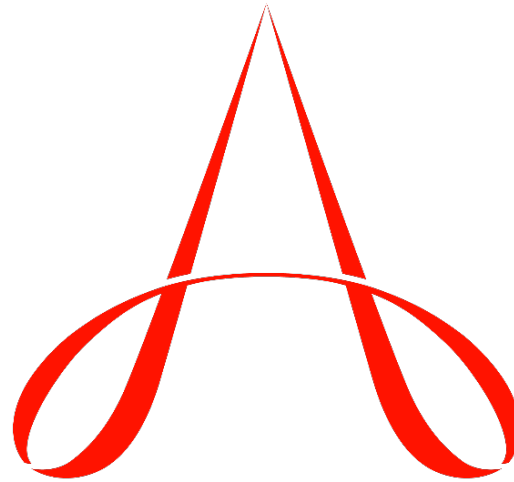




Supplemental Guide: Pediatric Nephrology



ACGME

April 2023

TABLE OF CONTENTS

INTRODUCTION 3

PATIENT CARE 4

 Organization and Prioritization of Patient Care 4

 Acute Kidney Injury 6

 Chronic Dialysis Therapy 9

 Chronic Kidney Disease 12

 Transplant 14

 Fluid, Electrolytes, and Acid-Base Disorders 17

 Hypertension 19

 Glomerular Disease 21

 Competence in Procedures 23

MEDICAL KNOWLEDGE 25

 Clinical Reasoning 25

 Physiology and Pathophysiology 28

SYSTEMS-BASED PRACTICE 29

 Patient Safety 29

 Quality Improvement 31

 System Navigation for Patient-Centered Care – Coordination of Care 33

 System Navigation for Patient-Centered Care – Transitions in Care 35

 Population and Community Health 37

 Physician Role in Health Care Systems 39

PRACTICE-BASED LEARNING AND IMPROVEMENT 42

 Evidence-Based and Informed Practice 42

 Reflective Practice and Commitment to Personal Growth 44

PROFESSIONALISM 46

 Professional Behavior 46

 Ethical Principles 49

 Accountability/Conscientiousness 51

 Well-Being 52

INTERPERSONAL AND COMMUNICATION SKILLS 54

 Patient- and Family-Centered Communication 54

 Interprofessional and Team Communication 56

 Communication within Health Care Systems 59

MAPPING OF 1.0 TO 2.0 61

RESOURCES 64

Milestones Supplemental Guide

This document provides additional guidance and examples for the Pediatric Nephrology Milestones. This is not designed to indicate any specific requirements for each level, but to provide insight into the thinking of the Milestone Work Group.

Included in this document is the intent of each Milestone and examples of what a Clinical Competency Committee (CCC) might expect to be observed/assessed at each level. Also included are suggested assessment models and tools for each subcompetency, references, and other useful information.

Review this guide with the CCC and faculty members. As the program develops a shared mental model of the Milestones, consider creating an individualized guide (Supplemental Guide Template available) with institution/program-specific examples, assessment tools used by the program, and curricular components.

Additional tools and references, including the Milestones Guidebook, Clinical Competency Committee Guidebook, and Milestones Guidebook for Residents and Fellows, are available at the end of this document as well as on the [Resources](#) page of the Milestones section of the ACGME website.

Patient Care 1: Organization and Prioritization of Patient Care Overall Intent: To organize and appropriately prioritize patient needs to optimize patient outcomes	
Milestones	Examples
Level 1 <i>Organizes patient care responsibilities by focusing on a subset of patients</i>	<ul style="list-style-type: none"> ● Sees a patient for suspected hypertension and measures the blood pressure
Level 2 <i>Organizes and prioritizes the simultaneous care of multiple patients, with guidance</i>	<ul style="list-style-type: none"> ● Manages multiple patients simultaneously, but needs guidance on triaging based on acuity and urgency ● While evaluating a child with unilateral hydronephrosis, is called about a new patient with severe hypertension and new onset seizures admitted to the intensive care unit; excuses self from the patient’s room and alerts the attending about the new patient and is instructed to promptly assess the patient with hypertension
Level 3 <i>Independently and efficiently prioritizes patient care based on level of acuity and available resources</i>	<ul style="list-style-type: none"> ● While evaluating a child with unilateral hydronephrosis and a patient with severe hypertension and new onset seizures arrives to the intensive care unit, excuses self from the first patient’s room and promptly proceeds to assess the patient with hypertension
Level 4 <i>Independently anticipates patient care needs and utilizes available resources to optimize patient care when volume and acuity approach the capacity of the team</i>	<ul style="list-style-type: none"> ● While covering a busy overnight service, is alerted by the intensive care unit about an incoming patient with acute kidney injury and hyperkalemia; suspects that the patient is likely to require dialysis and alerts the dialysis staff of the anticipated need advises the intensive care unit about appropriate catheter placement ● Delegates appropriate tasks to medical students, residents, and attendings when occupied with other high-priority tasks ● When discharging a postoperative transplant patient with a vesicostomy, coordinates care with the multidisciplinary team to ensure discharge readiness, including diet and medication education, catheterization supplies, home nursing, and transportation
Level 5 <i>Serves as a role model and coach for prioritizing and delegating patient care responsibilities when patient volume and acuity are high</i>	<ul style="list-style-type: none"> ● Leads a multidisciplinary team on rounds in an efficient and comprehensive manner, describes reasoning behind the care plan
Assessment Models or Tools	<ul style="list-style-type: none"> ● Audit of diagnoses and numbers of patients seen per session in a clinic ● Direct observation ● Multisource feedback ● Self-assessment
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● American Board of Pediatrics (ABP). “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021.

- Covey, Stephen. 1989. *The Seven Habits of Highly Effective People*. New York, NY: Simon & Schuster.
- Ledrick David, Fisher Susan, Thompson Justin, Sniadanko Mark. 2009. "An Assessment of Emergency Medicine Residents' Ability to Perform in a Multitasking Environment." *Academic Medicine* 84(9): 1289–1294. doi:10.1097/ACM.0b013e3181b18e1c.

Patient Care 2: Acute Kidney Injury (AKI)	
Overall Intent: To diagnose and treat acute kidney injury	
Milestones	Examples
<p>Level 1 <i>Recognizes patients with acute kidney injury with available clinical data</i></p> <p><i>Develops a basic diagnostic strategy, with guidance</i></p> <p><i>Develops a basic management plan, with guidance</i></p>	<ul style="list-style-type: none"> ● Is given labs from another practitioner and appropriately recognizes the diagnosis of AKI ● After discussion with the attending, orders ultrasound, blood and urine chemistries, and urine sediment ● After discussing with the attending, considers dehydration the most likely etiology, recommends resuscitation with isotonic fluids and repeating serum chemistries
<p>Level 2 <i>Creates a basic differential diagnosis for patients with acute kidney injury</i></p> <p><i>Interprets diagnostic test results</i></p> <p><i>Identifies patients who need urgent treatment, including dialysis and medication adjustment</i></p>	<ul style="list-style-type: none"> ● For a two-year-old boy who presents with nausea, vomiting, hypotension, and worsening kidney function, generates a differential diagnosis that includes pyelonephritis, glomerulonephritis, and obstructive uropathy ● Interprets an ultrasound to identify bilateral enlarged echogenic kidneys concerning for an acute process ● Correctly interprets a fractional excretion of sodium (FeNa) ● Reviews the radiologist report findings consistent with obstructive uropathy and recommends immediate placement of a urinary catheter and close monitoring of urine output
<p>Level 3 <i>Formulates a comprehensive differential diagnosis for patients with acute kidney injury</i></p> <p><i>Independently formulates a diagnostic strategy</i></p> <p><i>Develops a management plan, including dialysis modality selection and/or disease-specific treatment</i></p>	<ul style="list-style-type: none"> ● For a two-year-old boy who presents with nausea, vomiting, hypotension, and worsening kidney function, recognizes that the differential diagnosis includes prerenal, postrenal and intrinsic kidney injury; includes a broader differential within each category and determines which are most likely ● Recommends an ultrasound, serum and urine chemistries, and urinalysis with microscopy for patient with suspected AKI ● Recommends immediate placement of a urinary catheter and close monitoring of urine output; identifies hyperkalemia and recommends acute hemodialysis as the most appropriate modality
<p>Level 4 <i>Independently formulates a prioritized differential diagnosis for patients with common and uncommon causes of acute kidney injury</i></p>	<ul style="list-style-type: none"> ● For a 13-year-old boy post bone marrow transplantation with declining kidney function, hypotension, and severe metabolic acidosis, formulates a differential diagnosis that includes acute tubular necrosis as well as thrombotic microangiopathy (TMA)

<p><i>Independently interprets and integrates advanced diagnostic test results</i></p> <p><i>Independently develops and implements a management plan with consideration of patient acuity and complexity</i></p>	<ul style="list-style-type: none"> ● Interprets functional immune testing and genetic tests for TMA in conjunction with the other specialists caring for the patient ● Accurately prescribes and manages continuous renal replacement therapy to manage renal failure and acidosis ● Recognizes the utility of complement inhibitors for the treatment of transplant-associated thrombotic microangiopathy
<p>Level 5 <i>Independently formulates a prioritized differential diagnosis with consideration of rare or newly recognized causes of acute kidney injury</i></p> <p><i>Integrates innovative diagnostic strategies into practice</i></p> <p><i>Formulates a management plan, incorporating emerging therapies</i></p>	<ul style="list-style-type: none"> ● In a two-year-old boy status post kidney transplant for congenital nephrotic syndrome who develops new onset proteinuria and kidney injury, considers the possibility of anti-nephrin antibody mediated disease and recommends a kidney biopsy ● Participates in an institutional committee guiding the meaningful incorporation of urinary neutrophil gelatinase-associated lipocalin (NGAL) into clinical practice ● In a 2.5 kg baby with gastroschisis who is not a candidate for peritoneal dialysis, considers the possibility of transferring to another center that is able to provide infant-specific dialysis therapy
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Case-based discussion ● Case conferences assessment ● Direct observation ● In-training examination ● Medical record (chart) review
<p>Curriculum Mapping</p>	
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. ● Iverson, Cheryl. 2020. “Nomenclature.” <i>AMA Manual of Style: A Guide for Authors and Editors, 11th ed.</i> New York. doi: 10.1093/jama/9780190246556.003.0014. Accessed 2022. ● Kidney Disease Improving Global Outcomes. 2012. “Clinical Practice Guideline for Acute Kidney Injury.” <i>Kidney International Supplements</i> 2(1). doi:10.1038/kisup.2012.1. https://kdigo.org/wp-content/uploads/2016/10/KDIGO-2012-AKI-Guideline-English.pdf Accessed 2019. ● Levey, Andrew S., Kai-Uwe Eckardt, Nijsje M. Dorman, Stacy L. Christiansen, Ewout J. Hoorn, Julie R. Ingelfinger, Lesley A. Inker, et al. 2020. “Nomenclature for Kidney

Function and Disease: Report of a Kidney Disease: Improving Global Outcomes (KDIGO) Consensus Conference.” KDIGO Conference Report. 97(6)1117-1129.

[doi:10.1016/j.kint.2020.02.010](https://doi.org/10.1016/j.kint.2020.02.010).

- Macedo Etienne, and Mehta Ravindra L. 2016. “Continuous Dialysis Therapies: Core Curriculum 2016.” *American Journal of Kidney Diseases: The Official Journal of the National Kidney Foundation*. 68(4): 645–657. [doi:10.1053/j.ajkd.2016.03.427](https://doi.org/10.1053/j.ajkd.2016.03.427).
- Moore, Peter K., Raymond K. Hsu, and Kathleen D. Liu. 2018. “Management of Acute Kidney Injury: Core Curriculum 2018.” *American Journal of Kidney Diseases: The Official Journal of the National Kidney Foundation*. 72(1): 136–148. [doi:10.1053/j.ajkd.2017.11.021](https://doi.org/10.1053/j.ajkd.2017.11.021).
- National Kidney Foundation. “Guidelines and Commentaries.” https://www.kidney.org/professionals/guidelines/guidelines_commentaries. Accessed 2019.

