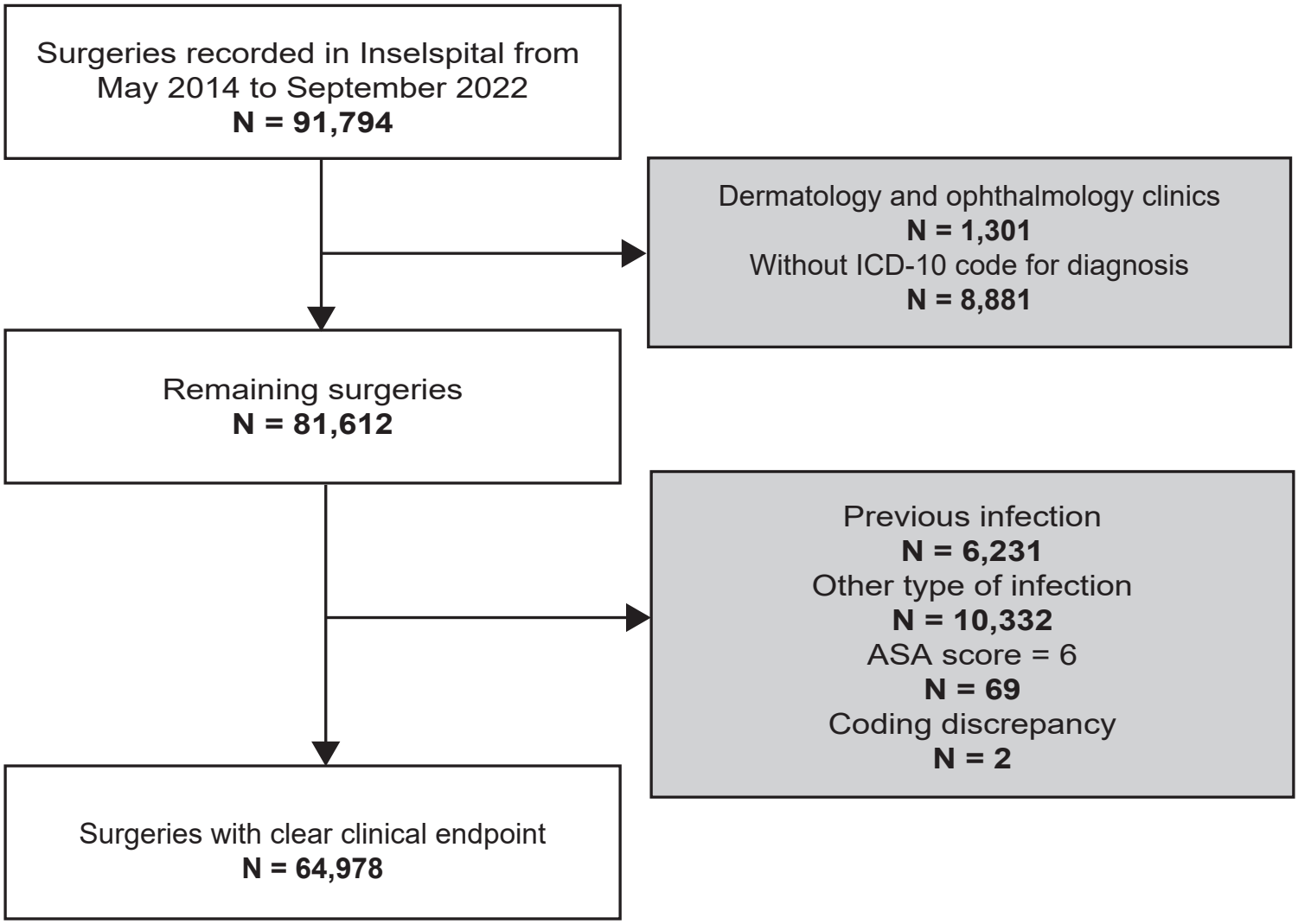
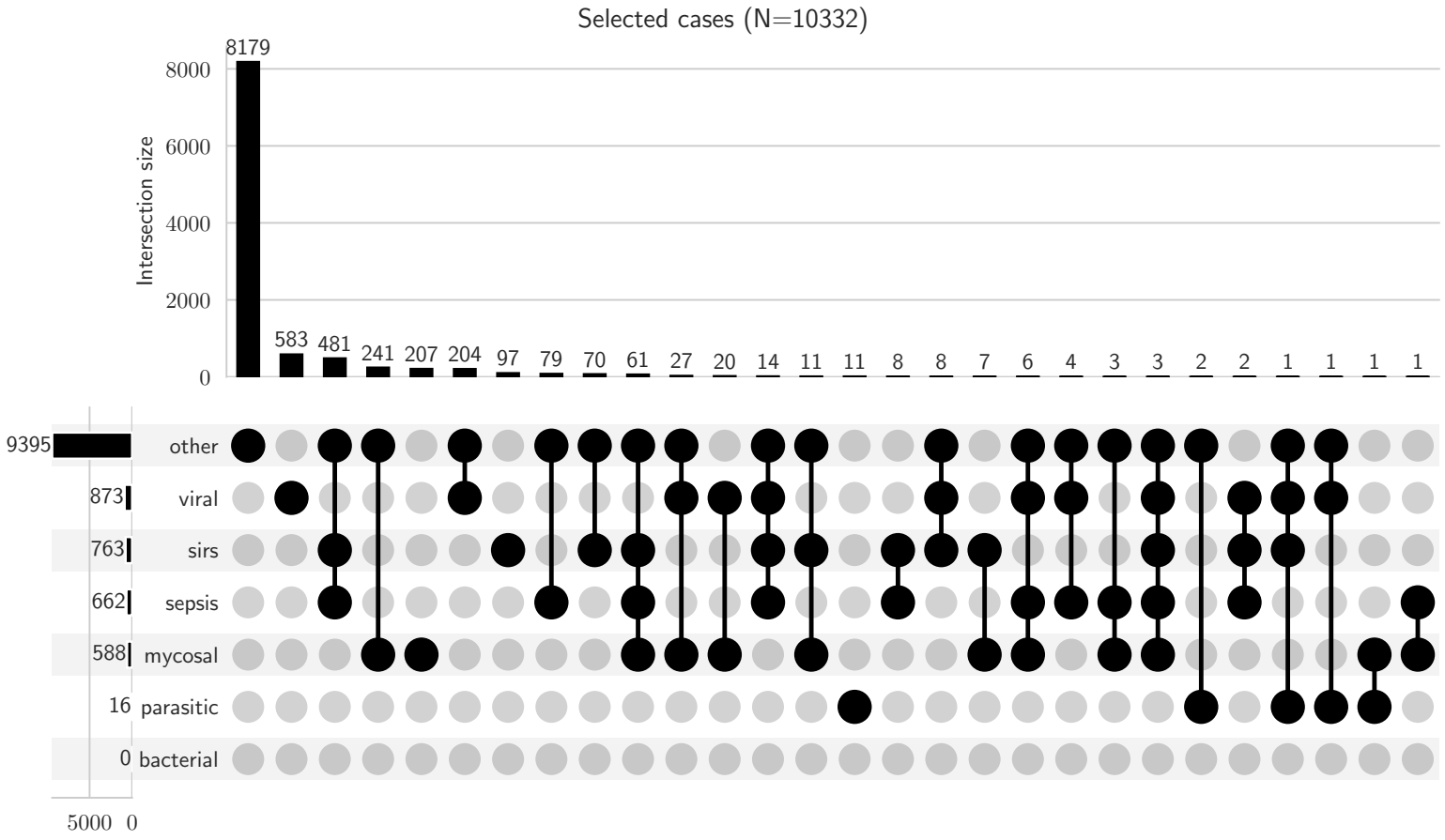
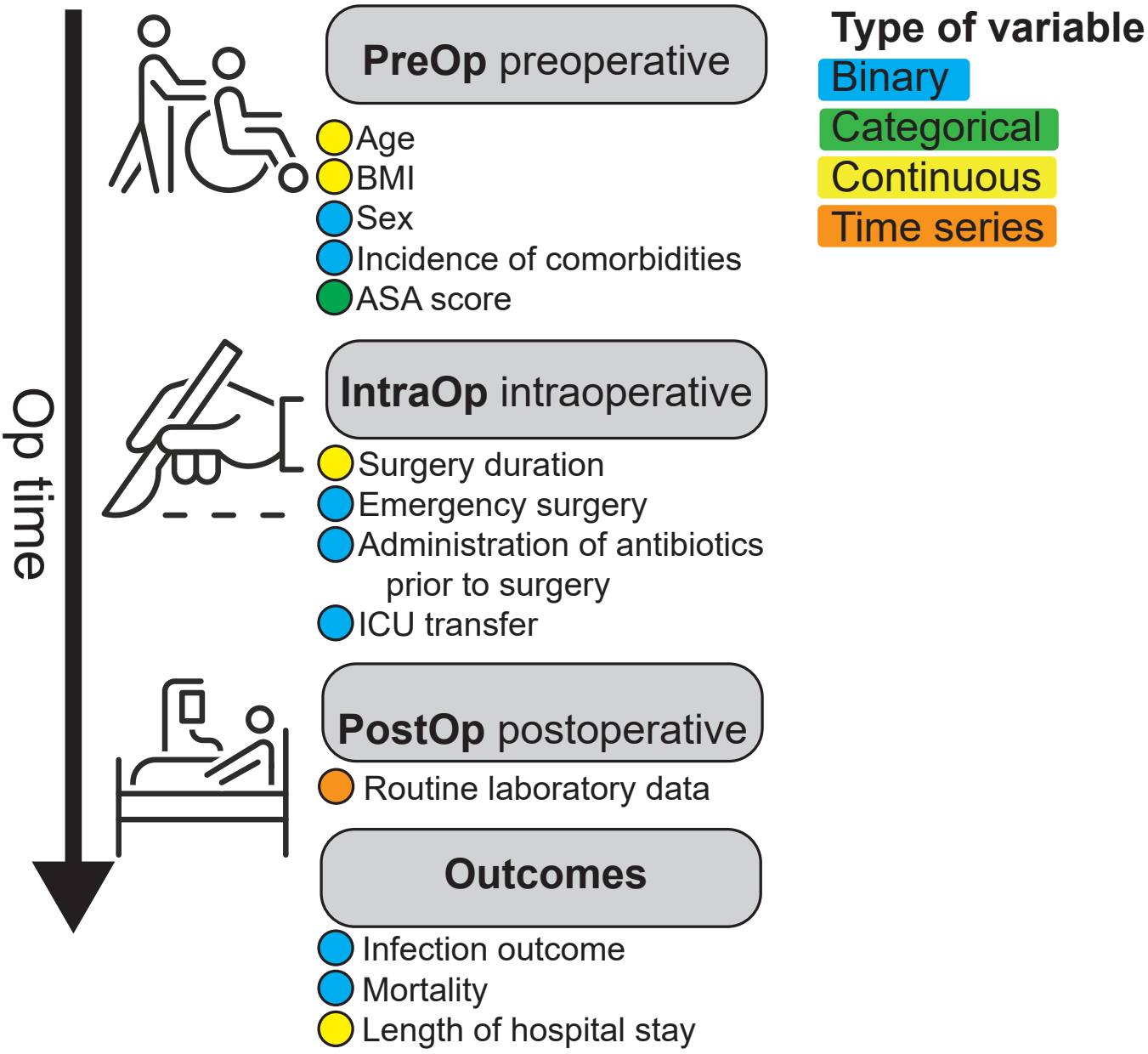
Supplementary Figure 1. Overview of the dataset. Patient selection flowchart detailing inclusion and exclusion criteria leading to the final study cohort.



