Medica Coverage Policy

Policy Name:	**Genetic Testing: Kidney Disorders**
Medica Effective Date:	**July 01, 2024**

Important Information – Please Read Before Using This Policy

These services may or may not be covered by all Medica plans. Coverage is subject to requirements in applicable federal or state laws. Please refer to the member's plan document for other specific coverage information. If there is a difference between policy requirements and the member's plan document, the member's plan document will be used to determine coverage. With respect to Medicare, Medicaid, and other government programs, this policy will apply unless those programs require different coverage. Members may contact Medica Customer Service at the phone number listed on their member identification card to discuss their benefits more specifically. Providers with questions about this Medica coverage policy may call the Medica Provider Service Center toll-free at 1-800-458-5512.

Medica coverage policies are not medical advice. Members should consult with appropriate health care providers to obtain needed medical advice, care, and treatment.

OVERVIEW

Inherited kidney disorders and inherited disorders that indirectly affect the kidneys can be more common, such as autosomal dominant polycystic kidney disease, or more rarely Lowe syndrome and Fabry disease. Identifying the genetic cause of an inherited kidney disorder can help direct treatment, inform family members, and contribute to the overall understanding of the genetic etiology of chronic kidney disease. More advanced next-generation sequencing, such as exome sequencing and comprehensive genetic testing panels, are emerging as a first-line diagnostic method for patients with chronic kidney disease.

POLICY REFERENCE TABLE

The tests and associated laboratories and CPT codes contained within this document serve only as examples to help users navigate claims and corresponding coverage criteria; as such, they are not comprehensive and are not a guarantee of coverage or non-coverage. Please see the Concert Genetics Platform for a comprehensive list of registered tests.

Coverage Criteria Sections	**Example Tests (Labs)**	**Common CPT Codes**	**Common ICD Codes**	**Ref**
Polycystic Kidney Disease				
Targeted Variant Analysis	Targeted Mutation Analysis for a Known Familial Variant	81403		2, 8
			Q61, N18	1, 2
Single gene or Multigene Panel	Autosomal Dominant Polycystic Kidney Disease via the PKD1 Gene (PreventionGenetics, part of Exact Sciences)	81407, 81479		

	PKD2 Full Gene Sequencing and Deletion/Duplication (Invitae)	81406, 81479		
	Autosomal Recessive Polycystic Kidney Disease (ARPKD) via the PKHD1 Gene (PreventionGenetics, part of Exact Sciences)	81408, 81479		
	Autosomal Dominant Polycystic Kidney Disease (ADPKD) via the GANAB Gene (PreventionGenetics, part of Exact Sciences)	81479		
	Autosomal Dominant Polycystic Kidney Disease (ADPKD) via the DNAJB11 Gene (PreventionGenetics, part of Exact Sciences)			
	Hereditary Cystic Kidney Diseases Panel (PreventionGenetics, part of Exact Sciences)	81404, 81405, 81406, 81407, 81408, 81479		
	Polycystic Kidney Disease Panel (GeneDx)			
Comprehensive Kidney Disease Panels				
Comprehensive Kidney Disease Panels	RenaSight (Natera)	81401, 81402, 81403, 81404, 81405, 81406, 81407, 81408, 81479	N00-N08, N10-N19, Q61, R31	3
	KidneySeq Version 5 Comprehensive Testing (Iowa Institute of Human Genetics)			
	RenalZoom (DNA Diagnostic Laboratory - Johns Hopkins Hospital)			
***APOL1*-Mediated Kidney Disease**				
APOL1-Targeted Variant Analysis	Apolipoprotein L1 (APOL1) Renal Risk Variant Genotyping (Quest Diagnostics)	0355U	N00-N08, N10-N19	9
	APOL1 Genotype, Varies (Mayo Clinic Laboratories)	81479		
Donor-Derived Cell Free DNA for Kidney Transplant Rejection				
Donor-Derived Cell Free DNA for	Allosure Kidney (CareDx, Inc.)	81479	T86.11, T86.12, Z94.0	7
	Prospera Kidney (Natera)			