Patient Care 3: Chronic Dialysis Therapy Overall Intent: To develop competence in prescribing and managing patients receiving chronic dialysis therapy	
Milestones	Examples
<p>Level 1 <i>Lists the indication(s) for initiation of chronic dialysis and recognizes when chronic dialysis is inappropriate</i></p> <p><i>Lists common complications in patients on chronic dialysis</i></p> <p><i>Identifies types of dialysis access and common access complications</i></p>	<ul style="list-style-type: none"> ● Recognizes that hyperkalemia in a chronic dialysis patient that is not amenable to medical management is an appropriate indication for urgent dialysis therapy ● Recognizes that hypervolemia-related hypertension that does not respond to medical management may be an indication to initiate chronic dialysis in a patient with chronic kidney disease ● Considers peritonitis in a patient with peritoneal dialysis who is reporting fever and abdominal pain ● Discusses fistulae and central venous catheters as options for hemodialysis access and is aware that infection and clots are common complications
<p>Level 2 <i>Selects appropriate dialysis modality and writes patient-specific hemodialysis and peritoneal dialysis prescriptions</i></p> <p><i>Assesses for common complications of chronic dialysis</i></p> <p><i>Performs basic assessment of dialysis accesses</i></p>	<ul style="list-style-type: none"> ● For a five-year-old girl on chronic peritoneal dialysis presenting with abdominal pain and fever, prepares a basic continuous cycling peritoneal dialysis prescription with antibiotics with input from the attending ● Sends fluid cell count and culture, and discusses empiric antibiotic treatment options ● Examines peritoneal dialysis catheter tunnel assessing for exit site (and tunnel) infection
<p>Level 3 <i>Initiates and modifies a dialysis prescription based on patient assessment</i></p> <p><i>Treats common complications of chronic dialysis</i></p>	<ul style="list-style-type: none"> ● For a five-year-old girl on chronic peritoneal dialysis presenting with hypertension and fluid overload with inadequate ultrafiltration, optimizes fill volume and increases dextrose concentration in dialysate fluid ● The fellow reviews a growth chart, identifies poor linear growth despite optimal dialysis management, and recommends growth hormone supplementation; when the patient, who is being administered activated vitamin D for secondary hyperparathyroidism, later presents with worsening hypercalcemia, changes to a non-calcium-based phosphate binder, reduces the calcium in the dialysis prescription, and adjusts activated vitamin D therapy

<p><i>Develops a diagnostic and therapeutic plan for management of common access complications</i></p>	<ul style="list-style-type: none"> ● Assesses the limb and fistula and orders fistulogram to evaluate access for a 13-year-old boy on chronic hemodialysis via a left brachiocephalic arteriovenous fistula who has high venous pressures ● For a 16-year-old girl on chronic peritoneal dialysis who has new pink-tinged effluent but is otherwise asymptomatic, provides reassurance and recommends continued monitoring when a thorough history and exam reveal menses as the most likely etiology
<p>Level 4 <i>Independently manages patients receiving dialysis as part of the multidisciplinary team</i></p> <p><i>Independently anticipates and manages common and uncommon complications of chronic dialysis</i></p> <p><i>Develops a diagnostic and therapeutic plan for management of uncommon access complications</i></p>	<ul style="list-style-type: none"> ● When a 14-year-old girl on chronic hemodialysis who is near her estimated dry weight at the beginning of the session develops cramping and tachycardia near the end of the session, discontinues ultrafiltration and reassess the patient's symptoms and hemodynamic status; subsequently reassesses dry weight with input from renal dietitian; presents the patient at the multidisciplinary care conference and leads a discussion about her management ● For a patient with systemic lupus erythematosus who presents with severe uremia and pericardial effusion, considers serositis and uremia as potential etiologies, and tailors dialysis therapy according to the patient's clinical course ● Suspecting a blood leak, promptly terminates the hemodialysis session and assess the patient for signs of blood loss when a two-year-old girl develops bloody dialysis effluent during a chronic hemodialysis session
<p>Level 5 <i>Identifies the complexities of providing evidence-based equitable care to the population of patients receiving dialysis</i></p> <p><i>Anticipates and manages the breadth of comorbid medical and technical complications in the patient on dialysis</i></p> <p><i>Advocates at the institutional level for access preservation strategies</i></p>	<ul style="list-style-type: none"> ● Takes on a leadership role in outpatient dialysis unit to review quality assurance and performance improvement (QAPI) measures for the reporting period ● Uses surveys and population health measures in the electronic health record (EHR) to identify inequities in school performance among the dialysis population and recommends targeted interventions ● Provides comprehensive dialysis care for patients with highly complex medical conditions ● Manages a two-year-old child with history of liver transplant in infancy secondary to biliary atresia who developed end-stage kidney disease (ESKD) and is on hemodialysis while preparing for a potential kidney transplant ● Takes on a leadership role in establishing a multidisciplinary access team to review access care in ESKD patients ● Takes on a leadership role in establishing a "Save the Vein" initiative to improve vascular access outcomes at an institutional level
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Case-based discussion ● Case conferences assessment

	<ul style="list-style-type: none"> ● Direct observation ● In-training examination ● Medical record (chart) review ● Simulation
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. ● Kidney Disease Improving Global Outcomes. “Guidelines.” https://kdigo.org/guidelines/. Accessed 2019. ● National Kidney Foundation. “Guidelines and Commentaries.” https://www.kidney.org/professionals/guidelines/guidelines_commentaries. Accessed 2019. ● Warady, Bradley A., Sevcan Bakkaloglu, Jason Newland, Michelle Cantwell, Enrico Verrina, Alicia Neu, Vimal Chadha, Hui-Kim Yap, and Franz Schaefer. 2012. “International Society of Peritoneal Dialysis: Consensus Guidelines for the Prevention and Treatment of Catheter-Related Infections and Peritonitis in Pediatric Patients Receiving Peritoneal Dialysis: 2012 Update.” <i>Peritoneal Dialysis International</i> 32:S32-S86. doi:10.3747/pdi.2011.00091.

Patient Care 4: Chronic Kidney Disease (CKD)	
Overall Intent: To evaluate causes, diagnosis, and treatment for a patient with chronic kidney disease	
Milestones	Examples
<p>Level 1 <i>Develops a differential diagnosis of causes of chronic kidney disease</i></p> <p><i>Develops a basic diagnostic plan for patients with chronic kidney disease</i></p> <p><i>Identifies stages of chronic kidney disease and how they relate to patient prognosis</i></p>	<ul style="list-style-type: none"> ● Includes congenital anomalies of the kidney and urinary tract (CAKUT) in the differential diagnosis of a male toddler presenting with repeated febrile urinary tract infection ● Orders laboratory work (creatinine), and basic imaging, such as ultrasound, and calculates estimated glomerular filtration rate (eGFR) ● Identifies correct stage of chronic kidney disease based on eGFR and recognizes that progression will depend on baseline eGFR, degree of proteinuria, and underlying diagnosis
<p>Level 2 <i>Expands the differential diagnosis</i></p> <p><i>Modifies the diagnostic plan based on evolving clinical data for patients with chronic kidney disease, with guidance</i></p> <p><i>Develops a basic management plan to treat complications and slow progression of chronic kidney disease</i></p>	<ul style="list-style-type: none"> ● Lists causes of CAKUT: posterior urethral valve (PUV), renal dysplasia or hypoplasia, prematurity/low birthweight associated with low nephron endowment as aggravating risk factors; orders further imaging, such as voiding cysto-urethrogram (VCUG) ● Recommends avoidance of non-steroidal anti-inflammatory drugs (NSAIDs) and starts prophylactic antibiotics ● Obtains input for surgical correction and ongoing bladder management with urology input (consult) ● Optimizes blood pressure control with the use of angiotensin-converting enzyme inhibitors (ACEI) or angiotensin II receptor blocker (ARB) medications
<p>Level 3 <i>Reformulates the differential diagnosis as necessary for atypical disease presentations</i></p> <p><i>Identifies patients with chronic kidney disease who require more evaluation, including kidney biopsy</i></p> <p><i>Implements an evidence-based management plan for chronic kidney disease complications and discusses treatment options</i></p>	<ul style="list-style-type: none"> ● Identifies a more rapid progression of disease with history of prematurity or low birth weight than expected for a full-term infant with CAKUT ● Orders a kidney biopsy in a patient with chronic kidney disease and unexplained dysmorphic red cells in the urine ● Develops a management plan to treat complications of chronic kidney disease including anemia, metabolic acidosis, growth failure, and secondary hyperparathyroidism ● Assesses for adequate iron stores, supplementing iron if necessary and initiating an erythropoiesis-stimulating agent (ESA) when indicated

<p>Level 4 <i>Independently diagnoses common and uncommon causes of chronic kidney disease</i></p> <p><i>Identifies indications for ordering advanced diagnostic studies</i></p> <p><i>Independently leads the preparation for the next steps in management of progressive chronic kidney disease and integrates patient-specific goals of care</i></p>	<ul style="list-style-type: none"> ● Recognizes CKD secondary to cystinosis ● Discusses a comprehensive management plan for a cystinosis diagnosis, specific treatment, and identifying and managing systemic complications including ophthalmologic surveillance, thyroid function, and growth failure ● Recommends to the patient’s family to place gastrostomy tube (G-tube) when indicated for nutrition, fluid, electrolyte repletion, and medication administration
<p>Level 5 <i>Independently recognizes rare and newly described causes of chronic kidney disease</i></p> <p><i>Identifies candidates for enrollment in research or novel and emerging therapies</i></p>	<ul style="list-style-type: none"> ● Recognizes tubular proteinuria and suspects tubulointerstitial nephritis and uveitis syndrome (TINU) in a patient presenting with persistently elevated creatinine and history of eye pain and blurry vision ● Assists a patient with rare disease in referring to clinical trial participation
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Case-based discussion ● Case conferences assessment ● Direct observation ● In-training examination ● Medical record (chart) review
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. ● Kidney Disease Improving Global Outcomes. “CKD Evaluation and Management.” https://kdigo.org/guidelines/ckd-evaluation-and-management/. Accessed 2019. ● National Kidney Foundation. “NKF KDOQI Clinical Practice Guidelines.” https://www.kidney.org/professionals/guidelines. Accessed 2021.

Patient Care 5: Transplant

Overall Intent: To manage care of the transplant patient from pre-transplant assessment, routine monitoring after transplant, and complications including rejection and allograft failure

Milestones	Examples
<p>Level 1 <i>Discusses indications and contraindications for kidney transplantation</i></p> <p><i>Lists induction and maintenance immunosuppressive and prophylaxis therapies</i></p> <p><i>Recognizes the potential complications in the immediate and late post- transplant period</i></p>	<ul style="list-style-type: none"> ● Identifies patient size as a potential limitation to transplantation such as an 8 kg child with dysplasia on peritoneal dialysis (PD) ● States mechanism of action of agents used for induction therapy in a nine-year-old male with focal segmental glomerulosclerosis (FSGS) ● Identifies steroid-free immunosuppression in a 15-year-old female with reflux nephropathy ● Identifies graft thrombosis as a potential etiology of primary graft nonfunction in the immediate post-operative kidney transplant setting
<p>Level 2 <i>Identifies patients eligible for kidney transplantation referral</i></p> <p><i>Discusses the principles of routine post-transplant clinical management</i></p> <p><i>Generates a differential diagnosis for common complications and proposes an initial management plan</i></p>	<ul style="list-style-type: none"> ● Refers a Wilms tumor patient for transplant two years following treatment of oncologic disease once eGFR is steadily at/below 60mL/min/1.73m² ● Recognizes higher blood pressure goals in the immediate post-transplant period to help with graft perfusion ● Identifies elevated creatinine in a patient with suspected non-adherence as a presentation of acute rejection
<p>Level 3 <i>Evaluates patients for kidney transplantation, with guidance</i></p> <p><i>Manages transplant recipients, with guidance</i></p>	<ul style="list-style-type: none"> ● Determines patient with systemic lupus erythematosus (SLE) has disease quiescence for six to 12 months and has clearance from relevant subspecialties to proceed with transplant ● Recognizes that voiding dysfunction can impact allograft function and post-transplant urinary tract infection (UTI) risk and obtains urology clearance ● Orders timeline-specific testing in an allograft recipient including chemistries, drug levels, and donor-specific antibodies, and counsels about routine health care maintenance, including use of sunscreen ● Orders and reviews infectious screening lab testing and monitors prophylactic antibiotic/antiviral treatments ● Identifies the targeted goals for therapeutic tacrolimus or cyclosporin levels ● Manages tacrolimus level by adjusting dose to achieve targeted goals