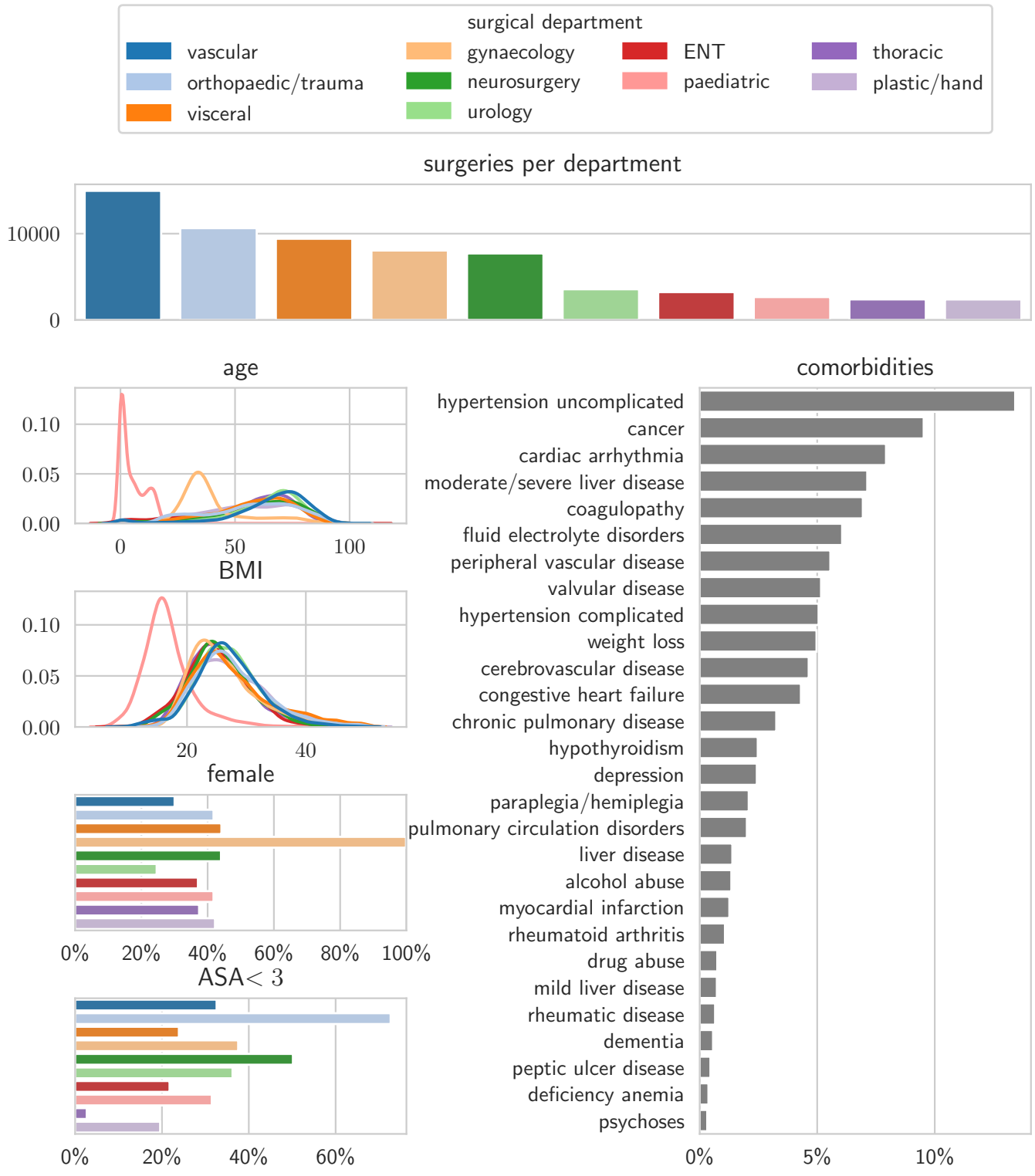
Supplementary Figure 2. Infection type distribution for excluded cases.



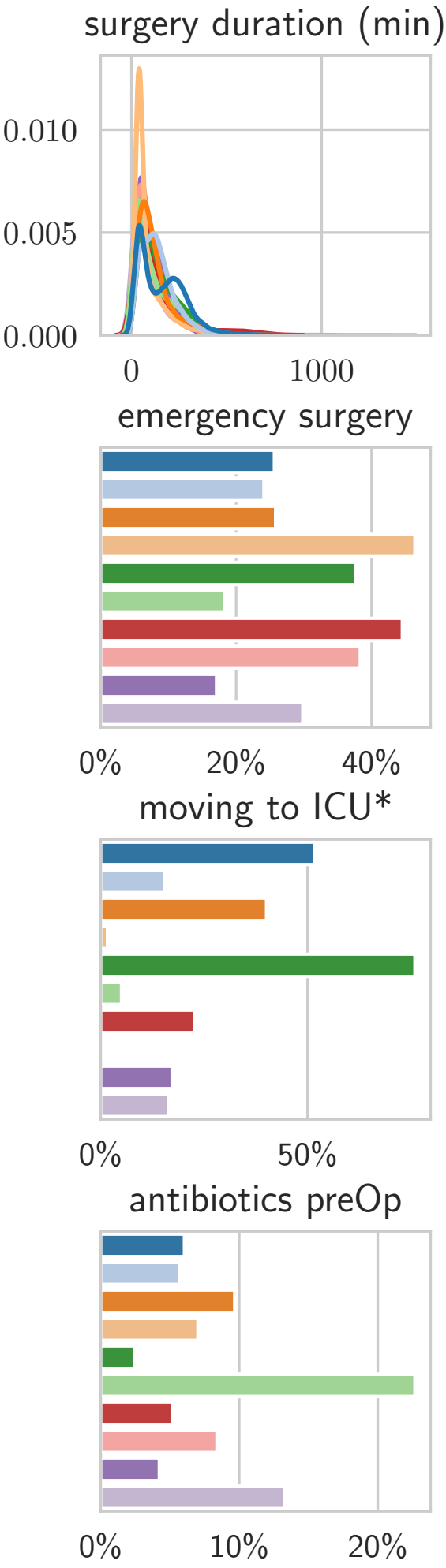
Supplementary Figure 3. Categorisation of used variables by their temporal occurrence relative to the surgical process: PreOp (preoperative), IntraOp (intraoperative), PostOp (postoperative)



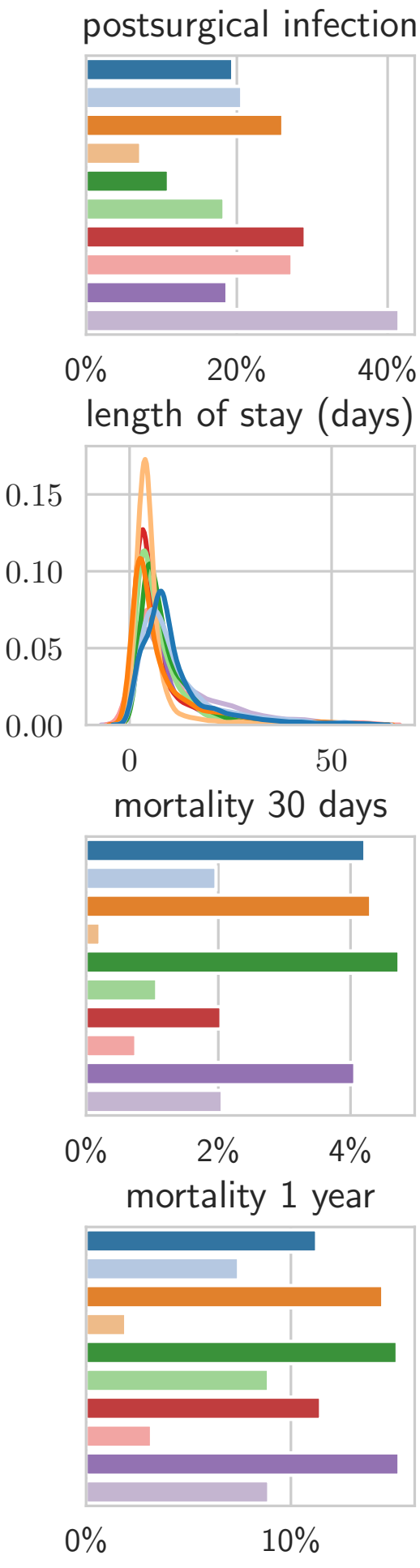
