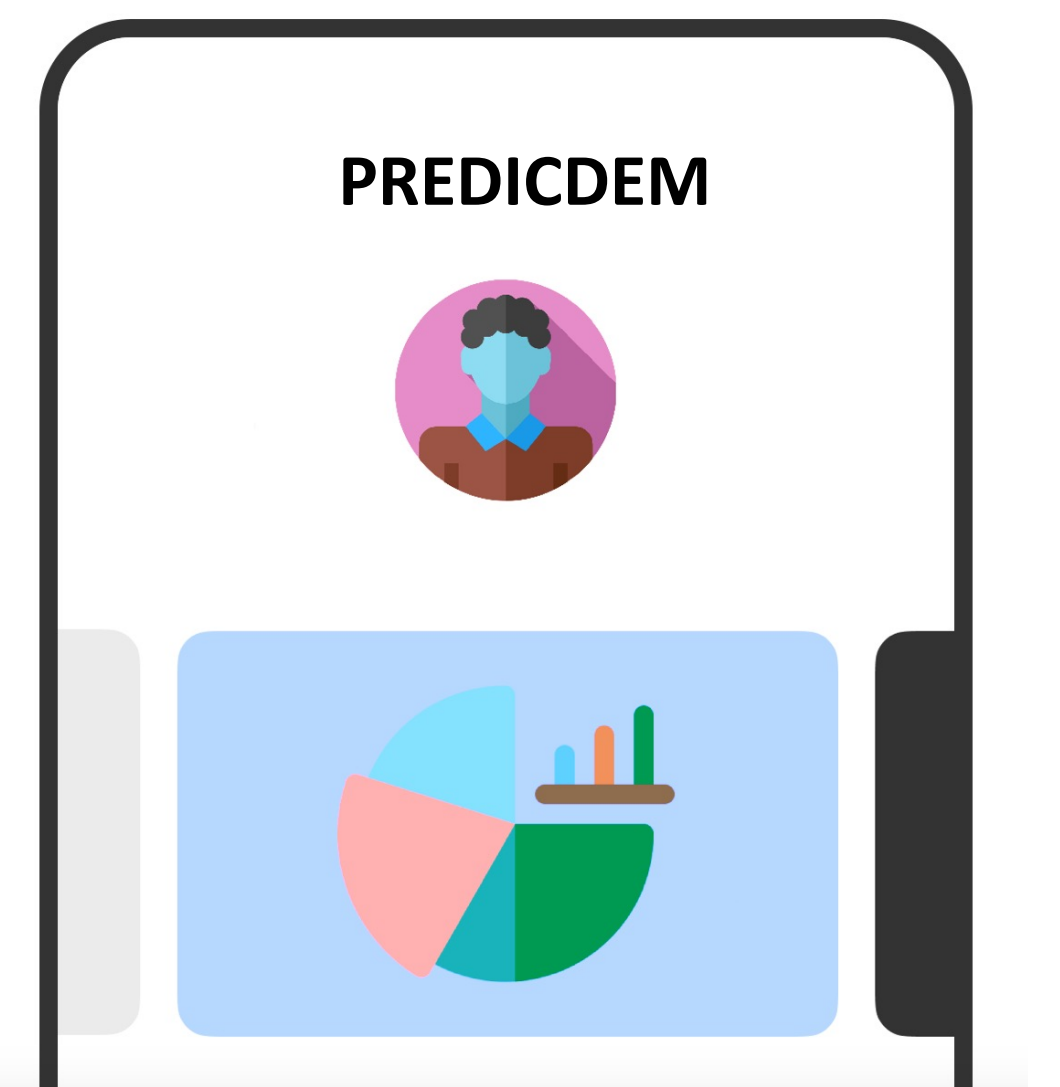


Fig 9

- We developed the PREDICDEM App.
- We have used routinely collected clinical data to model risk of needing enhanced care in dementia, which can be incorporated into models of risk prediction.
- This will allow stratification of patients at the time of diagnosis.
- This will facilitate trials of interventions to decrease the risk of crisis events.

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CONTACT INFORMATION

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REFERENCES

1- World Health Organization, 2 - Alzheimer's Disease International, 3 - Velandia et al, 2022