

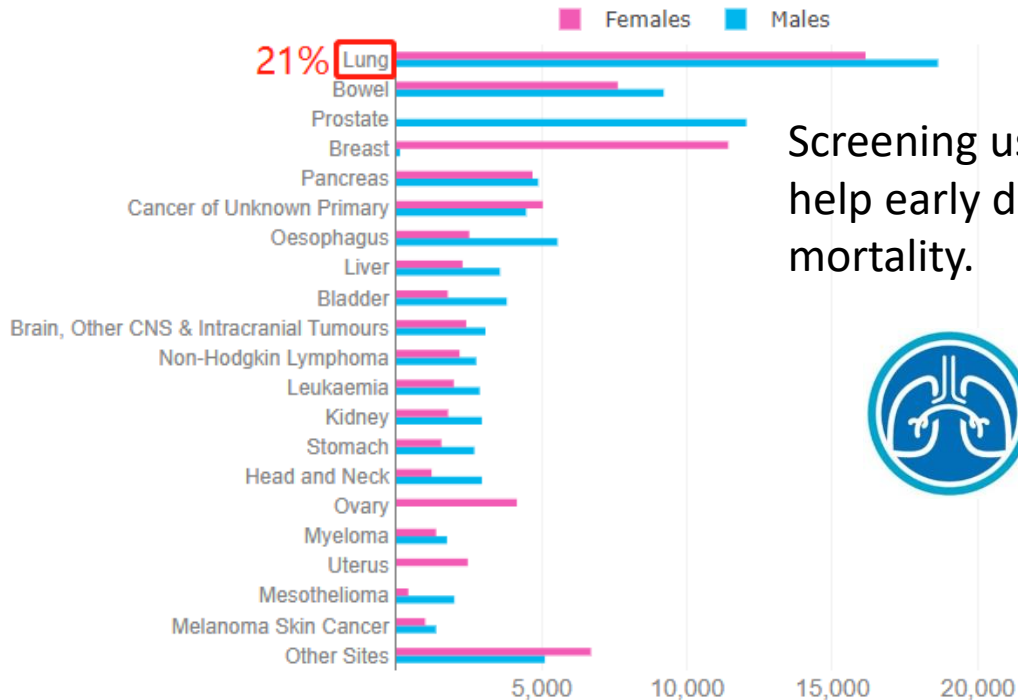
Predicting the future risk of lung cancer

Development and validation of QCancer2
(10-year risk) lung model and evaluating the
performance of nine prediction models

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Research background and rationale

The 20 Most Common Causes of Cancer Deaths, UK, 2017-2019



Screening using low dose CT can help early detection and reduce mortality.



Risk prediction model

Select those at high risk for screening



Low risk

Medium risk

High risk

LLP_{v2} and PLCO_{m2012} models in TLHC programme
 Not satisfactory model performance (O'Dowd et al)

- Motivation & aim: to develop and validate a model that works better for the English primary care population for lung cancer screening.

Methods

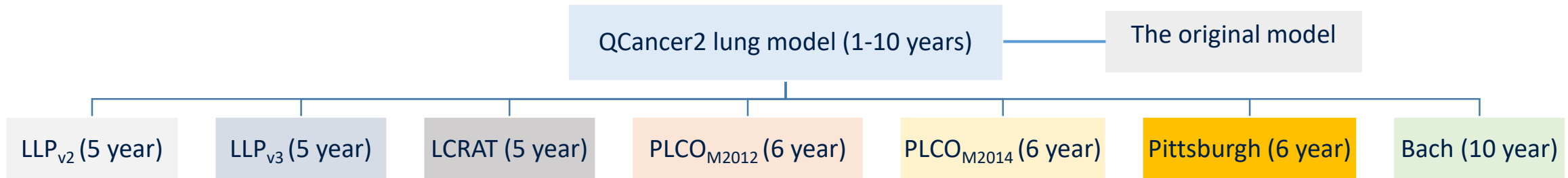
Model development (12.99M)

- Cox regression
- By sex (25-84 years old)

Model validation (4.14M)

- Discrimination measures: Harrell's C, D statistic, and R_D^2
- Calibration plots

- Stage 1: develop and validate the QCancer2 (10-year risk) lung model
- Stage 2: model evaluation



1. Ever-smokers aged 55-74 years

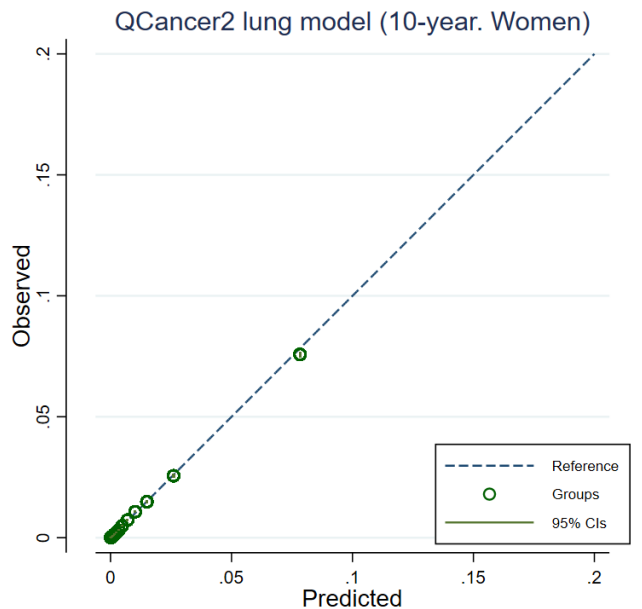
- The population for the Targeted Lung Health Check programme

