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Development of a prediction tool for estimated glomerular filtration rate decline in children with chronic kidney disease

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Objectives : Literature on the development of predictive tools for chronic kidney disease (CKD) progression in pediatric patients is scarce. This study aimed to develop and internally validate a tool for the short-term prediction of estimated glomerular filtration rate (eGFR) decline in pediatric patients with CKD.

Methods : A total of 539 patients participating in the KoreaN cohort study for Outcomes in patients With pediatric CKD (KNOW-pedCKD) were evaluated for 48 variables related to sociodemographic characteristics, laboratory data, and treatment use. These variables were assessed as potential predictors of eGFR decline in pediatric patients with CKD using a range of machine learning algorithms.

Results : The models exhibited good predictive performance with regard to an eGFR decline of $\geq 20\%$, including kidney replacement therapy or death (Figure 1). The Random Forest and XGBoost models demonstrated the best performance in predicting eGFR outcomes at one year compared with two and three years, respectively. The spot urine protein-to-creatinine ratio was the most influential variable in the prediction model, followed by baseline eGFR and serum albumin, chloride, and hemoglobin levels.

Conclusions : A tool for predicting eGFR decline in children with CKD over a short period of time was developed using potential predictors and machine learning methods in a large Korean pediatric CKD cohort.

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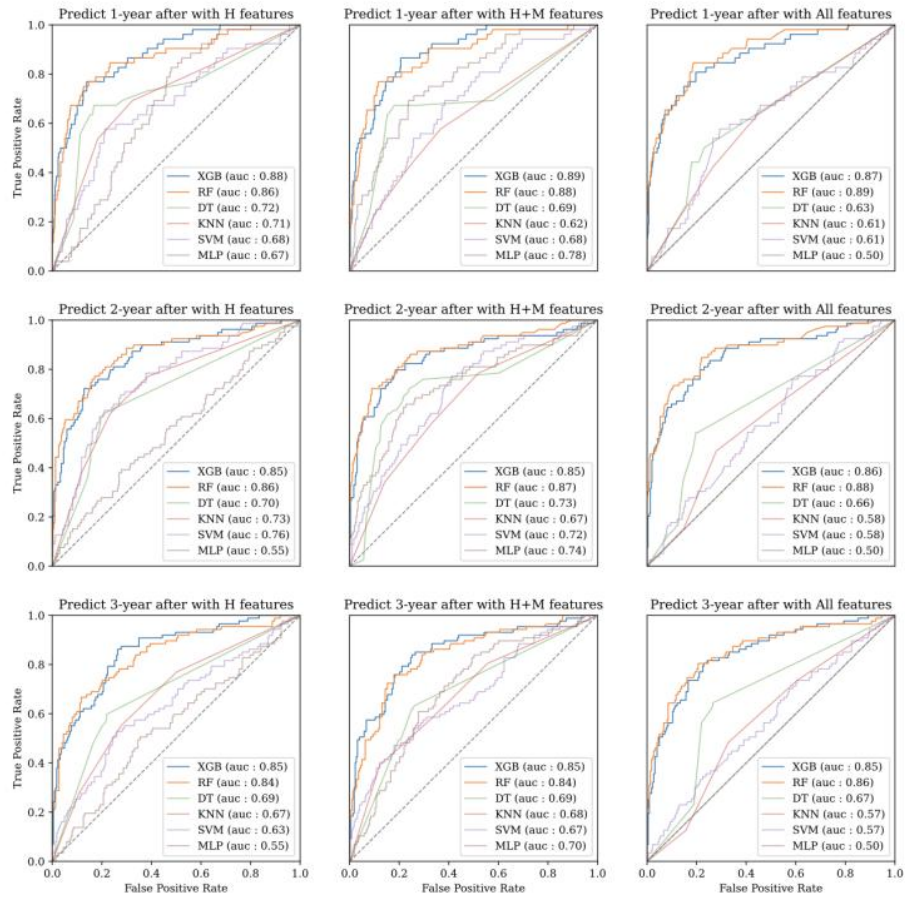


Figure 1. Predict eGFR decline greater than 20% or progression to KRT or death

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Beyond Challenges, Towards Healthier Kidney

