

A Prenatal Ultrasound-Based Prototype Calculator for Predicting Childhood Renal Impairment in Fetuses with CAKUT

Omri Dominsky, Hadas Miremberg, Catherine Garel, Noa Feldman, Roxana Kleper, Karina Krajden Haratz, Sharon Perlman

Lis Maternity and Women's Hospital, Tel Aviv Sourasky Medical Center, Israel | Gray Faculty of Medical & Health Sciences, Tel Aviv University

Objective

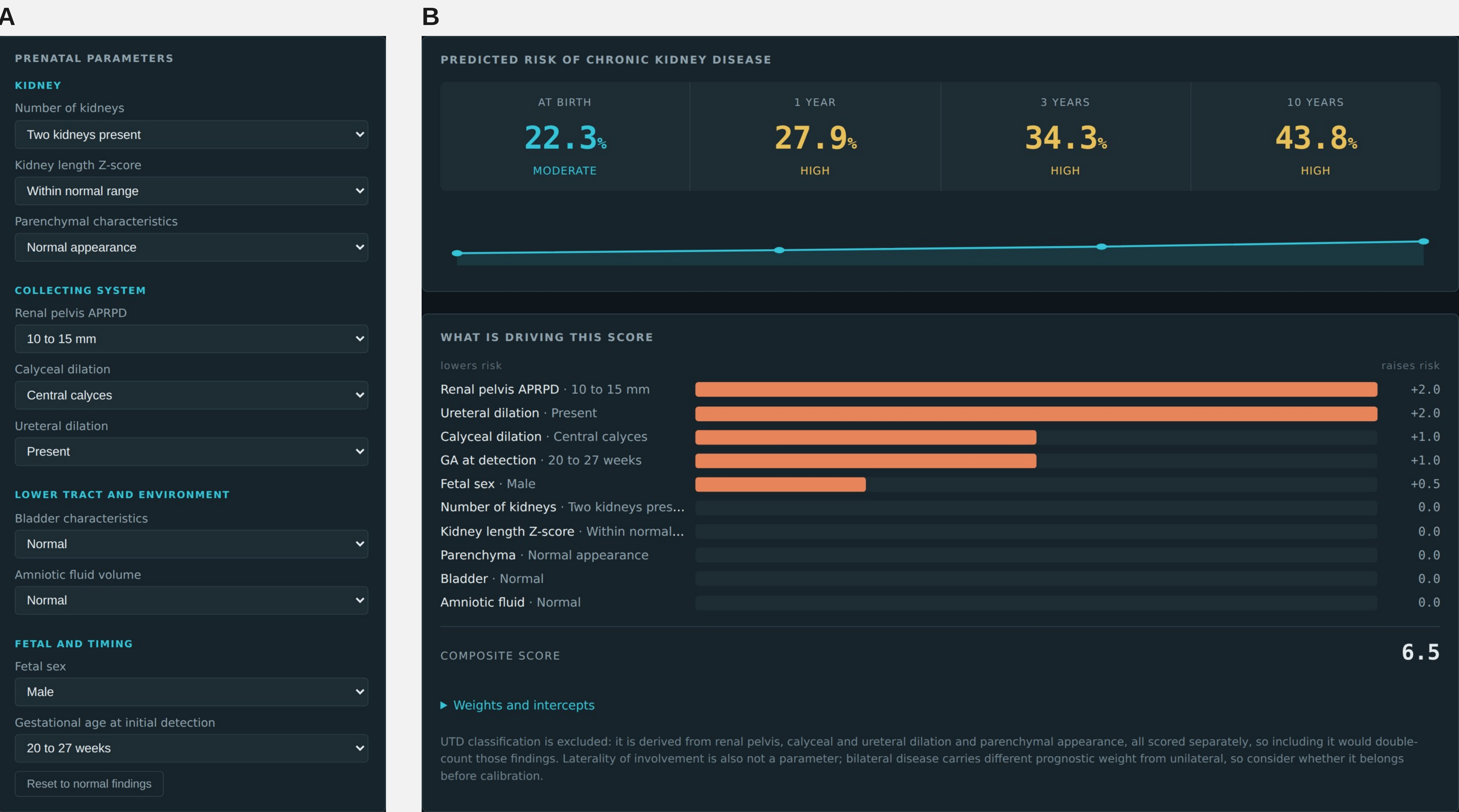
Prognostication of long-term renal function after a prenatal diagnosis of CAKUT remains a central challenge. We developed a structured, literature-derived prototype calculator estimating risk of chronic kidney disease from prenatal ultrasound parameters alone.

Methods

- Literature synthesis performed with large language models identified cohort studies reporting postnatal renal outcomes after prenatal CAKUT diagnosis.
- Prenatal ultrasound features were distilled into a weighted scoring framework, each variable weighted in proportion to its reported association with long-term renal function, and integrated into a composite score across **four prognostic timepoints: birth, 1, 3 and 10 years.**
- Ten predictors: number of kidneys; kidney biometry and Z-score; parenchymal characteristics; pelvic, calyceal and ureteral dilation; bladder characteristics; amniotic fluid volume; fetal sex; and gestational age at initial detection.

Conclusion An LLM-enabled, literature-derived prototype calculator forecasting renal impairment in CAKUT from prenatal imaging alone. Improved prenatal prognostication could guide early nephrologic referral, surveillance and timely renoprotective intervention.

Figure 1. Web interface, worked example



(A) Data entry panel. (B) Individualized risk output: predicted risk of chronic kidney disease at birth, 1, 3 and 10 years, with the contribution of every prenatal parameter to the composite score.