Kidney Transplant Rejection	Viracor TRAC Kidney dd-cfDNA (Viracor Eurofins)	0118U		
Other Covered Kidney Disorders				
Other Covered Kidney Disorders	See list below	81400, 81401, 81402, 81403, 81404, 81405, 81406, 81407, 81408, 0268U		4, 5, 6

OTHER RELATED POLICIES

This policy document provides coverage criteria for hereditary kidney disorders. Please refer to:

- ***Genetic Testing: Multisystem Inherited Disorders, Intellectual Disability, and Developmental Delay*** for coverage criteria related to genetic disorders that affect multiple organ systems
- ***Genetic Testing: Hereditary Cancer Susceptibility*** for coverage criteria related to von Hippel Lindau (VHL) syndrome and other hereditary cancer syndromes.
- ***Genetic Testing: General Approach to Genetic and Molecular Testing*** for coverage criteria related to genetic testing for kidney disease that is not specifically discussed in this or another non-general policy.

back to top

COVERAGE CRITERIA

POLYCYSTIC KIDNEY DISEASE

Targeted Variant Analysis

I. *PKD1*, *PKD2*, *GANAB*, or *DNAJB11* targeted variant analysis (81403) to establish a diagnosis of autosomal dominant polycystic kidney disease is considered **medically necessary** when:
   A. The member has a close relative with a known pathogenic or likely pathogenic variant in *PKD1*, *PKD2*, *GANAB*, or *DNAJB11.*

II. *PKHD1* targeted variant analysis (81403) to establish a diagnosis of autosomal recessive polycystic kidney disease is considered **medically necessary** when:
   A. The member has a biological full sibling with known biallelic pathogenic or likely pathogenic variants in *PKHD1*.

III. *PKD1*, *PKD2*, *GANAB*, *DNAJB11,* or *PKHD1* targeted variant analysis (81403) to establish a diagnosis of autosomal dominant or autosomal recessive polycystic kidney disease is considered **investigational** for all other indications.

Single Gene or Multigene Panel

I. *PKD1* (81407, 81479), *PKD2* (81406, 81479), *GANAB* (81479), *DNAJB11* (81479), *PKHD1* (81408, 81479) sequencing and/or deletion/duplication analysis or multigene panel analysis (81404, 81405, 81406, 81407, 81408, 81479) to confirm or establish a diagnosis of polycystic kidney disease is considered **medically necessary** when:
   A. The member has any of the following clinical features of polycystic kidney disease:
      1. Multiple bilateral renal cysts, **OR**
      2. Cysts in organs other than the kidneys (especially the liver, seminal vesicles, pancreas, and arachnoid membrane), **OR**
      3. Hypertension in an individual younger than age 35, **OR**
      4. Intracranial aneurysm, **OR**

5. Bilaterally enlarged and diffusely echogenic kidneys, **OR**
6. Poor corticomedullary differentiation, **OR**
7. Hepatobiliary abnormalities with progressive portal hypertension, **OR**
8. Congenital hepatic fibrosis (CHF) with portal hypertension.

II. *PKD1* (81407, 81479), *PKD2* (81406, 81479), *GANAB* (81479), *DNAJB11* (81479), *PKHD1* (81408, 81479) sequencing and/or deletion/duplication analysis or multigene panel analysis (81404, 81405, 81406, 81407, 81408, 81479) to confirm or establish a diagnosis of polycystic kidney disease is considered **investigational** for all other indications.

back to top

COMPREHENSIVE KIDNEY DISEASE PANELS

I. Genetic testing for kidney disease via a comprehensive kidney disease panel (81401, 81402, 81403, 81404, 81405, 81406, 81407, 81408, 81479) is considered **medically necessary** when:
   A. The member has chronic kidney disease with an undetermined cause after undergoing standard-of-care workup studies (examples: history and physical examination, biochemical testing, renal imaging, or renal biopsy), **AND**
   B. The member meets at least one of the following:
      1. Onset of chronic kidney disease under 40 years of age, **OR**
      2. One or more first- or second-degree relatives with chronic kidney disease, **OR**
      3. Consanguineous family history, **OR**
      4. Cystic renal disease, **OR**
      5. Congenital nephropathy.

