Proteinuria

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
# Proteinuria

## Standard Workup

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

## HPE RED FLAGS

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## Evaluation of Persistent Proteinuria in Children/Adolescents

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

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

For urgent issues, or to speak with the specialist on call 24/7, call the Physician Priority Link at 1-888-636-7997.