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Introduction

- Blood-based biomarkers offer a minimally invasive approach to stratify cancer risk and guide further investigation.
- However, most lack validation or are not readily deployable within routine clinical practice, presenting a major barrier to implementation.
- The UK-CA marked PinPoint test is a machine learning-based assay that integrates 30 routinely available blood parameters with age and sex to estimate cancer risk.
- In this study we evaluated its diagnostic performance in a lung cancer screening programme in socioeconomically deprived communities.

Methods

- Participants were prospectively recruited from a community-based lung cancer screening programme and a fast-track lung cancer clinic.
- Blood was drawn prior to screening or in clinic prior to further diagnostic investigations and processed in a standard NHS laboratory using routinely available assays.
- PinPoint risk scores were generated blinded to cancer outcomes and subsequently linked to clinical data for analysis.

Results

- A total of 1,073 participants had a PinPoint blood test, including 1,015 individuals recruited from the screening cohort (see Table).
- 61 lung cancers were diagnosed overall (5.7%).
- PinPoint test overall discrimination: **AUC 0.778** (95% CI: 0.722-0.834).
- At a threshold of 196:
 - sensitivity 82%
 - specificity 62%
 - negative predictive value 98%
- In the **screening cohort**, 9 cancers were detected (0.9%), with **AUC 0.741** (95% CI: 0.612-0.870).

	No cancer N = 1,012	Cancer N = 61
Age		
Median (IQR)	67 (63, 71)	68 (64, 73)
Min-Max	55-76	53-83
Sex		
Female	366 (36.2%)	30 (49.2%)
Male	646 (63.8%)	31 (50.8%)
PinPoint score		
Median (IQR)	164 (121, 238)	275 (227, 377)

Table. Participant characteristics and PinPoint result according to cancer status.