II. Genetic testing for kidney disease via a comprehensive kidney disease panel (81401, 81402, 81403, 81404, 81405, 81406, 81407, 81408, 81479) is considered **investigational** for all other indications.

back to top

***APOL1*-MEDIATED KIDNEY DISEASE**

***APOL-1* Targeted Variant Analysis**

I. Targeted variant analysis for the *APOL1* high-risk genotype (i.e., G1/G1, G1/G2, or G2/G2) (0355U, 81479) is considered **medically necessary** when:
   A. The member has kidney disease, **AND**
   B. The member meets at least one of the following:
      1. The member is of African ancestry, **OR**
      2. The member has a family member with a confirmed *APOL1* high-risk genotype (i.e., G1/G1, G1/G2, or G2/G2).

II. Targeted variant analysis for the *APOL1* high-risk genotype (i.e., G1/G1, G1/G2, or G2/G2) (0355U, 81479) is considered **investigational** for all other indications.

back to top

DONOR-DERIVED CELL-FREE DNA FOR KIDNEY TRANSPLANT REJECTION

I. The use of peripheral blood measurement of donor-derived cell-free DNA in the management of patients after renal transplantation (81479, 0118U) is considered **investigational** for all indications, including but not limited to:
   A. Detection of acute renal transplant rejection
   B. Detection of renal transplant graft dysfunction

back to top

OTHER COVERED KIDNEY DISORDERS

The following is a list of conditions that have a known genetic association. Due to their relative rareness, it may be appropriate to cover these genetic tests to establish or confirm a diagnosis.

I. Genetic testing to establish or confirm one of the following genetic kidney disorders to guide management is considered **medically necessary** when the member demonstrates clinical features* consistent with the disorder (the list is not meant to be comprehensive, see II below):
   A. Alport Syndrome
   B. C3 Glomerulopathy
   C. Congenital nephrotic syndrome
   D. Cystinosis
   E. Cystinuria
   F. Fabry Disease
   G. Genetic (familial) atypical hemolytic-uremic syndrome (aHUS)
   H. Primary Hyperoxaluria

II. Genetic testing to establish or confirm the diagnosis of all other kidney disorders not specifically discussed within this or another medical policy will be evaluated by the criteria outlined in *General Approach to Genetic and Molecular Testing* (see policy for coverage criteria).

*Clinical features for a specific disorder may be outlined in resources such as GeneReviews, OMIM, National Library of Medicine, Genetics Home Reference, or other scholarly source.

back to top

DEFINITIONS

1. Close relatives include first, second, and third degree blood relatives on the same side of the family:
   a. **First-degree relatives** are parents, siblings, and children
   b. **Second-degree relatives** are grandparents, aunts, uncles, nieces, nephews, grandchildren, and half siblings
   c. **Third-degree relatives** are great grandparents, great aunts, great uncles, great grandchildren, and first cousins
2. **Full siblings** are individuals who share the same biological parents.

back to top

BACKGROUND AND RATIONALE

Polycystic Kidney Disease - Targeted Variant Analysis

Genetic Support Foundation

The Genetic Support Foundation's Genetics 101 information on genetic testing says the following about testing for familial pathogenic variants:

Genetic testing for someone who may be at risk for an inherited disease is always easier if we know the specific genetic cause. Oftentimes, the best way to find the genetic cause is to start by testing someone in the family who is known or strongly suspected to have the disease. If their testing is positive, then we can say that we have found the familial pathogenic (harmful) variant. We can use this as a marker to test other members of the family to see who is also at risk.

GeneReviews: Polycystic Kidney Disease, Autosomal Dominant and Polycystic Kidney Disease, Autosomal Recessive

GeneReviews is an expert-authored review of current literature on a genetic disease, and goes through a rigorous editing and peer review process before being published online.

