

Simple tool may expedite transplants in kids with kidney failure

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An easy-to-use tool to predict the likelihood of a child with kidney disease progressing to kidney failure has a high degree of accuracy and could be used to reduce the burden of dialysis and increase transplantations, according to a study led by researchers at UCSF Benioff Children's Hospital San Francisco.

The tool, known as the kidney failure risk equation (KFRE), is already used for adults with kidney disease, with the goal of optimizing planning for dialysis, the researchers say. The study appears in *JAMA Pediatrics* on Dec. 18, 2017.

"Dialysis has a number of adverse health effects for [children](#)," said first author Erica Winnicki, MD, from the Division of Nephrology in the UCSF Department of Pediatrics. "In addition to a higher mortality rate, dialysis is detrimental to cognitive development, growth and cardiovascular health."

A 2016 study found that children who had dialysis for any amount of time had a 69 percent higher risk of death than children who had had a pre-emptive transplant. The average transplant wait time for a child in the United States with kidney failure is less than one year, with wide geographic variability.

In this retrospective study, researchers from four institutions compared the risk of kidney failure predicted by the tool with the actual outcomes of 603 children enrolled in the Chronic Kidney Disease in Children study. At one year, 27 children progressed to kidney failure, at two years 67 progressed to kidney failure and at five years 144 had reached that stage. They found that the tool had a 90 percent probability of discriminating between those children that reached kidney failure and those that would not one year later, 86 percent probability at two years and 81 percent at five years.

Dialysis Is Most Common First Treatment

In children, kidney failure is usually caused by birth anomalies, hereditary diseases and acquired conditions like lupus that impact the body's ability to filter waste and excess fluid from the blood. A total of 1,462 children began treatment for kidney failure in 2013, according to

the United States Renal Data Service. The most common initial treatment for these children was dialysis, in which a machine and filter removes waste and fluid, replacing the filtration function of healthy kidneys.

The children in the study, whose average age was 12, had a glomerular filtration rate (GFR) - a measure of how efficiently the kidneys filter blood - below 60, the benchmark for kidney disease. The tool predicts future risk by assessing four variables: age, gender, GFR and the ratio of albumin to creatinine levels, a test to determine elevated protein in urine, a marker of [kidney damage](#). A second tool, involving an additional four variables, was found to have a similar level of accuracy.

"Currently less than one quarter of children with kidney failure receive a pre-emptive transplant, despite increasing evidence that it improves survival," Winnicki said. "By improving our ability to determine when a child with kidney disease will progress to kidney failure, the risk equation enables the clinical team to better plan for transplant."

Tool May Fast-Forward Vaccinations, Shift Care to Pediatric Specialists

Immunizations should be completed before transplantation because they are less effective afterwards, when patients need to take immunosuppressants to prevent rejection of the new organ. Live vaccines, such as those to prevent measles, mumps and rubella, also could induce disease after transplant, Winnicki noted. As a result, the tool may enable children to receive vaccinations ahead of schedule if kidney failure appears imminent.

Other advantages of accurately predicting the risk of [kidney](#) failure include timely transfer of care to a pediatric nephrologist for children in

rural areas that are not served by specialists. And in children who are unlikely to undergo pre-emptive transplant, the tool may help clinicians decide when to plan for a surgical fistula or graft, instead of starting [dialysis](#) with a catheter. Both methods are less likely to cause infections and to need revisions, but can only be used after a period of healing, thus requiring planning, Winnicki said.

"I think what is most remarkable is how well the tool predicts [kidney failure](#), regardless of whether the patient is a child or adult and regardless of the cause of [kidney disease](#)," said senior author Elaine Ku, MD, from the Division of Nephrology in the UCSF departments of Medicine and Pediatrics. "The advantage of the [tool](#) is its use of clinically and readily available data to predict future risk."

Provided by University of California, San Francisco

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