Supplementary Figure 4. Variable distributions across the different departments: number of surgeries per clinic and distribution for PreOp variables: age, BMI, sex (female), ASA score below 3, and incidence of comorbidities.



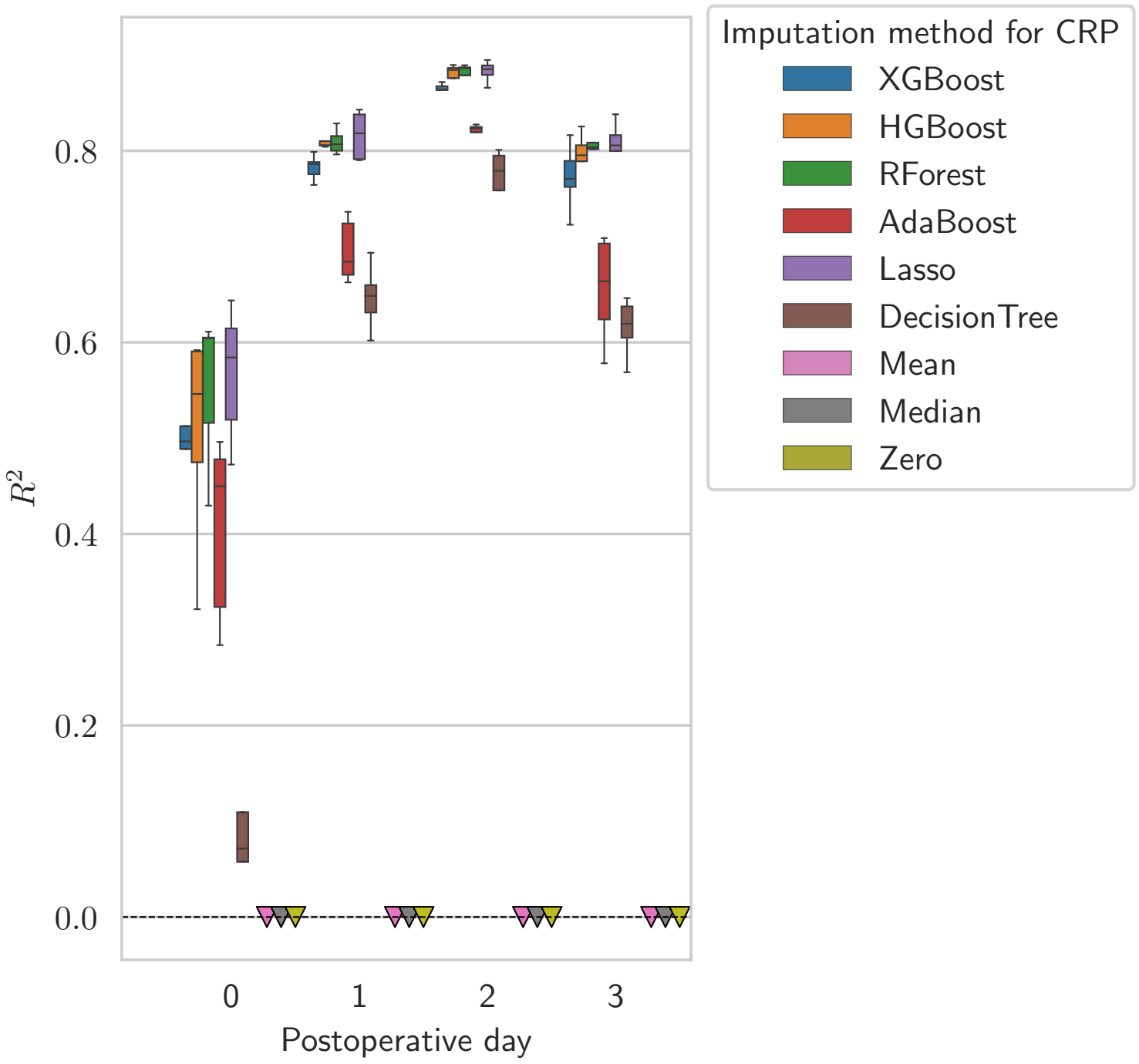
Supplementary Figure 5. Distributions for intraOp variables: surgery duration, emergency surgery cases, intensive care admissions post-surgery, and administration of antibiotics prior to surgery.