<p><i>Generates a comprehensive differential diagnosis for uncommon complications and implements a management plan</i></p>	<ul style="list-style-type: none"> ● Recognizes gastrointestinal complications of mycophenolate and adjusts dose of the medication ● Suspects graft thrombosis or adenovirus infection in a recent kidney transplant recipient with tenderness over the allograft and gross hematuria, and orders an allograft ultrasound, urinalysis and culture, donor-specific antibodies, and biopsy when culture is negative ● Recognizes histoplasmosis in the differential diagnosis of a transplant recipient with fever and cough with recent travel
<p>Level 4 <i>Independently evaluates patients for kidney transplantation as part of the multidisciplinary team</i></p> <p><i>Independently manages transplant recipients</i></p> <p><i>Independently diagnoses, works up, and manages complications</i></p>	<ul style="list-style-type: none"> ● Evaluates an adolescent patient for repeat transplant who had allograft failure secondary to non-adherence, in collaboration with transplant psychology, social work, pharmacy and other multidisciplinary team members ● Initiates and discontinues immunoprophylaxis as indicated ● Provides vaccine-related recommendations ● Monitors donor-specific antibodies in patients at increased risk of antibody-mediated rejection ● Recognizes the differential diagnosis of opportunistic infections, malignancy, and microangiopathy in the above patient, and orders hemolysis labs, infectious work-up, and drug levels, and schedules a kidney biopsy ● Tapers immunosuppressive medications and transitions to dialysis in a patient with severe fibrosis on allograft biopsy ● Orders kidney biopsy in patient with de novo donor-specific antibody formation
<p>Level 5 <i>Manages a kidney transplant and leads a multidisciplinary team</i></p> <p><i>Manages transplant patient care protocols for the institution</i></p>	<ul style="list-style-type: none"> ● Creates a process improvement to address the lack of transplant referrals from a chronic kidney disease clinic and creates an educational module to increase referrals ● Encourages and offers screening of patient’s family and friends as potential live donors ● Suggests alternate immunosuppression and options for clinical trial participation in a patient with post-transplant lymphoproliferative disorder
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Case-based discussion ● Case conferences assessment ● Direct observation ● In-training examination ● Medical record (chart) review ● Morbidity and mortality conference presentation assessment
<p>Curriculum Mapping</p>	

Notes or Resources	<ul style="list-style-type: none">● ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021.● Kidney Disease: Improving Global Outcomes (KDIGO) Transplant Work Group. 2009. “KDIGO Clinical Practice Guideline for the Care of Kidney Transplant Recipients.” <i>American Journal of Transplantation</i> 9(Supp3): S1–S155. https://doi.org/10.1111/j.1600-6143.2009.02834.x.
--------------------	--

Patient Care 6: Fluid, Electrolytes, and Acid-Base Disorders Overall Intent: To identify, diagnose, and manage fluid and electrolyte disorders	
Milestones	Examples
Level 1 <i>Creates a differential diagnosis and initial diagnostic plan</i>	<ul style="list-style-type: none"> ● For the differential of a 16-year-old female presenting with hyponatremia to 125 mEq/L, includes syndromes of inappropriate antidiuretic hormone secretion (SIADH) and water intoxication, and recommends checking serum and urine osmolality and urine electrolytes/creatinine, and instituting a fluid restriction
Level 2 <i>Develops a comprehensive differential diagnosis, recommends initial diagnostic testing, and identifies patients who require urgent treatment</i>	<ul style="list-style-type: none"> ● For a three-year-old male presenting with decreased urine output and potassium of 8 mEq/L, recommends an electrocardiogram (EKG), intravenous calcium gluconate, and rapid-acting potassium-lowering therapies, and recognizes the need for possible dialysis
Level 3 <i>Develops a prioritized differential diagnosis, interprets diagnostic test results, and implements a comprehensive management plan, with guidance</i>	<ul style="list-style-type: none"> ● For a five-year-old male presenting for medical evaluation of hypokalemia and hypomagnesemia, after a comprehensive medication review, considers genetic causes including Gitelman syndrome, follows the patient in clinic, and adjusts doses of supplements over the ensuing months
Level 4 <i>Independently formulates a differential diagnosis, including common and uncommon causes, and adjusts management plan based on patient response</i>	<ul style="list-style-type: none"> ● For an eight-year-old female presenting with fluid overload, decreased urine output, severe anemia (Hgb 6.5 g/dL), thrombocytopenia, creatinine of 4.5 mg/dL, and hyperkalemia (K 6mmol/L), considers a broad differential including atypical hemolytic uremic syndrome (HUS) in diagnosis, orders appropriate diagnostic evaluation, recognizes the need for intensive care unit (ICU) admission, close monitoring, urgent medical management of hyperkalemia, and close electrolyte monitoring during blood transfusion
Level 5 <i>Independently and effectively manages unusual, rare, or complex fluid and/or electrolyte disorder(s)</i>	<ul style="list-style-type: none"> ● Recognizes the need to measure 1,25-dihydroxyvitamin D and (if available) fibroblast growth factor 23 (FGF-23) in a two-year-old female with hypophosphatemia, hypercalciuria, and multiple fractures due to severe rickets ● Crafts a comprehensive fluid electrolyte and nutrition plan for a five-month-old infant with severe failure to thrive (fltering growth) and hypernatremia (serum sodium 170 mEq/L) and AKI (creatinine 1.7 mg/dL) due to nephrogenic diabetes insipidus
Assessment Models or Tools	<ul style="list-style-type: none"> ● Case-based discussion ● Case conferences assessment ● Direct observation ● In-training examination ● Medical record (chart) review
Curriculum Mapping	

Notes or Resources	<ul style="list-style-type: none">● ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021.● Feld, L.G., D.R. Neuspiel, B.A. Foster, M.G. Leu, M.D. Garber, K. Austin, R.K. Basu, E.E. Conway Jr., J.J. Fehr, et al. 2018. “Clinical Practice Guideline: Maintenance Intravenous Fluids in Children.” <i>Pediatrics</i> 142(6): e20183083. doi: 10.1542/peds.2018-3083. PMID: 30478247.
--------------------	---

Patient Care 7: Hypertension	
Overall Intent: To identify, diagnose, and treat hypertensive disorders	
Milestones	Examples
Level 1 <i>Identifies patients with hypertension</i>	<ul style="list-style-type: none"> • Correctly measures blood pressure by using instruments appropriately and placing correctly sized cuff in correct position • Interprets automated results of blood pressure and uses blood pressure tables appropriately • After being consulted for hypertension in a six-month-old admitted for respiratory distress, determines that the patient’s blood pressures were being measured on the leg; the patient has normal blood pressure when taken in the upper extremity
Level 2 <i>Develops a differential diagnosis of hypertension and proposes an initial diagnostic and management plan</i>	<ul style="list-style-type: none"> • When a five-year-old girl is referred for blood pressure of 124 mm Hg systolic, considers if the patient has risk factors for secondary hypertension; assesses for evidence of end organ dysfunction • Recognizes the role of ambulatory blood pressure monitoring (ABPM) in the evaluation of hypertension and appropriately orders ABPM in patients with high blood pressure in clinic • When an obese 15-year-old teenage male is referred to nephrology clinic with more than three accurately measured blood pressures in the outpatient setting above 135 mm Hg, appropriately orders additional tests and initiates treatment as indicated according to treatment guidelines
Level 3 <i>Formulates a diagnostic strategy, interprets the results of specialized testing, and adjusts management plan based on results and patient comorbidities, with guidance</i>	<ul style="list-style-type: none"> • Accurately interprets an ABPM and recommends treatment based on guidelines • Coordinates workup for a nine-year-old with secondary hypertension due to parenchymal renal disease due to reflux nephropathy, including imaging and appropriate interpretation of all laboratory results; chooses correct class of antihypertensives and counsels patient’s family about potential adverse effects
Level 4 <i>Independently develops and implements a management plan for patients with hypertension, and adjusts therapy based on patient acuity and complexity</i>	<ul style="list-style-type: none"> • Manages a hypertensive emergency from clinic through hospital admission and coordinates diagnostic work up and treatment plan • Manages a 12-year-old female patient with newly diagnosed lupus nephritis with acute kidney injury and fluid overload, and titrates antihypertensives as patient undergoes induction therapy
Level 5 <i>Independently and effectively manages unusual, rare, or complex presentations of hypertension</i>	<ul style="list-style-type: none"> • Is confident at diagnosing rare monogenic forms of hypertension, such as Liddle’s, Gordon’s, or glucocorticoid-remediable aldosteronism (GRA) • Takes a leadership role in a hypertension clinic • Works with an interdisciplinary management team to care for patients with renovascular hypertension
Assessment Models or Tools	<ul style="list-style-type: none"> • Case-based discussion • Case conferences assessment

	<ul style="list-style-type: none"> ● Direct observation ● In-training examination ● Medical record (chart) review
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. ● Flynn, Joseph T., Elaine M. Urbina, Tammy M. Brady, Carissa Baker-Smith, Stephen R. Daniels, Laura L. Hayman, Mark Mitsnefes, et al. 2022. “Ambulatory Blood Pressure Monitoring in Children and Adolescents: 2022 Update: A Scientific Statement from the American Heart Association.” <i>Hypertension</i>. 79: e114–e124. https://doi.org/10.1161/HYP.000000000000215. ● KDIGO. 2012. “KDIGO Clinical Practice Guideline for the Management of Blood Pressure in Chronic Kidney Disease.” <i>Kidney International Supplements</i>. https://kdigo.org/wp-content/uploads/2016/10/KDIGO-2012-Blood-Pressure-Guideline-English.pdf. ● Ostrowska, Alexadra, and Piotr Skrzypczyk. 2022. “Monogenic Hypertension.” <i>Polski Merkurusz Lekarski: Organ Polskiego Towarzystwa Lekarskiego</i>. 50(297): 198–201 http://pml.medpress.com.pl/ePUBLI/free/PML297-198.pdf.

