

## The Forgotten Stepchild of Nephrology

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### KEYWORDS

- Pediatrics • Chronic kidney disease
- Congenital anomalies of the kidney and urinary tract (CAKUT) • Growth and nutrition

### KEY POINTS

- The causes of chronic kidney disease in the pediatric population vary significantly from that of the adult population.
- In addition to the medical complications of chronic kidney disease in the pediatric population, special attention should be paid to psychosocial and developmental issues that arise.
- The period of transition of a pediatric patient with chronic kidney disease from Pediatric Nephrology to Adult Nephrology is a difficult time for both parents and patients.

### INTRODUCTION

Chronic kidney disease (CKD) is a devastating disease that can occur at any age. There are particular challenges that arise in the pediatric population requiring the expertise of a pediatric nephrologist in the management of CKD. Specific complications that are prevalent in children with CKD include impaired growth, psychosocial adjustments of the children and their families, and other issues that are age-specific, including immunizations. There is much more knowledge available regarding the epidemiology of adult-onset CKD versus childhood-onset CKD. More research is required in pediatric CKD because this can aid in the early identification and diagnosis of CKD, aggressive treatment of the complications, as well as identification of (this keeps parallel structure) preventable risk factors in the progression of CKD.<sup>1,2</sup>

### DEFINITION

In 2002, the National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (NKF K/DOQI) established guidelines on CKD, divided into 5 categories

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(Table 1).<sup>3</sup> This classification system is applicable to children over 2 years of age, because the glomerular filtration rate (GFR) does not reach normal adult values until after 2 years of age. The criteria for CKD include the presence of kidney damage for greater than or equal to 3 months or a GFR of less than 60 mL/min/1.73 m<sup>2</sup> for greater than or equal to 3 months. Kidney damage is defined by structural or functional abnormalities of the kidney, including abnormalities in the composition of the blood or urine, abnormalities seen on radiographic imaging studies, or abnormalities revealed on kidney biopsy testing. This definition is regardless of the pathologic cause of CKD.<sup>1,3</sup>

## EPIDEMIOLOGY

Although extensive epidemiologic data are available for the adult population with CKD, little epidemiologic data are available for the pediatric population. This is possibly due in part to the historical absence of a standardized definition of CKD. In addition, estimating GFR becomes challenging in a child, as it varies based on age, gender, and body size.<sup>1,3</sup>

Most epidemiologic data that are available in pediatric patients come from end-stage renal disease (ESRD) registries. In 2008, the prevalence of renal replacement therapy was estimated to be between 18 and 100 per million of children, aged 0 to 19 years.<sup>1</sup> According to the 2014 US Renal Data System, there were 1161 children in 2012 that began ESRD care. The incidence of ESRD in the United States peaked in 2003 and has been slowly decreasing since 2008.<sup>4</sup> There is a reported 10-year survival rate of 80% for adolescent-onset ESRD.<sup>5</sup>

The prevalence of CKD among pediatric patients is not known.<sup>5</sup> There is a reported prevalence of CKD of 1.5 to 3.0 per 1,000,000 among children younger than 16 years of age.<sup>6</sup>

## CAUSE

The cause of CKD in children is vastly different than those in adults. Congenital disorders are the primary cause of CKD in children, accounting for nearly half of all causes, including congenital anomalies of the kidney and urinary tract (CAKUT), such as vesicoureteral reflux (VUR), genitourinary tract obstruction, urinary tract infections, and hereditary nephropathies. Another prevalent cause of CKD in children is glomerulonephritis.<sup>1</sup>

The causes of CKD in children vary by age and race.<sup>1,5</sup> CAKUT and hereditary nephropathies are more common in younger children, compared with glomerulonephritis, which is more common in children over the age of 12 years. African Americans and

Stage	GFR (mL/min/1.73 m <sup>2</sup> )	Definition
1	≥90	Kidney damage with normal or increased GFR
2	60–89	Mild reduction in GFR
3	30–59	Moderate reduction in GFR
4	15–29	Severe reduction in GFR
5	<15	Kidney failure

Data from Hogg RJ, Furth S, Portman R, et al. National Kidney Foundation's Kidney Disease Outcomes Quality Initiative clinical practice guidelines for chronic kidney disease in children and adolescents: evaluation, classification, and stratification. *Pediatrics* 2003;111:1416–21.

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