Predicting the occurrence of complications after surgery for colorectal cancer using only preoperative variables is not yet up to a sufficient standard for use in a clinical setting.

Model improvement is needed to predict risk accurately to aid in clinical decision-making and identify patients that might benefit from pre-habilitation, increased monitoring, and stoma creation.

**RESULTS**
- 2,781 patients (11.7%) experienced a Clavien-Dindo complication grade ≥ 3B.
- The PLP was able to predict patients at elevated risk using 77 out of 156 only preoperatively known covariates with an AUC = 0.675 (0.654-0.679) and AUPRC = 0.227.

**INTRO:**
Postoperative complications after colorectal cancer surgery are a major driver of short- and long-term morbidity and mortality.

Postoperative complications are graded by severity using the Clavien-Dindo scale, where complications requiring surgery, ICU admission or death are graded ≥ 3B. Identifying patients at higher risk can allow for better preoperative planning by the surgeon, as well as inform patients on their individual risk for surgical complications.

**METHODS**
A CDM was built from all data from the validated Danish Colorectal Cancer Group (DCCG) Database, containing all colorectal cancer surgeries in Denmark since 2001. ATLAS, R and the OHDSI Patient-level Prediction package was used to create a prediction model using preoperatively available variables to predict complications 30 days after colorectal cancer surgery. Preoperative variable domains comprised conditions, measurements, procedures, observations and custom covariates of age groups and specific scales (e.g. ASA and Performance Score). Different models were constructed, wherein Lasso Logistic Regression was selected due to it performing best, split by person and 25% used for the testing set.

**TARGET cohort (T):** Patients undergoing colorectal cancer surgery

**OUTCOME cohort (O):** Patients experiencing a CD3B or higher complication

**Time at risk (TAR):** 30 days

**Clinical use of prediction models**
A patient's individual prediction can be used in the multidisciplinary team (MDT) meeting prior to surgery as well as with the patient in the preoperative discussion on treatment planning.

Patients at high risk for postoperative complications could either undergo 'pre-habilitation' to become 'more fit' prior to surgery, receive a (temporary) diverting stoma or also be monitored more closely after surgery where any deviation from the normal trajectory could mean a quick initiation of antibiotics or ordering scans or blood tests.

**Setting the threshold of when a ‘risk is too high’ and which treatment to perform must be discussed by the surgeon and individual patient prior to surgery and should be based on the combined risks and benefits of the available prediction models.**

**Perspectives**
Utilizing further data sources containing more in depth phenotypic data might ameliorate prediction models to a standard where they can be used routinely in the clinical setting. External validation is planned within the OHDSI community.