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Diagnosis/symptom
Chronic Kidney Disease

Referring provider's initial evaluation and management can include:

Normal levels of serum creatinine vary according to the child's height. Generally, normal levels are 0.3-0.7mg/dL. Stages of chronic kidney disease are determined according to calculations of estimated glomerular filtration rate, and the following rapid online calculator may be used to determine the presence or severity of kidney disease.

http://www.kidney.org/professionals/kdoqi/gfr_calculatorPed.cfm

Stage	Description	GFR ml/min/ 1.73 m ²
1	Kidney damage with normal or increased GFR	>90
2	Kidney damage with mild or decreased GFR	60-89
3	Moderate decrease in GFR	30-59
4	Severe decrease in GFR	15-29
5	Kidney Failure	<15 or dialysis

Note: From K/DOQI Clinical practice guidelines for chronic kidney disease: Evaluation, classification, and stratification (2007).

When to initiate referral:

Any patient with known chronic kidney disease from any underlying condition

What can referring provider send?

- Pertinent medical records, including growth charts
- Relevant laboratory studies
- List of all medications
- Blood pressure readings
- Clinical data are not required but if obtained, fax to number below prior to Children's appointment

Children's workup will likely include:

- Electrolytes
- BUN
- Creatinine
- Albumin
- Calcium, magnesium, phosphorus
- Urinalysis; if positive for protein, add protein/creatinine ratio
- CBC

> Tips for an effective visit:

- Talk with your patient and family about the reason for the referral and the questions to be answered.
- Our providers appreciate having the information ahead of time; alternatively, it can be hand carried by the family.
- Provide relevant clinical notes.

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Diagnosis/symptom

Hematuria

The presence of >5 RBCs/HPF on urine microscopy

Referring provider's initial evaluation and management can include:

Children's suggests the following for hematuria:

- Because hematuria can be transient, perform at least two urine dipsticks or urinalyses 1-2 days apart to confirm the finding
- We recommend at least one microscopic UA because false positive urine dipstick analysis can occur with beets, berries, povidone-iodine, skin cleansers, and pyridium
- Measure blood pressure, height, and weight
- CBC
- Sickle screen, in at-risk ethnic groups
- BUN
- Serum creatinine
- Random urinalysis for urine calcium/creatinine ratio, to identify hypercalciuria.

CALCIUM/CREATININE RATIOS

Age	Ca ²⁺ /Cr Ratio (mg/mg Ratio) (95th Percentile for Age)
<7 mo	0.86
7-18 mo	0.60
19 mo-6 yr	0.42
Adults	0.22

From Sargent JD, et al: J Pediatr 1993;123:393.

When to initiate referral:

- 2 or more consecutive urinalyses or dipsticks are positive for >5 RBCs/HPF
- Microscopic hematuria is present in multiple family members
- Recurrent episodes of painless gross hematuria have occurred
- Proteinuria is seen along with hematuria
- Hypertension is present
- Signs of constitutional illness are seen (weight loss, fever, arthralgia, rash, fatigue)

What can referring provider send?

- Pertinent medical records, including growth charts
- Relevant laboratory studies
- List of all medications
- Blood pressure readings
- Clinical data are not required but if obtained, fax to number below prior to Children's appointment

Children's workup will likely include:

- Urinalysis with microscopy
- Random urinalysis for urine calcium/creatinine ratio
- CBC
- Sickle screen, in at-risk ethnic groups
- BUN
- Creatinine
- Serum electrolytes, calcium and phosphorus
- Renal ultrasound
- VCUG (if indicated by abnormal renal ultrasound or history of UTI)
- C3, C4, ANA, streptozyme, hepatitis B and C titers, HIV

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Diagnosis/symptom

Hematuria

Referring provider's initial evaluation and management can include:

Note: for serum creatinine levels in infants:

- Within the first 2 days of life, PCr reflects maternal levels and may not reflect GFR of the infant.
- By 7 days in the term infant, serum creatinine levels are normally less than 0.5 mg/dL, whereas in preterm infant, levels can remain as high as 1.0 mg/dL for the first month of life.
- A progressive increase in serum creatinine during the neonatal period suggests renal insufficiency regardless of gestational age. Trompeter et al., 1983. Trompeter RA, Al-Dahhan J, Haycock GB, et al: "Normal values for plasma creatinine concentration related to maturity in normal term and preterm infants." *Int J Pediatr Nephrol* 1983; 4:145-148.

> Tips for an effective visit:

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- Provide relevant clinical notes.



Diagnosis/symptom

Hypertension

For gender, age, and height using 2004 BP tables, to identify abnormal blood pressure see web site: www.nhlbi.nih.gov/health/prof/heart/hbp/hbp_ped.pdf

Referring provider's initial evaluation and management can include:

- If BP is high using an automated device, Children's recommends that manual readings be obtained to confirm the blood pressure elevation.
- Ensure that the blood pressure cuff is large enough: the bladder area of the cuff should encircle 80-100% of the circumference of the arm; remember to use a bare arm. More information is available in the 2004 report.