Patient Care 8: Glomerular Disease	
Overall Intent: To identify, diagnose, and treat glomerular disorders	
Milestones	Examples
Level 1 <i>Identifies patients with glomerular disease and distinguishes between patients with nephritis and nephrotic syndromes</i>	<ul style="list-style-type: none"> ● Recognizes clinical presentation and laboratory findings associated with glomerulonephritis ● Correctly determines that a four-year-old patient with eyelid swelling and dipstick proteinuria requires a urine protein-creatinine ratio
Level 2 <i>Develops a differential diagnosis of glomerular disease and proposes an initial diagnostic and management plan</i>	<ul style="list-style-type: none"> ● Appropriately orders initial laboratory work up for common causes of glomerular diseases for an eight-year-old boy who presents with gross hematuria and proteinuria, including measurements of kidney function, complements, antinuclear antibody (ANA), and hepatitis profiles ● Recognizes need for genetic testing in a six-year-old with steroid resistant nephrotic syndrome, and appropriately considers secondary treatments such as rituximab or tacrolimus
Level 3 <i>Formulates a diagnostic strategy, interprets the results of specialized testing (including biopsy), and adjusts management plan based on results, with guidance</i>	<ul style="list-style-type: none"> ● After a 12-year-old female presents with clinical and laboratory findings consistent with rapidly progressive glomerular nephritis (RPGN), appropriately sends additional laboratory workup and recognizes urgency for kidney biopsy to help guide treatment ● While caring for an 18-year-old female patient with newly diagnosed SLE and lupus nephritis, under guidance of the attending, schedules kidney biopsy when patient’s hypertension is better controlled
Level 4 <i>Independently develops and implements a management plan for patients with glomerular diseases, and adjusts therapy based on patient acuity and complexity</i>	<ul style="list-style-type: none"> ● When a 16-year-old female with newly diagnosed microscopic polyangiitis (MPA) has completed induction therapy with glucocorticoids and rituximab but has ongoing systemic inflammation and active nephritis, recognizes need for additional induction therapy with cyclophosphamide ● Discusses next steps in management and likely long-term outcomes with the family of a child with new diagnosis of congenital nephrotic syndrome ● Interprets kidney biopsy results for a lupus nephritis patient and is aware of treatment recommendations based on classification
Level 5 <i>Independently and effectively manages unusual, rare, or complex presentations of glomerular diseases</i>	<ul style="list-style-type: none"> ● When an 18-year-old female with CAKUT and known CKD presents with acute kidney injury and serum and urine labs consistent with glomerulonephritis, and biopsy and additional serum labs suggest C3 GN, appropriately performs additional genetic testing and workup for secondary causes; recognizes the indication for using terminal complement inhibitors
Assessment Models or Tools	<ul style="list-style-type: none"> ● Case-based discussion ● Case conferences assessment ● Direct observation

	<ul style="list-style-type: none"> ● In-training examination ● Medical record (chart) review ● Multisource feedback
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. ● KDIGO. 2021. “KDIGO 2021 Clinical Practice Guideline for the Management of Glomerular Diseases.” <i>Kidney International Supplements</i>. https://kdigo.org/wp-content/uploads/2017/02/KDIGO-Glomerular-Diseases-Guideline-2021-English.pdf. ● Morishita, Kimberly A., Linda Wagner-Weiner, Eric Y. Yen, Vidya Sivaraman, Karen E. James, Dana Gerstbacher, Ann M. Szymanski, Kathleen M. O’Neil, David A. Cabral, Childhood Arthritis and Rheumatology Research Alliance (CARRA) Antineutrophil Cytoplasmic Antibody-Associated Vasculitis Workgroup. “Consensus Treatment Plans for Severe Pediatric Antineutrophil Cytoplasmic Antibody-Associated Vasculitis.” <i>Arthritis Care and Research</i>. 09;74(9): 1550-1558. https://onlinelibrary.wiley.com/doi/full/10.1002/acr.24590.

Patient Care 9: Competence in Procedures	
Overall Intent: To perform required procedures and manage any related complications	
Milestones	Examples
<p>Level 1 <i>Discusses the indications for and assists with all procedures</i></p> <p><i>Discusses potential procedural complications</i></p>	<ul style="list-style-type: none"> ● Identifies need for and assists in the performance of kidney biopsy in a seven-year-old boy presenting with microscopic hematuria, nephrotic-range proteinuria, and worsening kidney function ● Obtains appropriate informed consent from the parents, discussing risks of bleeding and other complications
<p>Level 2 <i>Performs procedures, with direct supervision</i></p> <p><i>Recognizes complications of procedures and enlists help</i></p>	<ul style="list-style-type: none"> ● Performs localization by ultrasound and other key portions of the biopsy procedure under immediate supervision ● Initiates acute dialysis and writes appropriate orders for a six-year-old with fluid overload from sepsis-related AKI after discussing with attending ● Requests urgent imaging, hemoglobin level, and frequent vital signs for a patient with post-biopsy pain and hypotension
<p>Level 3 <i>Competently performs procedures, with indirect supervision</i></p> <p><i>Manages complications of procedures, with supervision</i></p>	<ul style="list-style-type: none"> ● Properly sets up the sterile field and successfully biopsies a native kidney using ultrasound guidance ● Writes initial hemodialysis orders for an eight-year-old boy who initiates chronic dialysis for CAKUT-related ESKD ● Requests chest x-ray and consults thoracic surgery for a patient who develops acute shortness of breath after hemodialysis catheter placement
<p>Level 4 <i>Proficiently and independently performs procedures</i></p> <p><i>Anticipates and independently manages complications of procedures</i></p>	<ul style="list-style-type: none"> ● Serves as the primary operator for localization and performance of kidney biopsy with faculty members only observing ● Writes all continuous kidney replacement therapy orders, including appropriate adjustments for clearance, electrolytes, and ultrafiltration goals in a three-week-old infant on extracorporeal membrane oxygenation (ECMO) following cardiac surgery ● Identifies an expanding hematoma immediately after biopsy and recommends additional ultrasonographic evaluation, monitoring, and other imaging as necessary ● Identifies and manages anticoagulant and antiplatelet use, severe hypertension, and thin renal cortex as risk factors for biopsy complications
<p>Level 5 <i>Serves as an educational resource for procedures and their complications</i></p>	<ul style="list-style-type: none"> ● Assists other learners in planning and performing a biopsy

	<ul style="list-style-type: none"> ● Manages an entire shift of dialysis patients, including presentations at patient care conference and coordinating access monitoring and quality assurance performance improvement meetings
Assessment Models or Tools	<ul style="list-style-type: none"> ● Case-based discussion ● Case conferences assessment ● Checklist review ● Direct observation ● In-training examination ● Medical record (chart) review ● Simulation
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. ● Clark, Edward G., and Jeffrey H. Barsuk Jeffrey. 2014. “Temporary Hemodialysis Catheters: Recent Advances.” <i>Kidney International</i>. 86(5): 888-895. doi: 10.1038/ki.2014.162. ● Hogan, Jonathon J., Michaela Mocanu, and Jeffrey S. Berns. 2016. “The Native Kidney Biopsy: Update and Evidence for Best Practice.” <i>Clinical Journal of the American Society of Nephrology</i>. 11(2): 354-62. doi: 10.2215/CJN.05750515. ● Luciano, Randy L., and Gilbert W. Moeckel. 2019. “Update on the Native Kidney Biopsy: Core Curriculum 2019.” <i>American Journal of Kidney Disease</i>. 73(3): 404-415. https://doi.org/10.1053/j.ajkd.2018.10.011.

Medical Knowledge 1: Clinical Reasoning	
Overall Intent: To consistently develop a complete and prioritized differential diagnosis while minimizing the impact of cognitive errors	
Milestones	Examples
<p>Level 1 <i>Organizes and accurately summarizes information obtained from the patient evaluation to develop a clinical impression</i></p>	<ul style="list-style-type: none"> ● After evaluating a patient, states that the six-year-old boy who was seen for allergies by his primary medical doctor two weeks earlier is now presenting with progressive swelling including his eyes, abdomen, and lower extremities
<p>Level 2 <i>Integrates information from all sources to develop a basic differential diagnosis for common patient presentations</i></p> <p><i>Identifies clinical reasoning errors within patient care, with guidance</i></p>	<ul style="list-style-type: none"> ● Uses patient history, physical exam findings, laboratory data, and prior medical records to develop a differential diagnosis of glomerulonephritis in a 12-year-old girl with hypertension, gross hematuria, and nephrotic-range proteinuria ● In discussion with senior physician, identifies lack of awareness of characteristics of the disease as the reason for excluding systemic lupus erythematosus from differential diagnosis of hematuria in a young woman with a malar rash ● In discussion with clinic attending, recognizes own implicit bias as a reason for not identifying thyroid disease as the diagnosis in a Black teenage girl presenting in hypertension clinic with complaints of weight gain and fatigue
<p>Level 3 <i>Develops a thorough and prioritized differential diagnosis for common patient presentations</i></p> <p><i>Retrospectively applies clinical reasoning principles to identify errors</i></p>	<ul style="list-style-type: none"> ● For a two-year-old girl presenting to the emergency room with complaints of anasarca, discusses the differential diagnosis of infantile nephrotic syndrome versus minimal change disease and identifies the genetic mutations associated with possible causes of nephrotic syndrome in a young child ● During a team discussion of a patient with renal artery stenosis, recognizes that accurate diagnosis was delayed due to anchoring on a presumptive diagnosis of pheochromocytoma due to a recent case with a similar presentation ● After expression of frustration with a patient for “non-compliance” with diet and exercise recommendations, asks patient about access to food and safe and accessible areas for exercise
<p>Level 4 <i>Synthesizes subtle, unusual, or conflicting findings to prioritize differential diagnoses in complex patient presentations</i></p> <p><i>Continually re-appraises one’s own clinical reasoning to improve patient care in real time</i></p>	<ul style="list-style-type: none"> ● For a two-year-old girl presenting with severe proteinuria due to relapse of nephrotic syndrome, identifies subtle persistent tachypnea on exam and considers complications of nephrotic syndrome such as pulmonary embolism; reviews the EHR and notes that this exam finding was present on two recent admissions but was attributed to fluid overload ● When a patient’s weight percentile continues to rise despite appropriate lifestyle counseling, asks patient and family about access to food and safe and accessible areas for exercise

	<ul style="list-style-type: none"> • When a patient with systemic lupus erythematosus and end stage kidney disease has a pericardial effusion that fails to improve with aggressive dialysis, reconsiders uremia as the etiology and consults rheumatology for potential steroid therapy for serositis
<p>Level 5 Coaches others to develop prioritized differential diagnoses in complex patient presentations</p> <p><i>Models how to recognize errors and reflect upon one’s own clinical reasoning</i></p>	<ul style="list-style-type: none"> • Teaches a PGY-1 to identify subtle medical signs or symptoms in order to hone differential diagnosis in an ICU patient with dysnatremia • For the two-year-old girl with nephrotic syndrome and tachypnea, articulates that the diagnosis of pulmonary embolism was delayed due to anchoring on the diagnosis of the admitting team and discusses how to change the evaluation in future transitions of care
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Chart-stimulated recall • Direct observation • Medical record (chart) audit • Multisource feedback • Reflection • Simulation • Evaluation of formal case presentations incorporating explicit discussion of clinical reasoning (case conferences, morbidity and mortality (M and M) conferences, etc.)
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. • American College of Physicians (ACP). “Getting it Right: Cases to Improve Diagnosis.” https://www.acponline.org/cme-moc/online-learning-center/getting-it-right-cases-to-improve-diagnosis. Accessed 2020. • ACP. “Teaching Clinical Reasoning.” https://store.acponline.org/ebiz/products-services/product-details/productid/21910?productId=21910. Accessed 2020. • Bowen, Judith L. 2006. “Educational Strategies to Promote Clinical Diagnostic Reasoning.” <i>NEJM</i> 355: 2217-2225. https://www.nejm.org/doi/full/10.1056/NEJMra054782. • Charlin, Bernard, Jacques Tardif, Henny P. Boshuizen. 2000. “Scripts and Medical Diagnostic Knowledge. Theory and Applications for Clinical Reasoning Instruction and Research.” <i>Academic Medicine</i> 75(2): 182-190. https://www.ncbi.nlm.nih.gov/pubmed/10693854. • Croskerry, Pat. 2009. “A Universal Model of Diagnostic Reasoning.” <i>Academic Medicine</i> 84(8): 1022-1028. 10.1097/ACM.0b013e3181ace703. • DocNomo phone app: https://apps.apple.com/us/app/docnomo/id901279945.

- Graber, Mark L., Nancy Franklin, and Ruthanna Gordon. 2005. "Diagnostic Error in Internal Medicine." *Archives of Internal Medicine*. 165(13): 1493-1499. doi:10.1001/archinte.165.13.1493.
- Mamede, Silvia, Henk G. Schmidt, and Júlio César Penaforte. 2008. "Effects of Reflective Practice on the Accuracy of Medical Diagnosis." *Medical Education* 42(5): 468-475. doi:10.1111/j.1365-2923.2008.03030.x.
- Norman, Geoffrey R., Sandra D. Monteiro, Jonathon Sherbino, Jonathon Seth Ilgen, Henk G. Schmidt, and Silvia Mamede. 2016. "The Causes of Errors in Clinical Reasoning: Cognitive Biases, Knowledge Deficits, and Dual Process Thinking." *Academic Medicine*. 92(1): 23-30. doi: 10.1097/ACM.0000000000001421.
- Society to Improve Diagnosis in Medicine. <https://www.improvediagnosis.org/>. Accessed 2020.