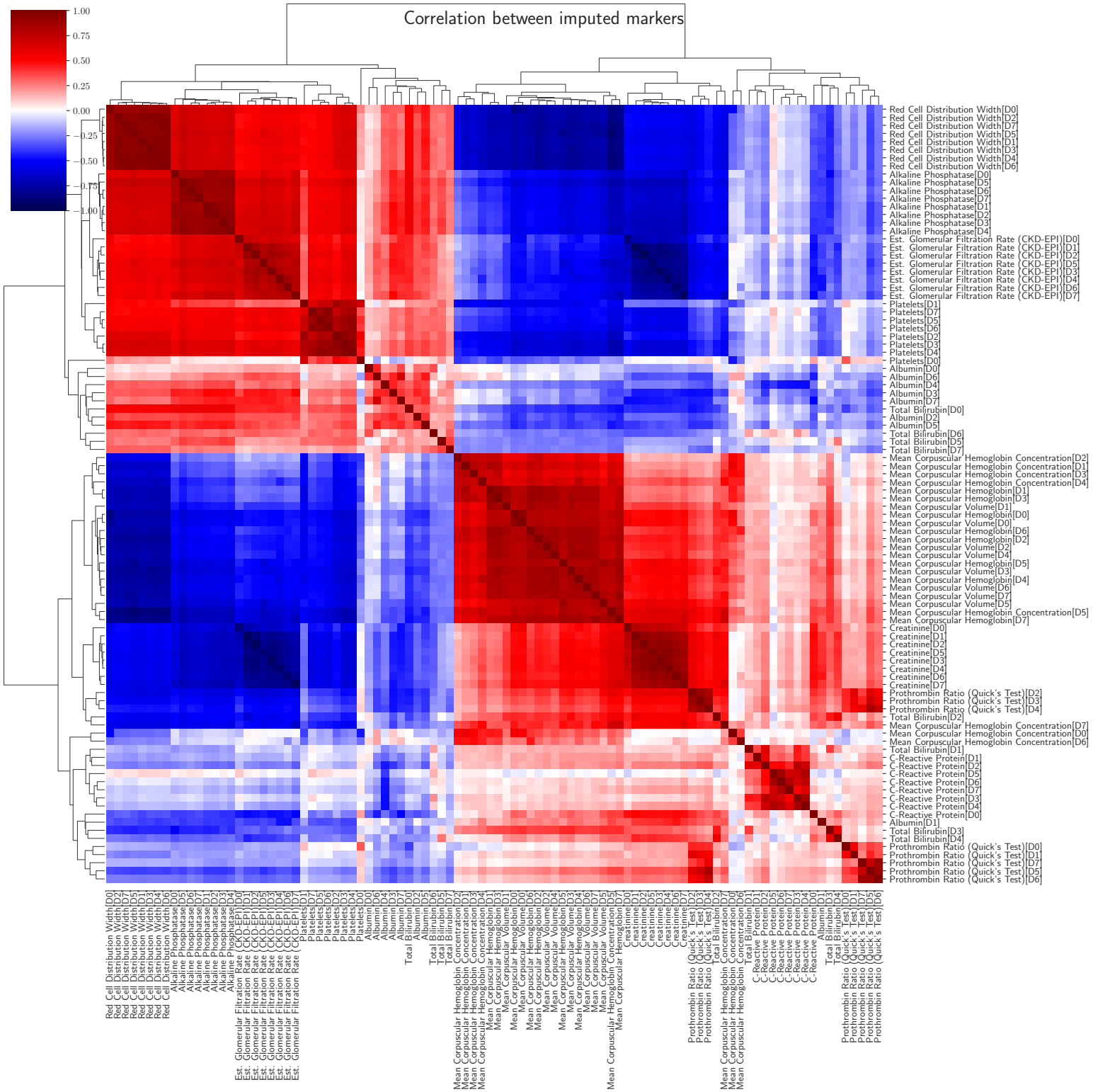
Supplementary Figure 6. Distributions for outcome variables: postsurgical infection rate, length of hospital stays, and 30-day and 1-year mortality rates.