When to initiate referral:

- Since BP in children and adolescents is labile, at least 3 elevated readings obtained on different occasions must be documented to refer a patient for further evaluation of hypertension.

Pre-hypertension

- 90th %tile – 95th %tile or if BP is >120/80 mmHg
- Recheck in 6 months – refer if elevated when repeated
- Note:120/80 occurs typically at 12 years old for SBP and at 16 years old for DBP

Stage 1 hypertension

- 95th %tile – 99th %tile plus 5 mmHg
- Recheck in 1-2 weeks or sooner if the patient is symptomatic
- If persistently elevated on 2 additional occasions, evaluate or refer to source of care within 1 month

Stage 2 hypertension

- >99th %tile plus 5 mmHg
- Recheck within 1 week; if persistent, evaluate or refer to pediatric nephrology within 1 week or immediately if the patient is symptomatic (severe headache, nausea, vomiting, blurred vision accompanying blood pressure above the 95%)

Adapted from The Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents

What can referring provider send?

- Pertinent medical records
- List of all medications
- Blood pressures: 3 elevated readings on separate PCP visits
- If the family has obtained BP readings at home and school, please encourage them to bring them to the appointment
- Clinical data are not required but if obtained, fax to number below prior to Children's appointment

Children's workup will likely include:

- Ambulatory BP monitoring to rule out white coat hypertension
- Urinalysis
- BUN, creatinine, electrolytes
- Fasting glucose
- Fasting lipids



Diagnosis/symptom
Nephrotic Syndrome

Proteinuria, low serum albumin edema, elevated cholesterol

Referring provider's initial evaluation and management can include:

Prior to treatment, these steps will be necessary:

- PPD placement and reading, because of likely prednisone therapy and subsequent increased susceptibility to infection. PPDs placed within one month of referral are valid and records should be sent to nephrology or with patient to appointment
- Serum varicella titer, because of prednisone therapy and increased susceptibility to infection

When to initiate referral:

All cases of nephrotic syndrome should be referred prior to treatment

What can referring provider send?

- Pertinent medical records, including growth charts
- List of all medications
- Blood pressure readings
- All labs
- Results of PPD testing and varicella titers
- Clinical data are not required but if obtained, fax to number below prior to Children's appointment

Children's workup will likely include:

- Electrolytes
- BUN
- Creatinine
- Albumin
- Urinalysis with microscopy
- CBC
- If age >16, Chest xray
- C3, C4
- Serologic workup indicated in all patients with multisystem disease: ANA, Hepatitis B, C, ANCA

> Tips for an effective visit:

- Talk with your patient and family about the reason for the referral and the questions to be answered.
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- Provide relevant clinical notes.



Diagnosis/symptom

Proteinuria

Presence of 1+ protein or more on urine dipstick

Referring provider's initial evaluation and management can include:

- Perform at least 2 consecutive urine dipsticks or urinalyses 1-2 days apart, to confirm the finding
- Because many children and adolescents with trace or 1+ urinary protein have orthostatic proteinuria, obtain an early morning and an afternoon dipstick analysis. If the morning sample is negative for protein, Children's recommends repeating the tests yearly, and no referral is necessary
- Obtain a urinalysis for protein:creatinine ratio (normal is <0.2 mg/mg).
- Measure blood pressure and evaluate growth velocity

When to initiate referral:

- Both early morning and afternoon samples are positive for protein or if afternoon dip is greater than 1+
- Absence of edema and constitutional symptoms
- Proteinuria accompanied by elevated serum creatinine

What can referring provider send?

- Pertinent medical records, including growth charts
- List of all medications
- Blood pressure readings
- All labs
- Clinical data are not required but if obtained, fax to number below prior to Children's appointment

Children's workup will likely include:

- Urinalysis with microscopy and protein:creatinine ratio
- 24 hour urine collection for protein and creatinine (if toilet trained)
- Serum electrolytes
- Serum creatinine and BUN
- Serum albumin
- C3, C4
- ANA, ANCA
- Hepatitis B and C serology, HIV testing
- Fasting lipid profile
- Renal ultrasound

> Tips for an effective visit:

- Talk with your patient and family about the reason for the referral and the questions to be answered.
- Our providers appreciate having the information ahead of time; alternatively, it can be hand carried by the family.
- Provide relevant clinical notes.

Clinic phone: 206-987-2524. To request a consult or referral, please call the Clinical Intake Nurses at 206-987-2080 or toll free at 866-987-2080. You may fax a New Appointment Request Form to 206-985-3121 or toll free at 866-985-3121. To speak with a Seattle Children's physician for an urgent phone consultation, call the Physician Operator at 206-987-7777 or toll free at 877-985-4637.

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