Medical Knowledge 2: Physiology and Pathophysiology	
Overall Intent: To demonstrate advanced knowledge of physiology, pathophysiology, and the basic sciences through integration with diagnosis and management	
Milestones	Examples
Level 1 <i>Identifies key physiological and pathophysiological concepts</i>	<ul style="list-style-type: none"> ● Explains normal kidney handling of sodium and identifies major pathophysiologic changes that occur in patients with ascites and edema ● Demonstrates a basic understanding of normal newborn renal function and maturation
Level 2 <i>Demonstrates knowledge of more complex physiology and pathophysiology</i>	<ul style="list-style-type: none"> ● Explains normal kidney water handling and identifies changes that occur in patients with hyponatremia ● Enumerates the hormonal regulation of phosphate metabolism
Level 3 <i>Applies knowledge of physiology and pathophysiology to diagnosis and management of routinely encountered conditions and presentations</i>	<ul style="list-style-type: none"> ● Uses electrolyte-free water clearance to develop a differential diagnosis and treatment plan for a patient with hyponatremia ● Understands the renin angiotensin system and mechanism of action of various antihypertensive medications
Level 4 <i>Integrates knowledge of physiology and pathophysiology with diagnosis and management of more complex conditions and presentation</i>	<ul style="list-style-type: none"> ● Synthesizes the pathophysiology of apparent mineralocorticoid excess syndromes and uses this knowledge to order additional diagnostic studies and choose therapy ● Synthesizes knowledge of basic immunology to determine choice of rejection treatment between patients with acute cellular and antibody mediated rejection
Level 5 <i>Synthesizes newly described and emerging clinical physiology and pathophysiology concepts with diagnosis and management</i>	<ul style="list-style-type: none"> ● Helps to identify and recognize implications of complement system abnormalities in a patient with C3 glomerulopathy and atypical HUS ● Uses off-label medications or clinical trials for rare diseases ● Collaborates with or participates in multicenter trials
Assessment Models or Tools	<ul style="list-style-type: none"> ● Chart-stimulated recall ● Direct observation ● In-training exam ● Medical record (chart) audit ● Reflection ● Simulation
Curriculum Mapping	
Notes or Resources	<ul style="list-style-type: none"> ● ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. ● American Journal of Kidney Diseases. “Core Curriculum in Nephrology.” https://www.ajkd.org/content/corecurriculum. Accessed 2019. ● Zeidel, Mark L., Melanie P. Hoenig, Paul M. Palevsky. 2014 “A New CJASN Series: Renal Physiology for the Clinician.” <i>Clinical Journal for the American Society of Nephrology</i> 9(7)1271. https://doi.org/10.2215/CJN.10191012.

Systems-Based Practice 1: Patient Safety	
Overall Intent: To engage in the analysis and management of patient safety events, including relevant communication with patients, patients’ families, and health care professionals	
Milestones	Examples
<p>Level 1 <i>Demonstrates knowledge of common patient safety events</i></p> <p><i>Demonstrates knowledge of how to report patient safety events</i></p>	<ul style="list-style-type: none"> ● Lists common patient safety events such as patient misidentification or medication errors ● Identifies need to adjust medication dose based on glomerular filtration rate ● Lists “patient safety reporting system” or “patient safety hotline” as ways to report safety events
<p>Level 2 <i>Identifies system factors that lead to patient safety events</i></p> <p><i>Reports patient safety events through institutional reporting systems (simulated or actual)</i></p>	<ul style="list-style-type: none"> ● Identifies that EHR default timing of orders as “routine” (without changing to “stat”) may lead to delays in medication administration ● Uses the EHR order sets to ensure proper dosing and timing of medication ● Reports delayed treatment administration using the appropriate reporting mechanism
<p>Level 3 <i>Participates in analysis of patient safety events (simulated or actual)</i></p> <p><i>Participates in disclosure of patient safety events to patients and families (simulated or actual)</i></p>	<ul style="list-style-type: none"> ● Participates in department morbidity and mortality presentations ● Participates in root cause analyses (mock or actual) ● Participates in a quality improvement project aimed at reducing racial disparities ● With the support of an attending or risk management team member, participates in the disclosure of a medication order error to a patient’s family
<p>Level 4 <i>Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual)</i></p> <p><i>Discloses patient safety events to patients and families (simulated or actual)</i></p>	<ul style="list-style-type: none"> ● Leads a simulated or actual root cause analysis related to a peritonitis episode in a chronic dialysis patient; develops action plan that includes prevention checklists, re-education of the patient’s caregivers, and timely reporting of exit site infections and touch contaminations ● Following consultation with risk management and other team members, independently discloses a medication error to a patient’s family
<p>Level 5 <i>Actively engages teams and processes to modify systems to prevent patient safety events</i></p> <p><i>Role models or mentors others in the disclosure of patient safety events</i></p>	<ul style="list-style-type: none"> ● Leads a multidisciplinary team to work on improved medication reconciliation processes to prevent discharge medication errors and considers biases among team members ● Leads a team to revise the treatment order sets in the EHR ● Conducts a simulation demonstrating techniques and approaches for disclosing patient safety events

	<ul style="list-style-type: none"> • Teaches a course during PGY-1 bootcamp about the resident’s role in disclosure of patient safety events
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Case-based discussion • Direct observation • E-module multiple choice tests • Guided reflection • Medical record (chart) audit • Multisource feedback • Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. • Guralnick, Susan, Stephen Ludwig, and Robert Englander. 2014. “Domain of Competence: Systems-Based Practice.” <i>Academic Pediatrics</i>. 14(2 Suppl): S70-S79. https://doi.org/10.1016/j.acap.2013.11.015. • Institute for Healthcare Improvement. http://www.ihl.org/Pages/default.aspx. Accessed 2020. • Singh, Ranjit, Bruce Naughton, John S. Taylor, Marlon R. Koenigsberg, Diana R. Anderson, Linda L. McCausland, Robert G. Wahler, Amanda Robinson, and Gurdev Singh. 2005. “A Comprehensive Collaborative Patient Safety Residency Curriculum to Address the ACGME Core Competencies.” <i>Medical Education</i> 39(12): 1195-204. DOI: 10.1111/j.1365-2929.2005.02333.x.

Systems-Based Practice 2: Quality Improvement	
Overall Intent: To understand and implement quality improvement methodologies to improve patient care	
Milestones	Examples
Level 1 <i>Demonstrates knowledge of basic quality improvement methodologies and metrics</i>	<ul style="list-style-type: none"> ● Describes fishbone diagram ● Describes components of a “Plan-Do-Study-Act” cycle
Level 2 <i>Describes local quality improvement initiatives (e.g., community vaccination rate, infection rate, smoking cessation)</i>	<ul style="list-style-type: none"> ● Describes clinic initiatives to improve administration rates of pneumococcal vaccines to patients with nephrotic syndrome ● Describes an initiative in the continuity clinic to improve influenza vaccination rates in the children seen in that clinic
Level 3 <i>Participates in local quality improvement initiatives</i>	<ul style="list-style-type: none"> ● Participates in an ongoing interdisciplinary project to improve medication reconciliation ● Collaborates on a project to improve discharge efficiency
Level 4 <i>Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project</i>	<ul style="list-style-type: none"> ● Develops and implements a quality improvement project to improve pneumococcal vaccination rates within a practice site that includes engaging the office team, assessing the problem, articulating a broad goal, developing a SMART (Specific, Measurable, Attainable, Realistic, Time-bound) aim, collecting data, analyzing, and monitoring progress and challenges ● In developing a quality improvement project, considers team bias and social determinants of health in patient population
Level 5 <i>Creates, implements, and assesses quality improvement initiatives at the institutional or community level</i>	<ul style="list-style-type: none"> ● Initiates and completes a quality improvement project to improve county pneumococcal vaccination rates in collaboration with the county health department and shares results through a formal presentation to the community leaders ● Looks for opportunities to improve clinic vaccination rates across a health care system ● Consistently engages in quality improvement around improving clinic vaccination rates
Assessment Models or Tools	<ul style="list-style-type: none"> ● Direct observation ● E-module multiple choice test ● Portfolio ● Poster or other presentation assessment ● Quality improvement project review ● Team evaluations
Curriculum Mapping	<ul style="list-style-type: none"> ●

Notes or Resources

- ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” <https://www.abp.org/content/entrustable-professional-activities-subspecialties>. Accessed 2021.
- Bright Futures. “QI Office System Tools.” <https://www.aap.org/en/practice-management/bright-futures/bright-futures-quality-improvement/qi-office-system-tools/>. Accessed 2022.
- Guralnick, Susan, Stephen Ludwig, and Robert Englander. 2014. “Domain of Competence: Systems-Based Practice.” *Academic Pediatrics*. 14(2 Suppl): S70-S79. <https://doi.org/10.1016/j.acap.2013.11.015>.
- Institute for Healthcare Improvement. <http://www.ihp.org/Pages/default.aspx>. Accessed 2020.
- Murtagh Kurowski, Eileen, Amanda C. Schondelmeyer, Courtney Brown, Christopher E. Dandoy, Samuel J. Hanke, and Heather L. Tubbs Cooley. 2015. “A Practical Guide to Conducting Quality Improvement in the Health Care Setting.” *Current Treatment Options in Pediatrics*. 1:380-392. <https://doi.org/10.1007/s40746-015-0027-3>.

Systems-Based Practice 3: System Navigation for Patient-Centered Care – Coordination of Care	
Overall Intent: To effectively navigate the health care system, including the interdisciplinary team and other care providers; to adapt care to a specific patient population to ensure high-quality patient outcomes	
Milestones	Examples
Level 1 <i>Lists the various interprofessional individuals involved in the patient’s care coordination</i>	<ul style="list-style-type: none"> ● For a patient with posterior urethral valves, identifies the team members and roles as part of the team, including pediatric urologists, clinic nurses, and social workers ● Identifies important members of the medical home team for a complex care patient in the continuity clinic ● Recognizes implicit bias as a contributor to health care disparities ● Identifies access to care and insurance coverage as social determinants of health
Level 2 <i>Coordinates care of patients in routine clinical situations, incorporating interprofessional teams with consideration of patient and family needs</i>	<ul style="list-style-type: none"> ● After valve ablation for a patient with a new diagnosis of posterior urethral valves, coordinates care with the urology and nephrology clinics at the time of discharge from the hospital ● Coordinates home health and subspecialty care for a child with a gastrostomy tube being seen in the continuity clinic
Level 3 <i>Coordinates care of patients in complex clinical situations, effectively utilizing the roles of interprofessional teams, and incorporating patient and family needs and goals</i>	<ul style="list-style-type: none"> ● Works with the social worker to coordinate outpatient care and ensure appropriate nephrology clinic follow-up for a patient with posterior urethral valves and chronic kidney disease stage 3 who resides in a rural area with limited family transportation options ● Refers patients to a local pharmacy that offers a sliding fee scale and provides pharmacy coupons for patients in need ● Recognizes that marginalized communities may have additional barriers to access and the need to involve a social worker or case manager in finding community resources
Level 4 <i>Coordinates interprofessional, patient-centered care among different disciplines and specialties, actively assisting families in navigating the health-care system</i>	<ul style="list-style-type: none"> ● During inpatient rotations, leads team members in approaching consultants to review cases/recommendations and arranges radiology rounds for the team ● Advocates for and coordinates rescheduling a patient who was “fired” from a subspecialty clinic for missing appointments due to underlying socioeconomic issues ● Recognizes the need for and coordinates a multidisciplinary team/family meeting to include appropriate subspecialists, physical therapist/occupational therapist, nutrition, child life, mental health resources, chaplain services, ethics specialist, etc.
Level 5 <i>Coaches others in interprofessional, patient-centered care coordination</i>	<ul style="list-style-type: none"> ● Leads an initiative to educate residents about home health services or medical home model for medically complex children, ensuring inclusion of discussion on health care disparities ● Coaches and mentors colleagues through a multidisciplinary team meeting of a child with complex health care needs
Assessment Models or Tools	<ul style="list-style-type: none"> ● Direct observation

	<ul style="list-style-type: none"> ● Medical record (chart) audit ● Multisource feedback ● Review of discharge planning documentation
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● American Academy of Pediatrics (AAP). https://www.aap.org/en-us/Pages/Default.aspx. Accessed 2020. ● AAP. Pediatric Care Coordination Resources. https://www.aap.org/en/practice-management/care-delivery-approaches/care-coordination-resources/. Accessed 2022. ● ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. ● Skochelak, Susan E., Maya M. Hammond, Kimberly D. Lomis, Jeffrey M. Borkan, Jed. D. Gonzalo, Luan E. Lawson, and Stephanie R. Starr. 2020. AMA Education Consortium: Health Systems Science, 2nd ed. Elsevier. ● Starr, Stephanie R., Neera Agrwal, Michael J. Bryan, Yuna Buhrman, Jack Gilbert, Jill M. Huber, Andrea N. Leep Hunderfund, et al. 2017. “Science of Health Care Delivery: An Innovation in Undergraduate Medical Education to Meet Society’s Needs.” <i>Mayo Clinic Proceedings: Innovations, Quality & Outcomes</i>. 1(2): 117-129. https://www.sciencedirect.com/science/article/pii/S2542454817300395.

