Introduction:
Acute kidney injury (AKI) is very prevalent after cardiac surgery in children, and associated with poor outcomes [1]. The present study is a preplanned sub-analysis of a prospective blinded observational study on the clinical value of the Foresight near-infrared spectroscopy (NIRS) monitor [2]. The purpose of this sub-analysis was to develop a clinical prediction model for severe AKI (sAKI) in the first week of PICU stay.

Methods:
sAKI was defined as serum creatinine (SCr) >/= 2 times the baseline, or urine output < 0.5 ml/kg/h for >/= 12h. Predictive models were built using multivariable logistic regression. Data collected during surgery, upon PICU admission, as well as monitoring and lab data until 6h before sAKI onset, were used as predictors. Relevant predictors with a univariate association with sAKI, were included in the models. Accuracy of the models was tested using bootstraps, by AUROC and decision curves.

Results:
177 children were enrolled, admitted to the PICU of the Leuven University Hospitals after cardiac surgery, between October 2012 and November 2015. 5 patients were excluded. 70 children (40.7%) developed sAKI in the first week of PICU stay. A multivariate model with 5 admission parameters (maximum lactate during surgery, duration of CPB, baseline sCr, RACHS1 and PIM2 scores), and 4 postoperative measurements (average heart rate, average blood pressure, hemoglobin, lactate), was most predictive for sAKI (figure 1).

Conclusion:
The risk of sAKI in children after congenital cardiac surgery could be predicted with high accuracy. Future models will also include medication data. These models will be compared against and combined with NIRS oximetry data to investigate the independent and added predictive value of the Foresight monitor.

References:
[2] ClinicalTrials.gov Identifier: NCT01706497

Image 1 :
Performance of the multivariate LR model for sAKI