Two approaches

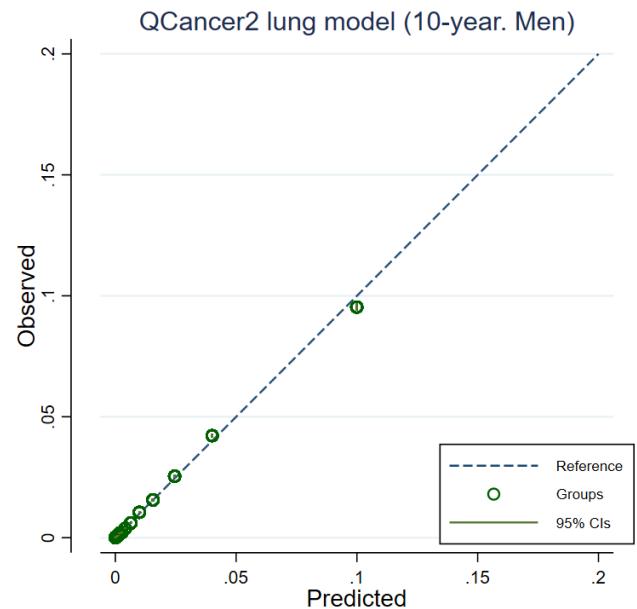
2. The eligibility criteria for study participants in each model

Results – Discrimination and calibration

Patients aged 25-84 years	Harrell's C	D statistic	R_D^2
QCancer2 (Women)	0.897 (0.893 - 0.900)	2.81 (2.77 - 2.85)	65.4% (64.8 – 66.0)
QCancer2 (Men)	0.904 (0.901 - 0.906)	2.79 (2.76 - 2.83)	65.0% (64.5 – 65.6)



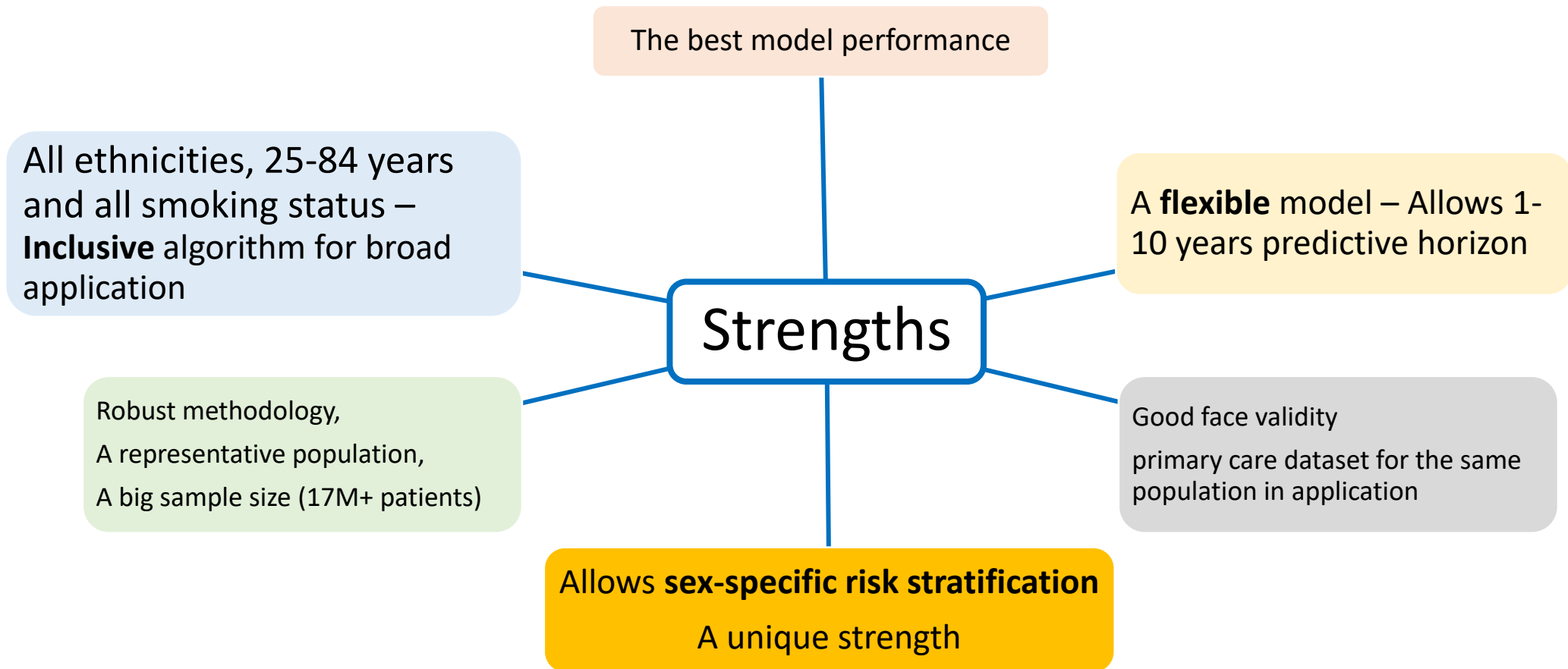
Note: the whole validation cohort (people aged 25-84 years old, including never-smokers)



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Please come to my poster (#9) to know more the predictors and the model performance when comparing with other models.

Strengths of the QCancer2 (10-year risk) lung model



Conclusions & take home messages

- The QCancer2 (10-year risk) lung model has the best model performance in discrimination, calibration, and net benefit among the nine prediction models in two approaches.
- It may be more suitable to use the QCancer2 (10-year risk) lung model for lung cancer screening in the English population. (We submitted a public consultation comment to the UK National Screening Committee in early June 2022)

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