Systems-Based Practice 4: System Navigation for Patient-Centered Care – Transitions in Care Overall Intent: To effectively navigate the health care delivery system during transitions of care to ensure high-quality patient outcomes	
Milestones	Examples
Level 1 <i>Uses a standard template for transitions of care/hand-offs</i>	<ul style="list-style-type: none"> • When handing off to colleagues on a night shift, reads verbatim from a templated hand-off but lacks context, is not appropriately specific in next steps, and does not provide contingency plans • During transitions, includes more information than is necessary
Level 2 <i>Adapts a standard template, recognizing key elements for safe and effective transitions of care/hand-offs in routine clinical situations</i>	<ul style="list-style-type: none"> • Routinely uses a standardized hand-off for stable patients, verbalizes a basic understanding of active problems, and provides basic contingency plans • Discusses a discharge of a newly transplanted patient from the hospital with the primary nephrologist and the primary care physician and provides a problem list, clinical course, and action items to be followed up as an outpatient
Level 3 <i>Performs safe and effective transitions of care/hand-offs in complex clinical situations, and ensures closed-loop communication</i>	<ul style="list-style-type: none"> • Routinely uses a standardized hand-off when transferring a patient to the intensive care unit, with direct communication of clinical reasoning, problems warranting a higher level of care, and status of completed/planned interventions; solicits read-back and confirms/uses specific resources and timeline for transfer to occur • Performs the hand-off for a patient with new diagnosis of end stage kidney disease to the primary nephrologist and relevant multidisciplinary team; includes a succinct summary by problem or system, ensuring that follow-up dialysis session is arranged, medications are clarified, and orders/consents for outpatient therapy are in place • When transitioning to the next responsible person, provides succinct and relevant patient information
Level 4 <i>Performs and advocates for safe and effective transitions of care/hand-offs within and across health care delivery systems, including transitions to adult care</i>	<ul style="list-style-type: none"> • Prior to going on vacation, proactively seeks out colleagues in continuity clinic to follow up on test results that are still pending and expected back during that week with specific instructions and contingency plans for the follow-up visit with the patient/family • Seeks out appropriate adult general and subspecialty practitioners to facilitate the transition of a 20-year-old patient with renal transplant to adult nephrology; ensures a thorough hand-off, including the patient’s cultural preferences and social needs, to the identified new adult practitioners
Level 5 <i>Coaches others in improving transitions of care within and across health care delivery systems to optimize patient outcomes</i>	<ul style="list-style-type: none"> • Designs and implements standardized hand-off workshop exercises for medical students prior to the start of their clinical rotations • Develops and implements a process for fellowship continuity clinics to improve the transition from pediatric nephrology to adult nephrology
Assessment Models or Tools	<ul style="list-style-type: none"> • Portfolio assessment • Direct observation • Standardized hand-off assessment checklist

	<ul style="list-style-type: none"> ● Multisource feedback ● Review of sign-out tools, use and review of checklists
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. ● Got Transition. “Clinician Education and Resources.” https://www.gottransition.org/resources-and-research/clinician-education-resources.cfm. Accessed 2020. ● I-PASS. “I-PASS Materials.” https://www.ipassinstitute.com/hubfs/I-PASS-mnemonic.pdf. Accessed 2022. ● Matern, Lukas H., Jeanne M. Farnan, Kristen W. Hirsch, Melissa Cappaert, Ellen S. Byrne, and Vineet M. Arora. 2018. “A Standardized Handoff Simulation Promotes Recovery from Auditory Distractions in Resident Physicians.” <i>Simulation in Healthcare</i>. 13(4): 233-238. DOI: 10.1097/SIH.0000000000000322. ● Society for Adolescent Health and Medicine. “Transition to Adulthood for Youth with Chronic Conditions and Special Health Care Needs.” <i>Journal of Adolescent Health</i> 66(5): P631-634. https://doi.org/10.1016/j.jadohealth.2020.02.006. ● Starmer, Amy J., Nancy D. Spector, Rajendu Srivastava, Daniel C. West, Glenn Rosenbluth, April D. Allen, Elizabeth L. Noble, et al. “Changes in Medical Errors after Implementation of a Handoff Program.” <i>New England Journal of Medicine</i>. 371:1803-1812. DOI: 10.1056/NEJMsa1405556.

Systems-Based Practice 5: Population and Community Health	
Overall Intent: To promote and improve health across communities and populations through patient care and advocacy, including public education and elimination of structural racism	
Milestones	Examples
Level 1 <i>Demonstrates awareness of population and community health needs and disparities</i>	<ul style="list-style-type: none"> • Identifies social determinants of health, such as poverty and structural racism • Identifies adverse childhood experiences
Level 2 <i>Identifies specific population and community health needs and disparities; identifies local resources</i>	<ul style="list-style-type: none"> • Screens patients for adverse childhood experiences and acknowledges social determinants of health and the impact of structural racism for individual patients • Discusses health disparities and is aware of benefits available to children with ESKD via Medicare
Level 3 <i>Uses local resources effectively to meet the needs and reduce health disparities of a patient population and community</i>	<ul style="list-style-type: none"> • Consistently refers ESKD patients for renal transplantation in a timely manner • Promotes to patients the local resources and programs aimed at eliminating structural racism and improving health disparities
Level 4 <i>Adapts practice to provide for the needs of and reduce health disparities of a specific population</i>	<ul style="list-style-type: none"> • Participates in a local advocacy project to improve health care access and/or decrease practices that support structural racism • Joins a project to assess food insecurity in ESKD patients • Organizes resources for patients who screen positive for mental health concerns
Level 5 <i>Advocates at the local, regional, or national level for populations and communities with health care disparities</i>	<ul style="list-style-type: none"> • Engages in a project to open a food bank in collaboration with community partners • Partners with a community organization working to increase COVID-19 vaccination rates for ESKD or transplant patients • Participates in longitudinal discussions with local, state, or national government policy makers to eliminate structural racism, reduce health disparities, and improve access to kidney transplant
Assessment Models or Tools	<ul style="list-style-type: none"> • Analysis of process and outcomes measures based on social determinants of health and resultant disparities • Direct observation • Medical record (chart) audit • Multisource feedback • Portfolio assessment • Reflection
Curriculum Mapping	<ul style="list-style-type: none"> •
Notes or Resources	<ul style="list-style-type: none"> • AAP. Bright Futures. Promoting Lifelong Health for Families and Communities. https://downloads.aap.org/AAP/PDF/Bright%20Futures/BF4_LifelongHealth.pdf?_ga=2.268230030.1236819861.1654476607-929400881.1619626826&_gac=1.229642574.1651085941.cj0kccjw06otbhc_arisaau1yov_dcxkc8cjmzqntqqmfsj0_flej6v7e95sxi3exmdjyivnt1vv9rxoaamnzealw_wcb. Accessed 2022.

- AAP. "Advocacy." <https://services.aap.org/en/advocacy/>. Accessed 2020.
- ABP. "Entrustable Professional Activities for Subspecialties: Nephrology." <https://www.abp.org/content/entrustable-professional-activities-subspecialties>. Accessed 2021.
- Blankenburg, Rebecca, Patricia Poitevien, Javier Gonzalez del Rey, Megan Aylor, John Frohna, Heather McPhillips, Linda Waggoner-Fountain, and Laura Degnon. 2020. "Dismantling Racism: Association of Pediatric Program Directors' Commitment to Action." *Academic Pediatrics*. 20(8): 1051-1053. doi: 10.1016/j.acap.2020.08.017.
- Centers for Disease Control and Prevention. "Preventing Adverse Childhood Experiences." https://www.cdc.gov/violenceprevention/aces/fastfact.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fviolenceprevention%2Facestudy%2Ffastfact.html. Accessed 2020.
- CommonHealth ACTION. 2016. "Leveraging the Social Determinants to Build a Culture of Health." https://healthequity.globalpolicysolutions.org/wp-content/uploads/2016/12/RWJF_SDOH_Final_Report-002.pdf. Accessed 2020.
- DallaPiazza, Michelle, Mercedes Padilla-Register, Megana Dwarakanath, Elyon Obamedo, James Hill, and Maria L. Soto-Greene. 2018. "Exploring Racism and Health: An Intensive Interactive Session for Medical Students." *MedEdPORTAL*. 14:10783. https://doi.org/10.15766/mep_2374-8265.10783.
- Johnson, Tiffani J. 2020. "Intersection of Bias, Structural Racism, and Social Determinants with Health Care Inequities." *Pediatrics*. 146(2): e2020003657. <https://doi.org/10.1542/peds.2020-003657>.
- MedEdPORTAL. "Anti-Racism in Medicine Collection." <https://www.mededportal.org/anti-racism>. Accessed 2020.
- Trent, Maria, Danielle G. Dooley, Jacqueline Dougé, Section on Adolescent Health, Council on Community Pediatrics, Committee on Adolescence, Robert M. Cavanaugh, et al. 2019. "The Impact of Racism on Child and Adolescent Health." *Pediatrics*. 144(2):e20191765. <https://doi.org/10.1542/peds.2019-1765>.

Systems-Based Practice 6: Physician Role in Health Care Systems	
Overall Intent: To understand the physician’s role in health systems science to optimize patient care delivery, including cost-conscious care	
Milestones	Examples
Level 1 <i>Engages with patients and other providers in discussions about cost-conscious care and key components of the health care delivery system</i>	<ul style="list-style-type: none"> ● Articulates the impact of patients coming to continuity clinic for non-emergent acute visits instead of seeking care in the emergency department ● Considers that insurance coverage, or lack of coverage, can affect prescription drug availability/cost for individual patients ● Identifies that one’s own implicit biases contribute to disparities and less-than-optimal care
Level 2 <i>Identifies the relationships between the delivery system and cost-conscious care and the impact on the patient care</i>	<ul style="list-style-type: none"> ● Considers the patient’s prescription drug coverage when choosing an antihypertensive for a teenage with metabolic syndrome ● Ensures that a patient hospitalized with relapsed nephrotic syndrome has a scheduled follow-up appointment at discharge
Level 3 <i>Discusses the need for changes in clinical approaches based on evidence, outcomes, and cost-effectiveness to improve care for patients and families</i>	<ul style="list-style-type: none"> ● Accepts an appropriate level of uncertainty when balancing cost-conscious care (e.g., not ordering a urinalysis when it will not change management) ● Discusses risks and benefits of pursuing sedated magnetic resonance imaging (MRI) in the setting of an incidental finding of a simple renal cyst measuring <1 cm on an abdominal ultrasound in light of costs to patient’s family and health system ● Adapts plan to minimize costs and provides appropriate care for an uninsured patient ● Considers health care disparities in pursuit of evidence-based care
Level 4 <i>Advocates for the promotion of safe, quality, and high-value care</i>	<ul style="list-style-type: none"> ● Works collaboratively to identify additional services for a patient who was recently initiated on hemodialysis and is facing psychosocial barriers to adherence to medications ● Identifies the value of the Standardizing Care to Improve Outcomes in Pediatric End Stage Kidney Disease (SCOPE) collaborative and the placement of the peritoneal dialysis (PD) catheter facing downward to improve catheter function and infection prevention, discusses the implementation of the practice with all the pediatric surgeons, and implements a project to track PD placement practices
Level 5 <i>Coaches others to promote safe, quality, and high-value care across health care systems</i>	<ul style="list-style-type: none"> ● Raises awareness at a systems level to promote cost-conscious care (e.g., implementation of “Save the Vein” recommendations or development of a local evidence-based guideline) ● Leads team members in conversations around cultural and language barriers to effectively assess psychosocial barriers to medical care and creates team plans to provide comprehensive depression screening in a clinic ● Educates colleagues on chronic kidney disease awareness and organizes a day at the hospital to obtain serum creatinine levels in employees and visitors
Assessment Models or Tools	<ul style="list-style-type: none"> ● Direct observation ● Medical record (chart) audit

