

# Predicting 1-, 3-, and 5-year mortality after surgery for colorectal cancer using a Danish quality assurance database

Using Danish quality assurance data and the OHDSI tools to create evidence for personalized surgery.

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## INTRO

Long-term survival is an important outcome after oncological surgery for colorectal cancer. Prediction models for long-term mortality which can identify patients with a high risk of long-term mortality can potentially help guide treatment plans.

## METHODS

The Danish national quality assurance data covering patients diagnosed with colorectal cancer (DCCG) was converted into the OMOP CDM. Prediction studies were designed using ATLAS and executed using R and the PLP package. The target cohort were all patients receiving an operation for colorectal cancer and having at least 1, 3, or 5 years follow up after surgery, the target cohort was death from any cause, and the time at risk were 1, 3, or 5 years after the date of surgery. A LASSO logistic regression were trained using data available at any time prior in the age, gender, conditions, measurement values, procedures and observation domain. Custom covariates were created to specific scales (e.g. performance score). The model development used 3 fold-cross validation and a 75% / 25% split between training and test set.

## RESULTS

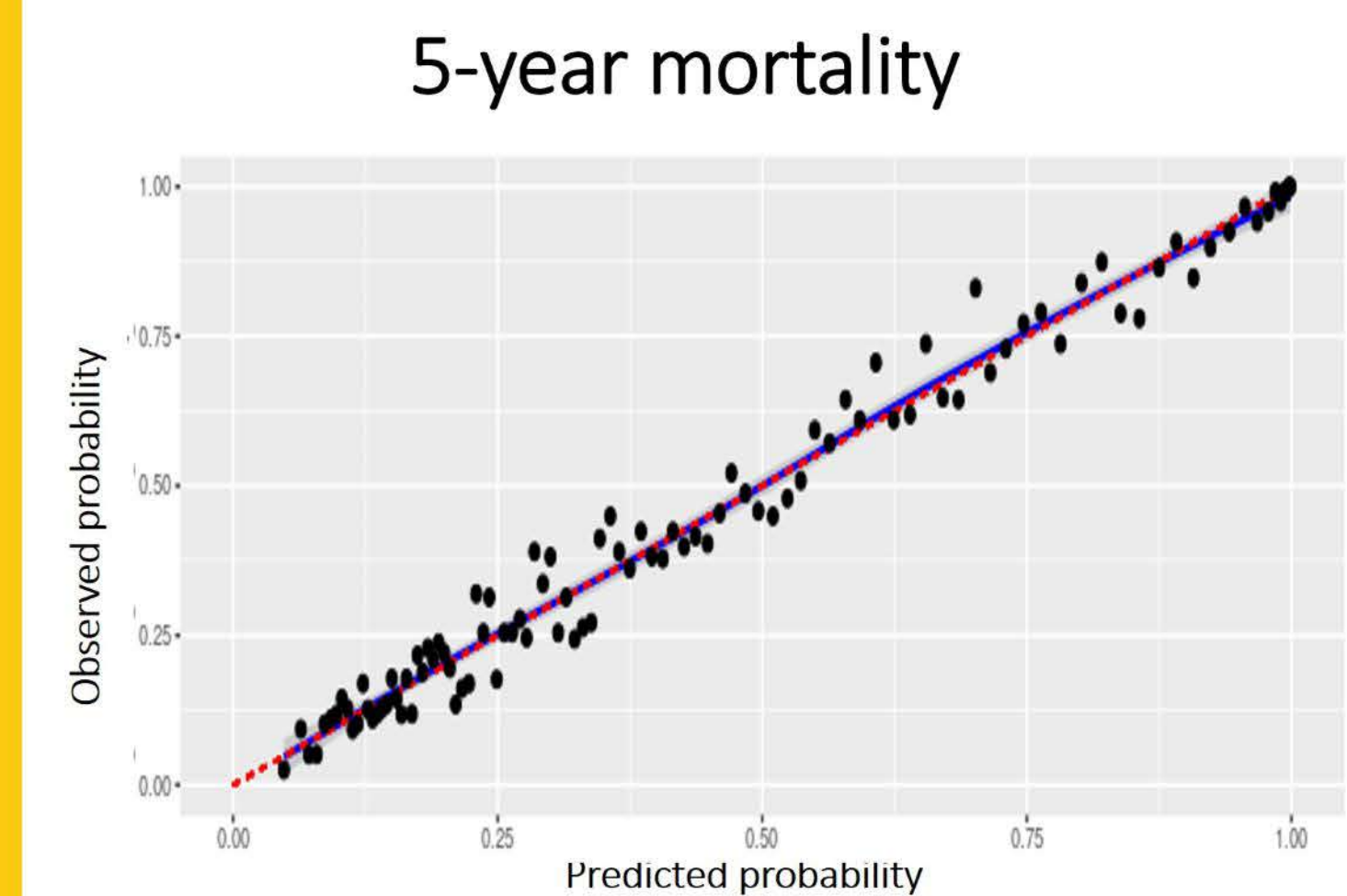
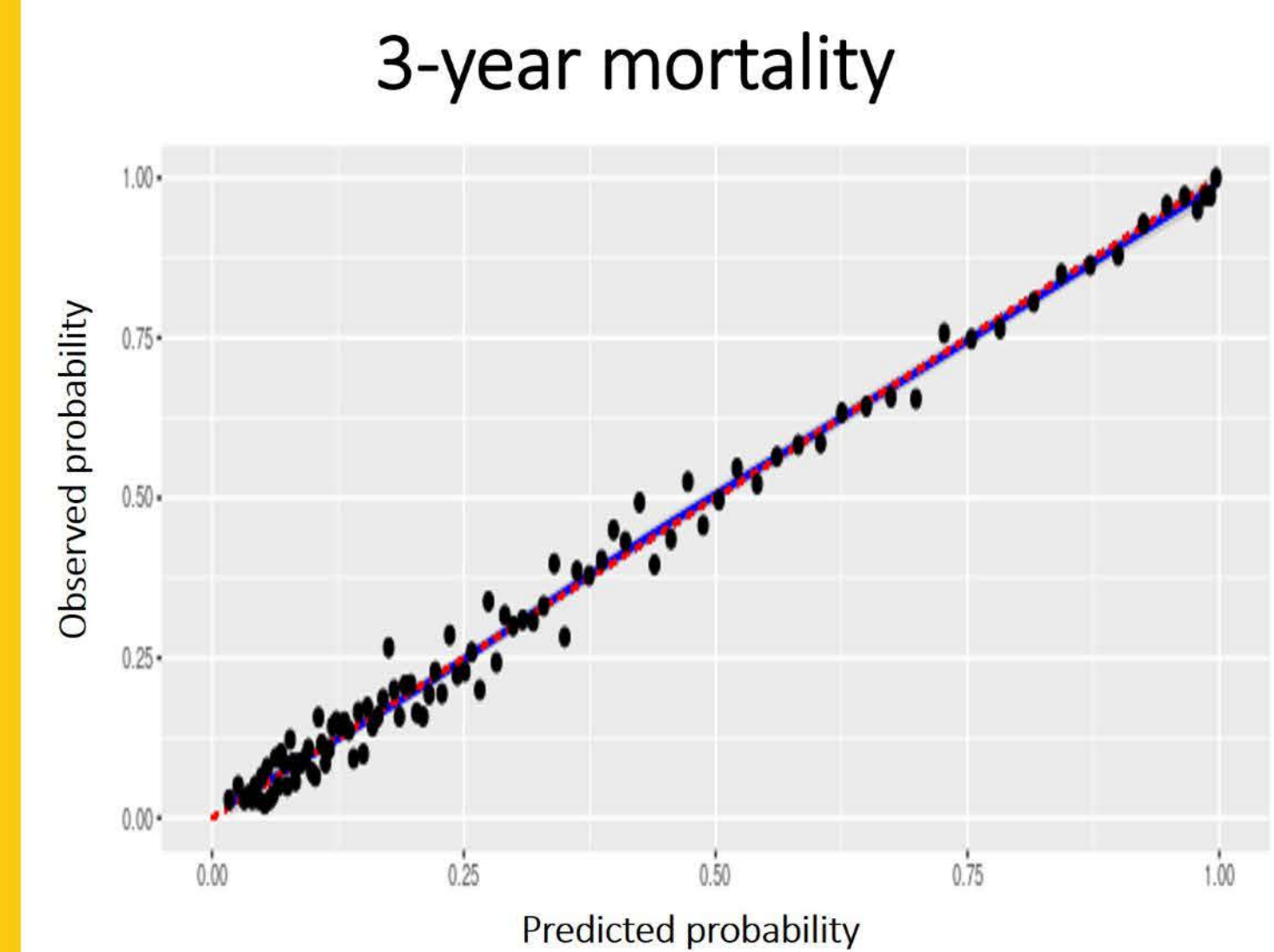
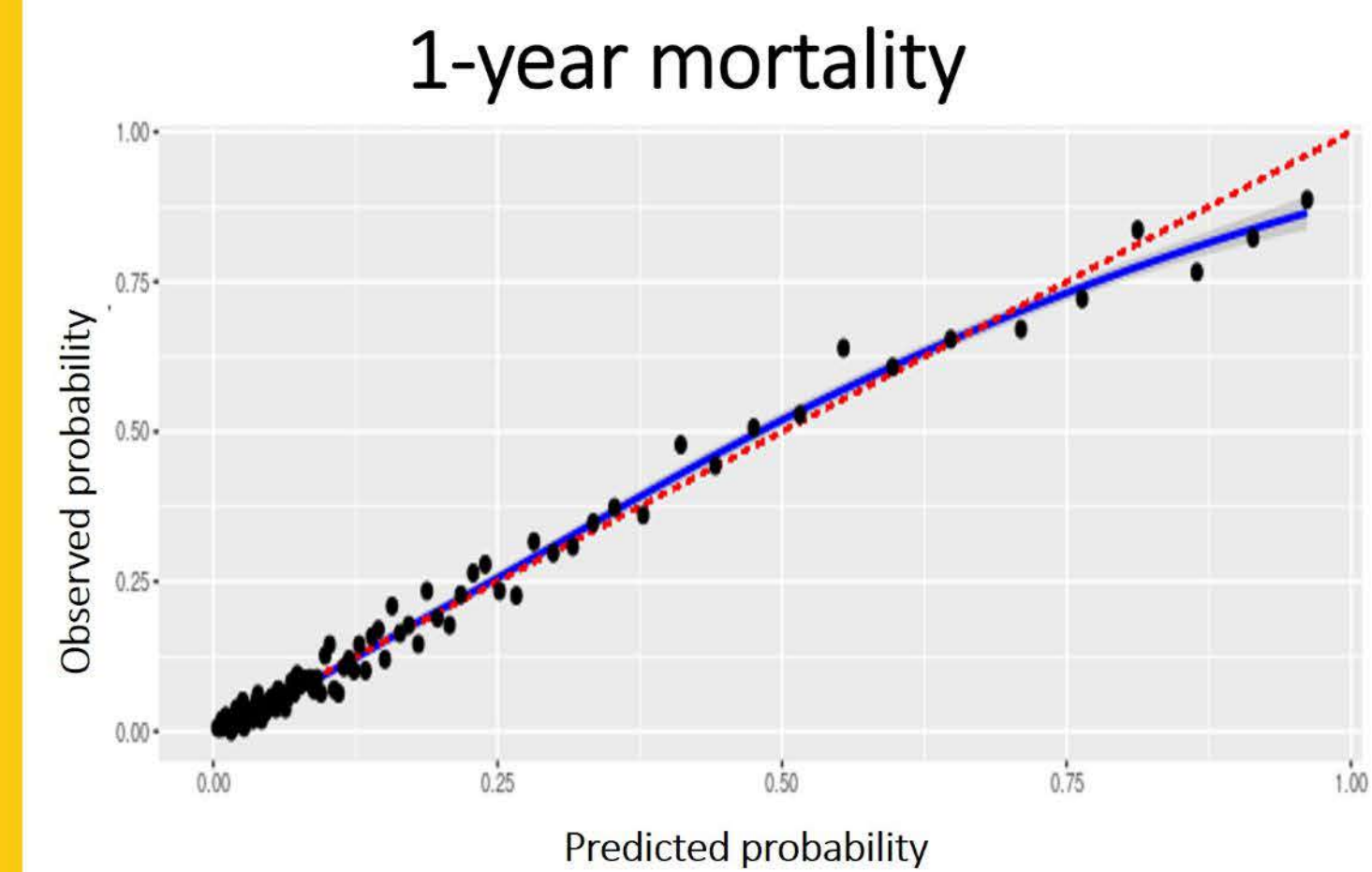
- 1 year survival model: 63333 patients were in the target cohort of which 10587 died within the time at risk, the model performed with an **AUC = 0.863 (0.855-0.87)**, **AUPRC = 0.62** and a **Brier score = 0.09**
- 3 years survival model: 55819 patients were in the target cohort of which 18142 died within the time at risk, the model performed with an **AUC = 0.844 (0.837-0.852)**, **AUPRC = 0.77** and a **Brier score = 0.14**
- 5 years survival model: 47333 patients were in the target cohort of which 20971 died within the time at risk, the model performed with an **AUC = 0.833 (0.826-0.84)**, **AUPRC = 0.82** and a **Brier score = 0.16**

# Using quality assurance data to predict long-term mortality delivered promising results.



# Potentially prediction models could be improved by including other data sources, e.g., medical history, lab measurements and medication.

## CALIBRATION PLOTS



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