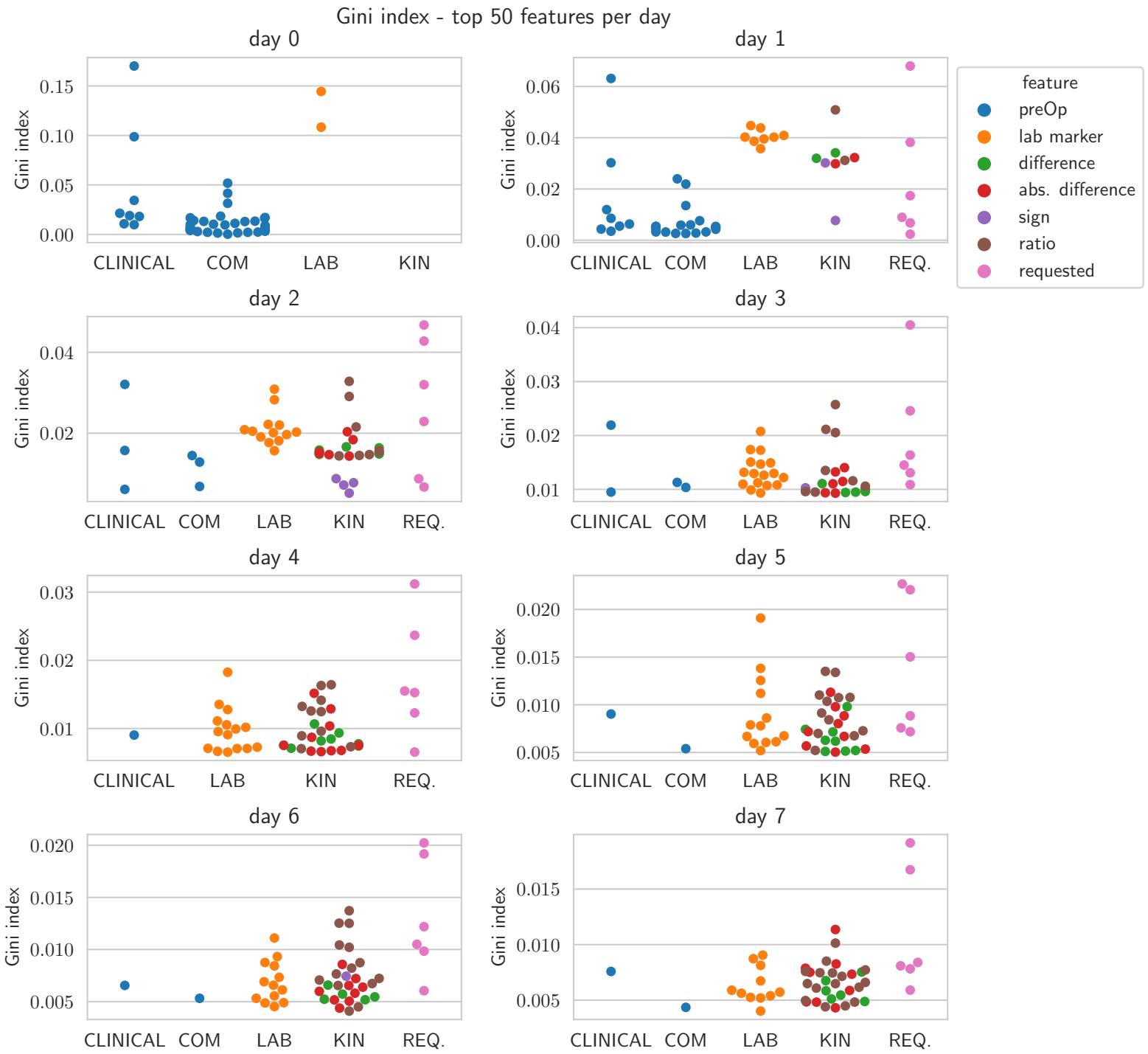
Supplementary Figure 7. Performance of imputation methods for CRP. These 9 methods were tested on all laboratory values.



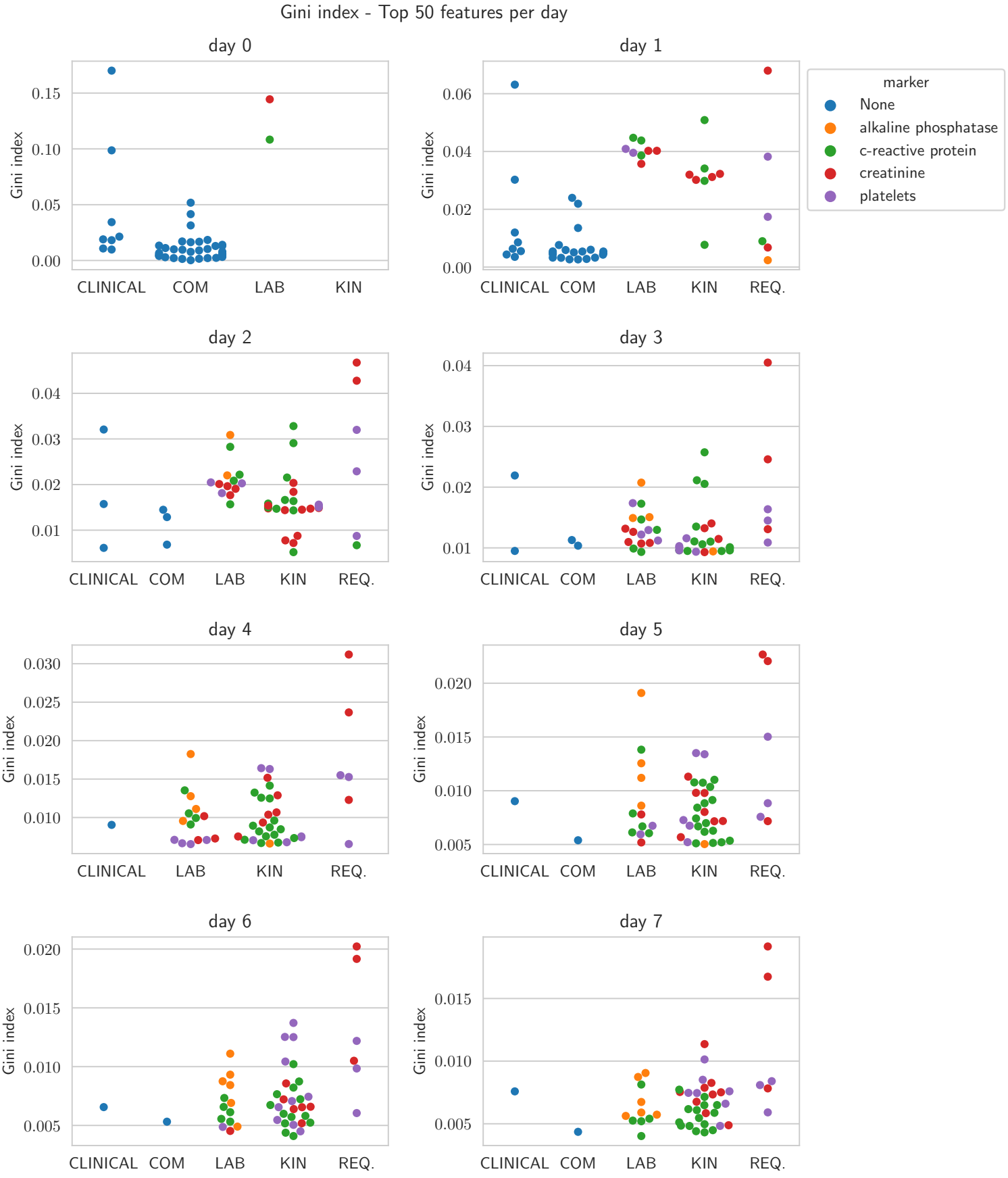
Supplementary Figure 8. Correlation matrix of a subset of the imputed markers. For instance, redundancy for prediction becomes visible given the correlation between erythrocyte markers (e.g. red cell distribution width), alkaline phosphatase and est. glomerular filtration rate. Also, the relevance of specific time points becomes more evident given the lower correlation of platelets with other parameter at postoperative D0 and D1 and thereby support the results from Figure 4c and d.