Per GeneReviews, autosomal recessive polycystic kidney disease (ARPKD) is due to biallelic mutations in the *PKHD1* gene. Testing is possible for siblings of an affected individual in whom both of the causative mutations are identified

Polycystic Kidney Disease - Single Gene or Multigene Panel

GeneReviews: Polycystic Kidney Disease, Autosomal Dominant and Polycystic Kidney Disease, Autosomal Recessive

GeneReviews is an expert-authored review of current literature on a genetic disease, and goes through a rigorous editing and peer review process before being published online.

The recommended polycystic kidney disease testing for autosomal dominant polycystic kidney disease (ADPKD) and autosomal recessive polycystic kidney disease (ARPKD) is as follows:

"ADPKD should be suspected in individuals with the following:

- Multiple bilateral renal cysts and the absence of manifestations suggestive of a different renal cystic disease
- Cysts in other organs, especially the liver, but also seminal vesicles, pancreas, and arachnoid membrane…
- Hypertension in an individual younger than age 35 years
- An intracranial aneurysm…"

"Autosomal recessive polycystic kidney disease (ARPKD) should be suspected in individuals with bilaterally enlarged, diffusely echogenic kidneys…[and] one or more of the following:...Clinical/laboratory signs of congenital hepatic fibrosis (CHF) that leads to portal hypertension…"

"The renal diagnostic criteria for ARPKD detected by ultrasonography are:

- Increased renal size (in relation to normative size based on age and size of the affected individual);
- Increased echogenicity;
- Poor corticomedullary differentiation"

"[In] Childhood and young adulthood…The hepatobiliary abnormalities with progressive portal hypertension are often the prominent presenting features."

Comprehensive Kidney Disease Panels

Hays et al (2020)

"We propose the following approach, based on a review of current literature and our practical experience. This approach assumes individuals have already undergone an initial nephrologic workup, including biochemical and serologic testing, imaging of the kidneys, and renal biopsy if indicated.

…[A]fter a negative or inconclusive initial workup, a patient is considered to have KDUE [kidney disease of unknown etiology] and may then be stratified according to the probability of a genetic disease. We consider higher probability patients as those with the following risk factors: early-onset disease (age <40 years), a positive family history of CKD [chronic kidney disease], consanguinity, extrarenal anomalies, cystic renal disease, or congenital nephropathy". (p. 594)

***APOL1*-Mediated Kidney Disease**

Freedman et al (2021)

A multidisciplinary group of experts and patient advocates performed a systematic review and created consensus-based guidelines in 2021 to guide health care providers in *APOL1*-associated neuropathy. The guidelines recommend the following:

"...*APOL1* testing should be considered in all patients of African ancestry with kidney disease and in any patient with kidney disease and a family member with a confirmed *APOL1* high-risk genotype." (p. 1768)

Regarding the definition of "high-risk phenotype": "Two copies of the *APOL1* variants (G1/G1, G1/G2, G2/G2) are commonly referred to as a 'high-risk' genotype…" (p. 1765)

Donor-Derived Cell-Free DNA for Kidney Transplant Rejection

Knight et al (2019)

A publication in the journal Transplantation entitled "Donor-specific Cell-free DNA as a Biomarker in Solid Organ Transplantation. A Systematic Review" stated the following:

In summary, donor-derived cfDNA shows promise as a biomarker for the detection of acute transplant graft injury. It has potential to reduce the need for protocol biopsy surveillance, allowing for a more targeted diagnostic approach. Detection of injury occurs before clinical manifestation, meaning that there is a window for earlier detection and treatment of AR [acute rejection] and other causes of graft injury with the potential to improve outcomes. It may also facilitate the detection of under immunosuppression and find use as a tool for monitoring during immunosuppression minimization. Further studies are required to validate the thresholds for further investigation and intervention, determine the optimum frequency for monitoring, and to identify whether prospective monitoring using dd-cfDNA can indeed improve transplant outcomes compared to current practice. (p. 280)

back to top

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back to top

Note: Medica uses the genetic testing clinical criteria developed by Concert Genetics, an industry-leader in genetic testing technology assessment and policy development.

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