

Measurement of kidney function in children with kidney disease improved

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A formula used to measure kidney function in children with chronic kidney disease has been revised to make it more precise, according to a study published online January 21 in the Journal of the American Society of Nephrology. This study is based on data collected by the Chronic Kidney Disease in Children (CKiD) clinical trial, funded by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), part of the National Institutes of Health (NIH).

"This study illustrates the importance of our commitment to research on chronic kidney disease in children," said NIDDK Director Griffin P. Rodgers, M.D. "As NIDDK-supported research discovers more accurate methods of diagnosing and monitoring biomedical conditions, our ability to treat those conditions, reduce suffering, and prolong life also continues to improve."

Glomerular filtration rate (GFR), the flow rate of fluid through the tiny capillaries in the kidney (glomeruli) that filter waste materials out of the blood and into the urinary system, is the most useful indicator of kidney function. However, determining true GFR is costly, time-consuming, and difficult to perform at regular clinical office visits. As a result, different methods of estimating GFR using biochemical markers of kidney function have been developed.

One of those methods, the Schwartz formula, estimates GFR from an equation that uses serum creatinine (a waste product in the blood from meat protein in the diet and from muscle metabolism) and height. GFR

estimated by this formula has been used as one of the enrollment criteria for the CKiD study, which assesses children with mild to moderate chronic kidney disease. The current study, led by George Schwartz, M.D., who originated the formula in the mid-1970s, used data from baseline CKiD visits of 349 children aged 1 year to 16 years to evaluate the existing GFR prediction equations.

The investigators compared the Schwartz formula with a highly successful Scandinavian method of measuring GFR using disappearance of the X-ray dye iohexol from the blood. The Schwartz formula overestimated GFR. Because the iohexol method is only used every two years after the first two visits in the CKiD trial, an accurate assessment of GFR is needed during the annual visits when the iohexol method is not performed.

After comparing various estimated GFR models using a testing data set of 168 children in the CKiD trial, the investigators found that a modified Schwartz formula using height, serum creatinine, cystatin C (a small protein expressed throughout the body), blood urea nitrogen, and gender came the closest to replicating the results of the iohexol method, widely regarded as the gold standard in measuring GFR.

Use of estimated GFR allows the investigators to describe the trajectory of declining kidney function and to adjust the dose of medications so they don't become toxic to the kidneys. However, the investigators also point out that the revised formula may not be useful in the general pediatric population because the children they studied have reduced growth rates and delayed puberty.

"The relationship between estimated GFR and the biochemical markers may be different in this population than in a population with more normal kidney function and without poor skeletal growth," said Schwartz. "Although we did not observe that our formula changed with

puberty, other populations with more normal physique and health status should be examined to evaluate the estimated GFR for adolescents."

For more information on chronic kidney disease in children, go to [kidney.niddk.nih.gov/kudisease ... eydiseases/index.htm](https://www.kidney.niddk.nih.gov/kudisease...eydiseases/index.htm) .

Source: NIH/National Institute of Diabetes and Digestive and Kidney Diseases

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