

Prediction of early acute readmission after colorectal cancer surgery using only clinical preoperative variables.



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INTRO

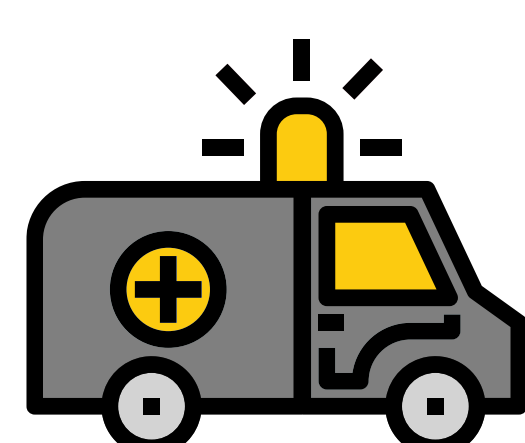
Early unplanned readmission following colorectal cancer surgery is a significant economic burden to the health care system and may delay patient recovery and adjuvant chemotherapy onset. Identifying patients at high risk of readmission when planning the surgical and oncological treatment is of high value, as preoperative training or extensive postoperative monitoring can be planned.

METHODS

A CDM was built using data from the Danish colorectal cancer group's nationwide database (DCCG), containing clinical data from all colorectal cancer surgeries since 2001. DCCG-Data was enriched with information about readmission from the Danish National Patient registry.

OHDSI's ATLAS tool and R was used to build a patient-level prediction model with acute readmission as outcome. The target cohort was colorectal cancer patients undergoing surgery, and time-at-risk was date of surgery until 30 days after. Covariates in the age, gender, measurement values, conditions, procedures and observation domain available any time prior to surgery was included in the model. Custom covariates were constructed for specific clinical scales (e.g., ASA score).

16.6%



RESULTS

- **62.824** patients underwent colorectal cancer surgery between 2001 to 2019. The incidence of unplanned 30-day readmission was **10.423 (16,6%)**.
- **96 variables** were included in the model.
- Using only preoperative available variables, the prediction model had a **AUC of 0.60 (95%CI 0.59:0.61)** and an **AUPRC of 0.22**. Calibration was considered acceptable with a **brier score of 0.14**.

Preoperative clinical variables can predict early acute readmission after colorectal cancer surgery.



Accurate prediction of acute readmission may assist the multidisciplinary team in the decision-making of the patients' treatment trajectory.

CLINICAL USE OF THE PREDICTION

MODEL

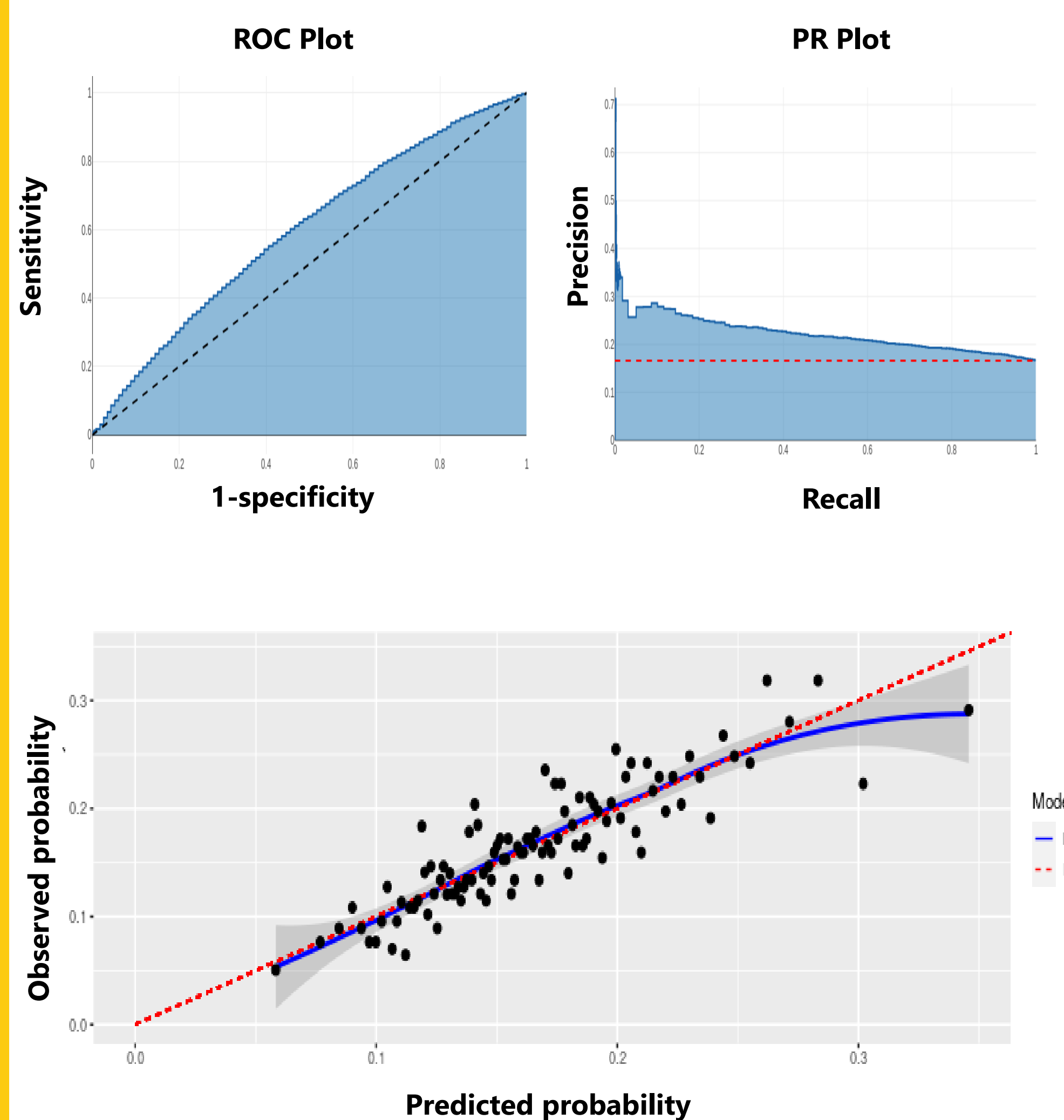
The patients' treatment trajectories are often planned at a multidisciplinary team conference (MDT). Identifying patients with high risk of postoperative morbidity is crucial at MDT, and a decision support tool visualizing personalized readmission risk may prove to be of high value for identifying high-risk patients and deciding the treatment plan accordingly.

- Interventions on high-risk patients may include
- ⊕ **Delay of surgery and preoperative training (prehabilitation).**
 - ⊕ **Increased postoperative monitoring or delayed discharge.**

The prediction model can not be used as a stand-alone tool in the MDT-setting but **combining results from multiple prediction models** may be useful for assisting the clinicians in the decision-making process.

PERSPECTIVES

Enriching the CDM with further **phenomics from other nationwide data sources** may improve the performance of the prediction model significantly.



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