Proteinuria

FAST FACTS

1–5%
of children may be found to have 1+ or greater degree of proteinuria

~10%
of children with ≥ 1 degree of proteinuria will have persistent abnormality after 6 months

less than 2%
of those children will have significant underlying renal disease

In children, protein in the urine is common and usually benign. The most widely used method of screening is the urine dipstick test. Proteinuria is present when urine protein excretion > 4mg/m2/hour or 100mg/m2/day.

Spot urine (ideally first morning urine sample) results indicate proteinuria when:
> 0.2mg protein/mg creatinine for patients > 2 years of age
> 0.5mg protein/mg creatinine in patients 6 to 24 months of age.

ASSESSMENT

Perform detailed history focused on description and timing of abdominal/scrotal/leg swelling. Perform complete physical exam focused to evaluate swelling of the abdomen, genitalia and lower extremities. Medical imaging (ultrasound) is unnecessary.

HPE RED FLAGS

History of Present Illness:
- Swelling around eyes in the morning
- Swelling in legs in the afternoon, socks leaving prints on legs
- Swollen joints
- Abdominal pain
- High blood pressure: headaches, chest pain, shortness of breath
- Changes in urine output, dysuria
- Skin lesions

Patient History
- Growth history
- Medication intake (NSAIDS, lithium, heavy metals, opioid use particularly heroin)

Family History
- Kidney disease
- Dialysis
- Kidney transplant
- Deafness
- Visual disorders

MANAGEMENT/TREATMENT

If dipstick shows proteinuria, obtain a first morning urine for protein and creatinine ratio.

If urine dipstick is obtained at the time of intercurrent illness and positive for protein, repeat when patient has returned to baseline.

WHEN TO REFER

Refer patients with any of the following to Cincinnati Children's Nephrology:
- Protein/creatinine ratio of >0.2
- Presence of hematuria in addition to proteinuria
- Elevated blood pressure
- Presence of edema and/or rash
- Red flags as described

If you have clinical questions about a patient who with proteinuria, call 513-636-4531 or email nephrology@cchmc.org.

If you would like additional copies of this tool, or would like more information, please contact the Physician Outreach and Engagement team at Cincinnati Children's.

Tool developed by Cincinnati Children's physician-hospital organization (known as Tri-State Children's Health Services, Inc.) and staff in the James M. Anderson Center for Health Systems Excellence. Developed using expert consensus and informed by Best Evidence Statements, Care Practice Guidelines, and other evidence-based documents as available. For Evidence-Based Care Guidelines and references, see www.cincinnatichildrens.org/evidence.

Proteinuria

Patient Presents

Standard Workup

- **History of Present Illness**
- **Family History**
- **Physical Exam**
  - Assess for edema
  - Check blood pressure

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Evaluation of Persistent Proteinuria in Children/Adolescents

Abnormal urine dipstick protein in an afebrile child

≥ 1+

Obtain first morning void for urine total protein/creatinine ratio and urinalysis with microscopic exam

> 0.2 mg protein per mg creatinine

Further Evaluation
- History (drugs, family history)
- Physical exam, including BP
- Serum chemistries: creatinine, BUN, electrolytes, cholesterol and albumin
- Also consider (when appropriate):
  - Renal ultrasonography
  - Serum C3/C4 complement, ANA
  - Hepatitis B and C serology
  - HIV testing

Consult with a pediatric nephrologist who will consider a kidney biopsy and define appropriate therapy based on the findings

Trace

≤ 0.2 mg protein per mg creatinine and normal U/A

Repeat dipstick on first morning void in one year

Method	Indictations	Normal Range	Comments
Dipstick testing	Routine screening for proteinuria performed in the office	Negative or a trace in a concentrated urine specimen (specific gravity >1.020) or very con-centrated (specific gravity >1.025)	False positive can occur if urine is very alkaline (pH >8.0)
24-hour urine for proteinuria and creatinine excretion	Quantitation of proteinuria as well as creatinine clearances	<100 mg/m2/24 h	More accurate than spot urine analysis
Spot urine for protein/ creatinine ratio, preferably on first morning urine	Semi-quantitative assessment of proteinuria	<0.2 mg protein/mg creatinine in children > 2 years old <0.5mg protein/mg creatinine in children age 6–24 months	Simplest method to detect proteinuria. Less accurate than 24-hour test
Micro-albuminuria	Assess risk of progressive glomerulopathy	<30 mg urine albumin/ g creatinine on first morning urine	Therapy should be intensified in diabetics with MA in DM

For urgent issues, or to speak with the specialist on call 24/7, call the Physician Priority Link at 1-888-987-7997.