	<ul style="list-style-type: none"> ● Multisource feedback ● Patient satisfaction data ● Patient safety conference ● Review and guided reflection on costs accrued for individual patients or patient populations with a given diagnosis
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes and Resources	<ul style="list-style-type: none"> ● Agency for Healthcare Research and Quality (AHRQ). “Measuring the Quality of Physician Care.” https://www.ahrq.gov/talkingquality/measures/setting/physician/index.html Accessed 2022. ● AAP. Practice Management. https://www.aap.org/en/practice-management/. Accessed 2022. ● American Board of Internal Medicine. “QI/PI Activities.” https://www.abim.org/maintenance-of-certification/earning-points/qi-pi-activities.aspx. Accessed 2020. ● ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. ● American College of Physicians. “Newly Revised: Curriculum for Educators and Residents.” https://www.acponline.org/clinical-information/high-value-care/medical-educators-resources/newly-revised-curriculum-for-educators-and-residents-version-40. Accessed 2020. ● Choosing Wisely. “American Academy of Pediatrics: Ten Things Physicians and Patients Should Question.” https://www.choosingwisely.org/societies/american-academy-of-pediatrics/. Accessed 2020. ● The Commonwealth Fund. “State Health Data Center.” http://datacenter.commonwealthfund.org/?_ga=2.110888517.1505146611.1495417431-1811932185.1495417431#ind=1/sc=1. Accessed 2020. ● Crow, Byron, Sami G. Tahhan, Curtis Lacy, Jule Grzankowski, and Juan N. Lessing. 2020. “Things We Do for No Reason™: Routine Correction of Elevated INR and Thrombocytopenia Prior to Paracentesis in Patients with Cirrhosis.” <i>Journal of Hospital Medicine</i> 16(2): 102-104. https://doi.org/10.12788/jhm.3458. ● Dzau, Victor J., Mark McClellan, Sheila Burke, Molly J. Coye, Thomas A. Daschle, Angela Diaz, William H. Frist, et al. 2017. “Vital Directions for Health and Health Care: Priorities from a National Academy of Medicine Initiative.” <i>NAM Perspectives</i>. Discussion Paper, National Academy of Medicine, Washington, DC. https://doi.org/10.31478/201703e.

- Solutions for Patient Safety. "Hospital Resources."
<https://www.solutionsforpatientsafety.org/for-hospitals/hospital-resources/>.
Accessed 2020.

Practice-Based Learning and Improvement 1: Evidence-Based and Informed Practice Overall Intent: To incorporate evidence and apply it to individual patients and patient populations	
Milestones	Examples
Level 1 <i>Develops an answerable clinical question and demonstrates how to access available evidence, with guidance</i>	<ul style="list-style-type: none"> ● Identifies a question such as, “How do you diagnose hypertension in neonates and children?”, but needs guidance to focus it into a searchable question ● Uses general medical resources (i.e., background information) such as UpToDate or DynaMed to search for answers ● Access available evidence using unfiltered resources, retrieving a broad array of related information
Level 2 <i>Independently articulates clinical question and accesses available evidence</i>	<ul style="list-style-type: none"> ● Clearly identifies a focused, answerable question (e.g., “Among children with elevated blood pressure, does ambulatory blood pressure monitoring determine those patients with white coat versus ambulatory hypertension?”) ● Uses PubMed to search for the answer to a clinical question and appropriately filters results
Level 3 <i>Locates and applies the evidence, integrated with patient preference, to the care of patients</i>	<ul style="list-style-type: none"> ● Obtains, appraises, and applies evidence to use ambulatory blood pressure monitoring to evaluate and diagnose hypertension in pediatric patients ● Efficiently searches and filters key databases, retrieving information that is specific to the clinical question ● Applies evidence-based clinical practice guidelines for diagnosing hypertension in pediatric patients ● Evaluates diagnostic criteria that center around social determinants of health
Level 4 <i>Critically appraises and applies evidence, even in the face of uncertainty and conflicting evidence to guide care tailored to the individual patient</i>	<ul style="list-style-type: none"> ● Routinely seeks out and applies evidence to the care of individual patients or populations to change (or re-evaluate) own clinical practice ● Adds to library of resources with updated primary literature or clinical guidelines with new revisions ● Weighs primary and secondary outcomes to enhance specificity to individual patients ● Elicits patient’s prior experiences regarding diversity, equity, and inclusion in the health care system to start conversations about optimal management patient preference ● Explores, evaluates, and incorporates new resources into search strategies ● Discusses with patients’ families if alternative options (e.g., food insecurity issues when making dietary recommendations) may be reasonable, while considering patient preferences/needs (e.g., frozen versus canned foods) ● Uses levels of evidence to weigh the primary outcomes that apply to the care of individual patients

<p>Level 5 <i>Coaches others to critically appraise and apply evidence for complex patients</i></p>	<ul style="list-style-type: none"> ● Provides feedback to other residents on their ability to formulate questions, search for the best available evidence, appraise evidence, and apply that information to the care of patients ● Role models and coaches others in creating efficient and effective search strategies to answer clinical questions ● As part of a team, develops an evidence-based clinical pathway in the EHR for recognition of elevated blood pressure in children
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Direct observation ● Oral or written examinations ● Presentation evaluation ● Research portfolio ● Journal club faculty evaluations
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. ● Duke University. “Evidence-Based Practice.” https://guides.mclibrary.duke.edu/ebm/home. Accessed 2020. ● Guyatt, Gordon, Drummond Rennie, Maureen O. Meade, and Deborah Cook. 2015. <i>Users’ Guides to the Medical Literature: A Manual for Evidence-Based Clinical Practice</i>, 3rd ed. USA: McGraw-Hill Education. https://jamaevidence.mhmedical.com/Book.aspx?bookId=847. Accessed 2020. ● US National Library of Medicine. “PubMed® Online Training.” https://www.nlm.nih.gov/bsd/disted/pubmedtutorial/cover.html. Accessed 2020.

Practice-Based Learning and Improvement 2: Reflective Practice and Commitment to Personal Growth Overall Intent: To continuously improve patient care based on self-evaluation and lifelong learning	
Milestones	Examples
Level 1 <i>Participates in feedback sessions</i> <i>Develops personal and professional goals, with assistance</i>	<ul style="list-style-type: none"> ● Attends scheduled feedback sessions ● Develops a plan with faculty member to assess how often nephrotic syndrome patients receive pneumococcal 23 vaccination ● Acknowledges own implicit/explicit biases
Level 2 <i>Demonstrates openness to feedback and performance data</i> <i>Designs a learning plan based on established goals, feedback, and performance data, with assistance</i>	<ul style="list-style-type: none"> ● Acknowledges concerns about timely note completion and works with clinic preceptor to develop goals for improvement ● After reviewing clinic pneumococcal 23 vaccination rates in nephrotic syndrome patients, integrates feedback to develop an individual education plan about vaccine guidelines ● Devises a plan to explore biases and how they impact vaccine hesitancy
Level 3 <i>Seeks and incorporates feedback and performance data episodically</i> <i>Designs and implements a learning plan by analyzing and reflecting on the factors which contribute to gap(s) between performance expectations and actual performance</i>	<ul style="list-style-type: none"> ● Reviews quarterly chart audit and timely communication of results or change in plan with patients' families ● Evaluates the pneumococcal 23 vaccine practices for nephrotic syndrome patients in continuity clinic patients to ensure each one has an appropriate plan consistent with current guidelines ● Recognizes own implicit biases that affect vaccine recommendations for nephrotic syndrome patients
Level 4 <i>Seeks and incorporates feedback and performance data consistently</i> <i>Adapts a learning plan using long-term professional goals, self-reflection, and performance data to measure its effectiveness</i>	<ul style="list-style-type: none"> ● Initiates a monthly chart audit to ensure appropriate completion of charts and sets improvement goal to communicate with families within 48 hours ● Adapts learning plan to incorporate current evidenced based vaccination guidelines for existing and emerging infectious diseases ● Actively seeks out resources to mitigate impact of biases on clinical practice
Level 5 <i>Role models and coaches others in seeking and incorporating feedback and performance data</i> <i>Demonstrates continuous self-reflection and coaching of others on reflective practice</i>	<ul style="list-style-type: none"> ● Leads a multidisciplinary clinic discussion on opportunities to improve communication with patients' families ● Meets with learners to review practice habits and develop their learning goals
Assessment Models or Tools	<ul style="list-style-type: none"> ● Direct observation ● Medical record (chart) audit

	<ul style="list-style-type: none"> ● Review of learning plan
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. ● Burke, Anne E., Bradley Benson, Robert Englander, Carol Carraccio, and Patricia J. Hicks. 2014. “Domain of Competence: Practice-Based Learning and Improvement.” <i>Academic Pediatrics</i>. 14(2): S38-S54. DOI: https://doi.org/10.1016/j.acap.2013.11.018. ● Lockspeiser, Tai M., Su-Ting T. Li, Ann E. Burke, Adam A. Rosenberg, Alston E. Dunbar 3rd, Kimberly A. Gifford, Gregory H. Gorman, et al. 2016. “In Pursuit of Meaningful Use of Learning Goals in Residency: A Qualitative Study of Pediatric Residents.” <i>Academic Medicine</i>. 91(6):839-846. DOI: 10.1097/ACM.0000000000001015. ● Lockspeiser, Tai M., Patricia A. Schmitter, J. Lindsey Lane, Janice L. Hanson, Adam A. Rosenberg, and Yoon Soo Park. 2013. “Assessing Residents’ Written Learning Goals and Goal Writing Skill: Validity Evidence for the Learning Goal Scoring Rubric.” <i>Academic Medicine</i>. 88(10):1558-1563. DOI: 10.1097/ACM.0b013e3182a352e6.