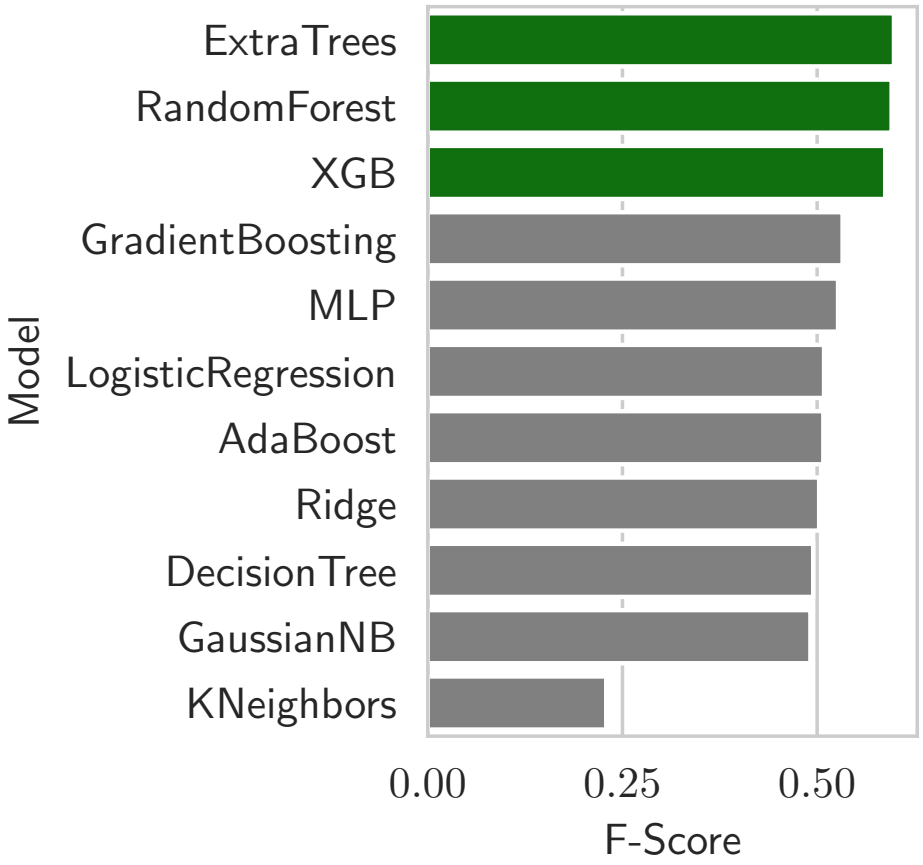
Supplementary Figure 9. Top 50 features according to Gini index for each postoperative day. Depicted categories are CLINICAL (age, sex, ASA score), COM (comorbidities computed from ICD-10 code diagnosis), LAB (raw laboratory values and average up to the day of prediction), KIN (computed kinetic features), REQ. (whether a laboratory test was requested by the clinician). Colour indicates subcategories when applicable.



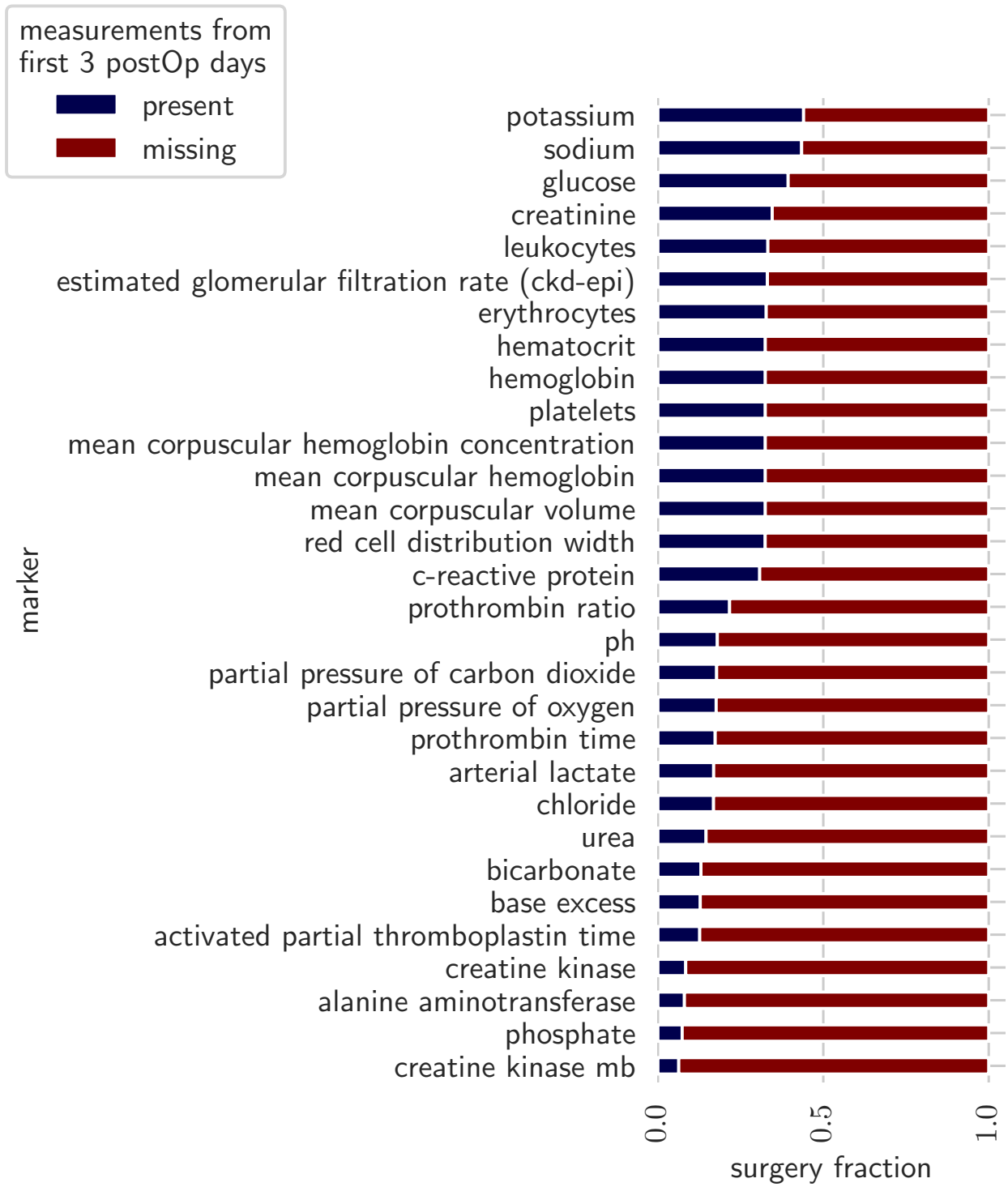
Supplementary Figure 10. Top 50 features according to Gini index for each postoperative day. Depicted categories are CLINICAL (age, sex, ASA score), COM (comorbidities computed from ICD-10 code diagnosis), LAB (raw laboratory values and average up to the day of prediction), KIN (computed kinetic features), REQ. (whether a laboratory test was requested by the clinician). Colour indicates markers when applicable.



