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 (HISTORY AND PHYSICAL EXAM) 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.
Proteinuria

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

**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;br&gt;&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>

<table>
<thead>
<tr>
<th>Method</th>
<th>Indications</th>
<th>Normal Range</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<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;br&gt;&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>

**Patient Presents**

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

**HPE (HISTORY AND PHYSICAL EXAM) 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

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

**≥ 1+** Abnormal urine dipstick protein in an afebrile child

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

**Repeat dipstick on first morning void in one year**

**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

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