Introduction:
Acute kidney injury (AKI) may occur up to 50% in the intensive care unit (ICU). Predicting AKI recovery may allow for risk stratification of patients, patient and family counseling, and early post-discharge renal care planning. However, predicting AKI recovery at an early stage remains a challenge.

Methods:
This is a retrospective study of the EPaNIC multicenter randomized controlled trial database [1], which was split into development (n=2194) and validation (n=2446) cohorts, and patients experiencing AKI stage 3 and/or renal replacement therapy (RRT) in the ICU were included [2]. AKI recovery was defined as being alive, without any stage of AKI, and without need of RRT at hospital discharge. A logistic regression model with backward feature elimination was developed. The model performance was assessed by discrimination, calibration, and net benefit analysis, and internally validated with ten-fold cross validation.

Results:
Only the results in the development cohort are reported. Of the 229 patients who developed AKI3, 86 patients (37.55%) recovered from AKI. The multivariable model selected age, bilirubin, heart rate, mean arterial blood pressure, surgical diagnostic group on ICU admission, mechanical hemodynamic support on ICU admission, suspected sepsis on ICU admission as AKI recovery predictors. The model had a mean area under the receiver operating characteristic curve (AUROC) of 0.75 (Standard deviation (SD) 0.01), mean calibration slope of 1.02 (SD 0.04), and mean calibration-in-the-large of <0.01 (SD 0.01). At the classification threshold that maximized sensitivity and specificity, mean net benefit with respect to treat-none was 0.16 (SD 0.01) and mean net benefit with respect to treat-all was 0.11 (SD 0.01).

Conclusion:
By using the routinely collected clinical data, the developed prediction model can fairly identify patients with a higher chance of AKI recovery at hospital discharge.

References:
Internally validated model performance. (top row) ROC curve (middle row) calibration curve (bottom row) decision curve