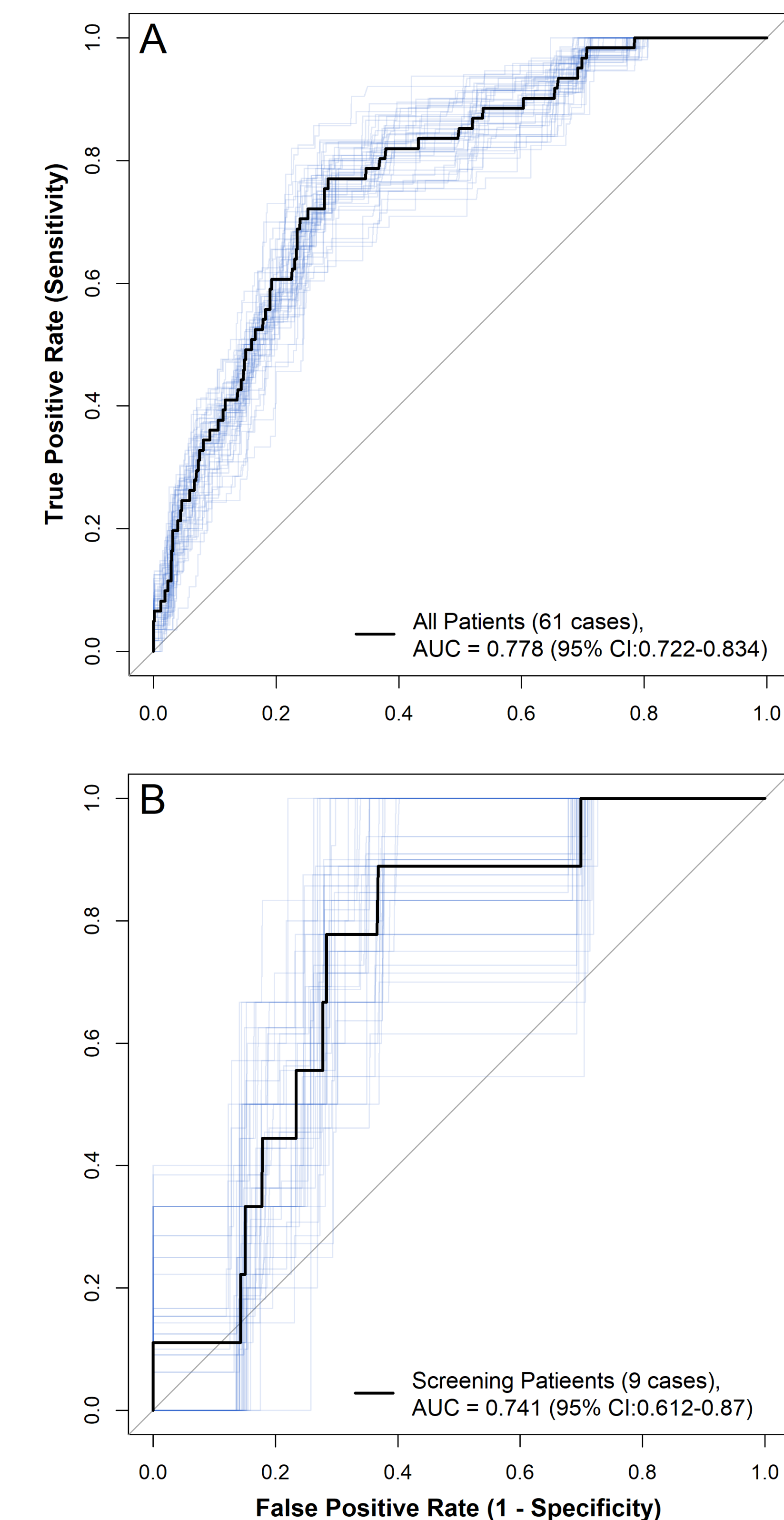
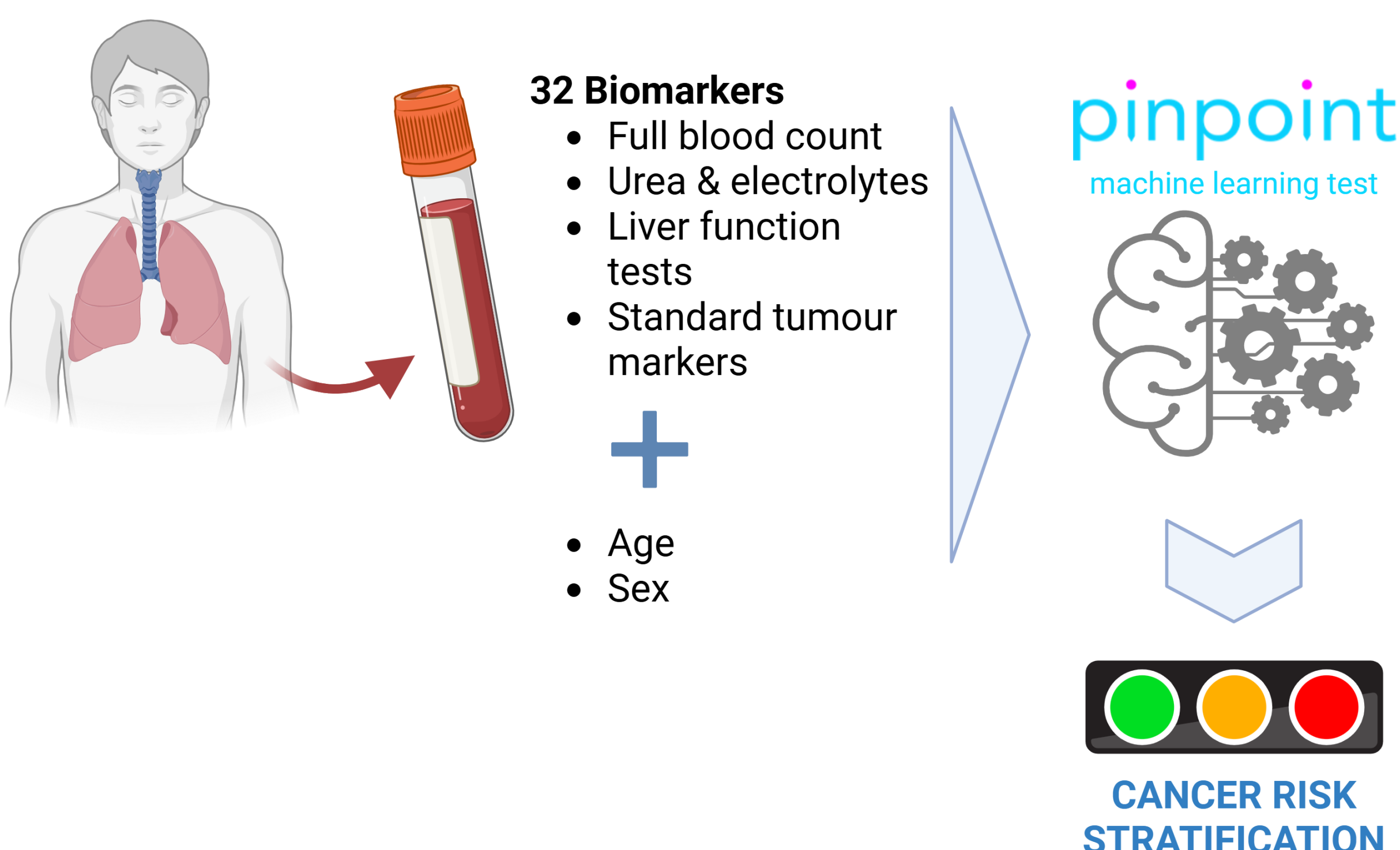


Figure. ROC curves for discriminatory performance of PinPoint blood test for presence of lung cancer in

(A) all participants and

(B) screening participants.



Conclusions

The PinPoint blood test demonstrated good discrimination for lung cancer detection in a targeted lung cancer screening cohort with significantly higher test scores in lung cancer cases.

Negative predictive value was high, which is particularly important in the screening context.

In a real-world targeted screening cohort, the PinPoint test provided additional biological risk signal that may improve risk stratification, particularly in socioeconomically deprived populations. Further evaluation is warranted.