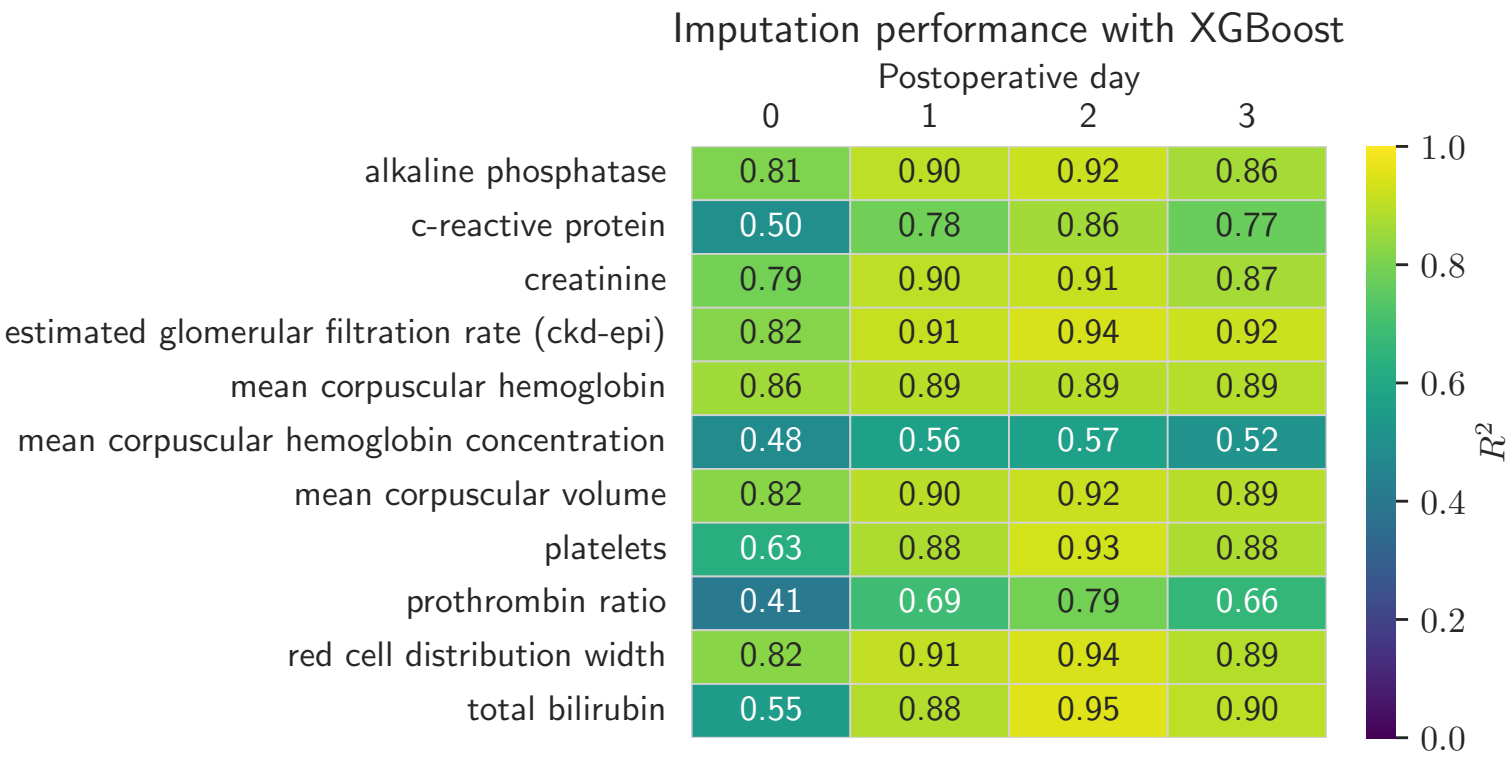
Supplementary Figure 11. F-scores from an evaluation of eleven machine learning algorithms, conducted on 40% of the full dataset with 5-fold cross-validation.



Supplementary Figure 12. Fraction of missing measurements on the top 30 most abundant markers for the postoperative days 0 to 3. “Present” indicates the average number of measurements per patient over the 4 postoperative days.



Supplementary Figure 13. Markers with imputation performance R2>0.4 on the first four postoperative days.



Supplementary Figure 14. Imputed marker trends.