Professionalism 1: Professional Behavior	
Overall Intent: To demonstrate ethical and professional behaviors and promote these behaviors in others, and to use appropriate resources to manage professional dilemmas	
Milestones	Examples
<p>Level 1 <i>Identifies expected professional behaviors and potential triggers for lapses</i></p> <p><i>Identifies the value and role of pediatric nephrology as a vocation/career</i></p>	<ul style="list-style-type: none"> ● Asks a senior fellow or faculty member for feedback on post-call interactions with staff and colleagues after realizing own tendency to be curt when tired ● Acknowledges the importance of pediatric nephrologists in evaluating and treating patients with hypertension
<p>Level 2 <i>Demonstrates professional behavior with occasional lapses</i></p> <p><i>Demonstrates accountability for patient care as a pediatric nephrologist, with guidance</i></p>	<ul style="list-style-type: none"> ● Is late to morning rounds, identifies this lapse, and immediately apologizes to peers and attendings upon arrival ● When a patient’s family asks to have Family Medical Leave Act (FMLA) paperwork filled out, is unfamiliar with this form and seeks out help from attending to complete form in timely manner
<p>Level 3 <i>Maintains professional behavior in increasingly complex or stressful situations</i></p> <p><i>Fully engages in patient care and holds oneself accountable</i></p>	<ul style="list-style-type: none"> ● During a busy night on call, demonstrates caring and compassionate behaviors with patients, patients’ families, colleagues, and staff members ● Advocates for an individual patient’s needs in a humanistic and professional manner regarding home care, medication approval, and need for care by another subspecialist
<p>Level 4 <i>Recognizes situations that may trigger professionalism lapses and intervenes to prevent lapses in self and others</i></p> <p><i>Exhibits a sense of duty to patient care and professional responsibilities</i></p>	<ul style="list-style-type: none"> ● Models respect and compassion for patients and promotes the same from colleagues by actively identifying positive professional behavior ● Without prompting, assists colleagues with seeing patients when the clinic is busy ● Speaks up in the moment when observing racist/sexist behavior within the health care team and uses reporting mechanisms to address it
<p>Level 5 <i>Models professional behavior and coaches others when their behavior fails to meet professional expectations</i></p> <p><i>Extends the role of the pediatric nephrologist beyond the care of patients by engaging with the community, specialty, and medical profession as a whole</i></p>	<ul style="list-style-type: none"> ● Discusses the importance of timeliness with a learner with habitual lateness, making a plan together to address the underlying issues of why the learner is late ● Advocates for process improvement to help a cohort of patients, takes on larger projects to remedy a system issue that is affecting patients, and sees the opportunity to improve care as a responsibility ● Develops education and/or modules on microaggressions and bias
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Direct observation ● Global evaluation

	<ul style="list-style-type: none"> ● Multisource feedback ● Oral or written self-reflection ● Simulation
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● AbdelHameid, Duaa. 2020. "Professionalism 101 for Black Physicians." <i>New England Journal of Medicine</i>. 383(5): e34. doi:10.1056/NEJMpv2022773. ● American Academy of Pediatrics. "Resident Curriculum: Mental Health Education Resources." https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/Mental-Health/Pages/Residency-Curriculum.aspx. Accessed 2020. ● American Board of Internal Medicine, ACP-ASIM Foundation, European Federation of Internal Medicine. 2007. "Medical Professionalism in the New Millennium: A Physician Charter." <i>Annals of Internal Medicine</i>. 136:243-246. http://abimfoundation.org/wp-content/uploads/2015/12/Medical-Professionalism-in-the-New-Millennium-A-Physician-Charter.pdf. Accessed 2020. ● ABP. "Entrustable Professional Activities for Subspecialties: Nephrology." https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. ● American Board of Pediatrics. "Medical Professionalism." https://www.abp.org/content/medical-professionalism. Accessed 2020. ● American Board of Pediatrics. "Teaching, Promoting, and Assessing Professionalism Across the Continuum: A Medical Educator's Guide." https://www.abp.org/professionalism-guide. Accessed 2020. ● American Medical Association. "Ethics." https://www.ama-assn.org/delivering-care/ama-code-medical-ethics. Accessed 2020. ● Bynny, Richard L., Douglas S. Paauw, Maxine Papadakis, and Sheryl Pfeil. 2017. <i>Medical Professionalism Best Practices: Professionalism in the Modern Era</i>. Menlo Park, CA: Alpha Omega Alpha Medical Society. https://www.alphaomegalpha.org/wp-content/uploads/2022/01/Monograph2018.pdf. ISBN: 978-1-5323-6516-4. ● Domen, Ronald E., Kristen Johnson, Richard Michael Conran, Robert D. Hoffman, Miriam D. Post, Jacob J. Steinberg, Mark D. Brissette, et al. 2016. "Professionalism in Pathology: A Case-Based Approach as a Potential Educational Tool." <i>Archives of Pathology and Laboratory Medicine</i> 141: 215-219. https://doi.org/10.5858/arpa.2016-0217-CP. ● Levinson, Wendy, Shiphra Ginsburg, Frederic W. Hafferty, and Catherine R. Lucey. 2014. <i>Understanding Medical Professionalism</i>. New York, NY: McGraw-Hill Education. https://accessmedicine.mhmedical.com/book.aspx?bookID=1058. ● Osseo-Asare, Aba, Lilanthi Balasuriya, Stephen J. Huot, et al. 2018. "Minority Resident Physicians' Views on the Role of Race/Ethnicity in Their Training Experiences in the

Workplace.” *JAMA Network Open*. 1(5): e182723.
doi:10.1001/jamanetworkopen.2018.2723.

- Paul, Dereck W. Jr., Kelly R. Knight, Andre Campbell, and Louise Aronson. 2020. “Beyond a Moment - Reckoning with Our History and Embracing Antiracism in Medicine.” *New England Journal of Medicine*. 383: 1404-1406. doi:10.1056/NEJMp2021812. <https://www.nejm.org/doi/full/10.1056/NEJMp2021812>.

Professionalism 2: Ethical Principles	
Overall Intent: To recognize and address or resolve common and complex ethical dilemmas or situations	
Milestones	Examples
Level 1 <i>Demonstrates knowledge of the ethical principles underlying informed consent, surrogate decision making, advance directives, confidentiality, error disclosure, stewardship of limited resources, and related topics</i>	<ul style="list-style-type: none"> ● Identifies and applies ethical principles involved in informed consent when unclear of all of the risks
Level 2 <i>Applies ethical principles in common situations</i>	<ul style="list-style-type: none"> ● Articulates how the principle of “do no harm” applies to performing a kidney biopsy in a patient normally not biopsied despite it being a learning experience
Level 3 <i>Analyzes complex situations using ethical principles to address conflict/controversy; seeks help when needed to manage and resolve complex ethical situations</i>	<ul style="list-style-type: none"> ● Discusses the risks and benefits of initiating chronic dialysis in a premature infant with anuric renal failure due to absent kidneys ● Works with team to better understand and address family refusal of all vaccinations prior to kidney transplant work up
Level 4 <i>Manages and seeks to resolve ethical dilemmas using appropriate resources (e.g., ethics consultations, literature review, risk management/legal consultation)</i>	<ul style="list-style-type: none"> ● Appropriately uses ethics and palliative care resources to discuss end-of-life care of a child in the intensive care unit with multiorgan failure and poor prognosis ● Uses institutional resources, including social work and risk management, when a patient's parent chooses to leave the hospital against medical advice ● Engages with a multidisciplinary team to address issues of disagreement between the patient's family and physicians regarding care plans for a patient on dialysis preparing for transplant ● Recognizes and seeks to understand how prior experiences of patient/family racism influence trust and decision making
Level 5 <i>Called upon by others to consult in cases of complex ethical dilemmas; identifies and seeks to address system-level factors that induce or exacerbate</i>	<ul style="list-style-type: none"> ● Participates as part of the ethics consult service and provides guidance for complex cases
Assessment Models or Tools	<ul style="list-style-type: none"> ● Direct observation ● Global evaluation ● Multisource feedback ● Oral or written self-reflection ● Simulation
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● American Board of Internal Medicine, ACP-ASIM Foundation, European Federation of Internal Medicine. 2007. “Medical Professionalism in the New Millennium: A Physician Charter.” <i>Annals of Internal Medicine</i>. 136:243-246. http://abimfoundation.org/wp-

[content/uploads/2015/12/Medical-Professionalism-in-the-New-Millennium-A-Physician-Charter.pdf](https://www.alphaomegaalpha.org/wp-content/uploads/2015/12/Medical-Professionalism-in-the-New-Millennium-A-Physician-Charter.pdf). Accessed 2020.

- ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” <https://www.abp.org/content/entrustable-professional-activities-subspecialties>. Accessed 2021.
- American Medical Association. “Ethics.” <https://www.ama-assn.org/delivering-care/ama-code-medical-ethics>. Accessed 2020.
- Bynny, Richard L., Douglas S. Paauw, Maxine Papadakis, and Sheryl Pfeil. 2017. *Medical Professionalism Best Practices: Professionalism in the Modern Era*. Menlo Park, CA: Alpha Omega Alpha Medical Society. <https://www.alphaomegaalpha.org/wp-content/uploads/2022/01/Monograph2018.pdf>. ISBN: 978-1-5323-6516-4.
- Domen, Ronald E., Kristen Johnson, Richard Michael Conran, Robert D. Hoffman, Miriam D. Post, Jacob J. Steinberg, Mark D. Brissette, et al. 2016. “Professionalism in Pathology: A Case-Based Approach as a Potential Educational Tool.” *Archives of Pathology and Laboratory Medicine* 141: 215-219. <https://doi.org/10.5858/arpa.2016-0217-CP>.
- Levinson, Wendy, Shiphra Ginsburg, Frederic W. Hafferty, and Catherine R. Lucey. 2014. *Understanding Medical Professionalism*. New York, NY: McGraw-Hill Education. <https://accessmedicine.mhmedical.com/book.aspx?bookID=1058>.

Professionalism 3: Accountability/Conscientiousness	
Overall Intent: To take responsibility for one’s own actions and their impact on patients and other members of the health care team	
Milestones	Examples
Level 1 <i>Performs tasks and responsibilities, with prompting</i>	<ul style="list-style-type: none"> ● Responds to first reminder from program administrator to complete work hour logs ● After being informed by the program director that too many conferences have been missed, changes habits to meet the minimum attendance requirement ● Completes patient care tasks (e.g., callbacks, consultations, orders) after prompting from a supervisor
Level 2 <i>Performs tasks and responsibilities in a timely manner in routine situations</i>	<ul style="list-style-type: none"> ● Completes administrative tasks (e.g., licensing requirements) by specified due date ● Completes routine patient care tasks as assigned ● Answers pages and emails promptly with rare need for reminders
Level 3 <i>Performs tasks and responsibilities in a thorough and timely manner in complex or stressful situations</i>	<ul style="list-style-type: none"> ● Identifies multiple competing demands when caring for patients, triages and delegates tasks to other team members
Level 4 <i>Coaches others to ensure tasks and responsibilities are completed in a thorough and timely manner in complex or stressful situations</i>	<ul style="list-style-type: none"> ● Reminds residents to complete patient care tasks, gives tips on task prioritization ● Supervises residents and/or medical students on a busy night, delegating tasks appropriately, and ensures that all tasks are completed for safe and thorough patient care
Level 5 <i>Creates strategies to enhance others’ ability to efficiently complete tasks and responsibilities</i>	<ul style="list-style-type: none"> ● Meets with multidisciplinary team (e.g., nurses, social worker, case manager) to streamline patient discharges
Assessment Models or Tools	<ul style="list-style-type: none"> ● Compliance with deadlines and timelines ● Direct observation ● Global evaluations ● Multisource feedback ● Self-evaluations and reflective tools ● Simulation
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. ● American Medical Association. “Ethics.” https://www.ama-assn.org/delivering-care/ama-code-medical-ethics. Accessed 2020. ● Code of conduct from fellow/resident institutional manual ● Expectations of residency program regarding accountability and professionalism

Professionalism 4: Well-Being	
Overall Intent: To identify resources to manage and improve well-being	
Milestones	Examples
Level 1 <i>Recognizes the importance of addressing personal and professional well-being</i>	<ul style="list-style-type: none"> ● Acknowledges how individual response to participating in the care of a dying, critically ill patient may impact the approach to other patients seen later the same day ● Discusses the importance of a faculty mentor ● Recognizes that personal stress may require a change in schedule
Level 2 <i>Describes institutional resources that are meant to promote well-being</i>	<ul style="list-style-type: none"> ● Identifies well-being resources such as meditation apps and mental health resources for students and residents available through the program and institution ● Meets with program director to discuss FMLA options when expecting a child
Level 3 <i>Recognizes institutional and personal factors that impact well-being</i>	<ul style="list-style-type: none"> ● Identifies that being on service and working with critically ill patients in the intensive care units may be stressful and impact well-being ● Identifies that working during a pandemic is unusually stressful both personally and professionally ● Identifies the tensions between personal and professional stressors and responsibilities
Level 4 <i>Describes interactions between institutional and personal factors that impact well-being</i>	<ul style="list-style-type: none"> ● Discusses a plan to mitigate the tension between a busy schedule and spending time with family ● Recognizes how microaggressions from coworkers and/or faculty members are impacting performance or engagement in patient care
Level 5 <i>Coaches and supports colleagues to optimize well-being at the team, program, or institutional level</i>	<ul style="list-style-type: none"> ● Leads organizational efforts to address clinician well-being ● Leads a team debrief after a stressful, busy shift; shares personal impact of the shift and plans to decompress ● Develops an affinity group to provide support for self and others to explore impact of microaggressions and biases
Assessment Models or Tools	<ul style="list-style-type: none"> ● Direct observation ● Group interview or discussions for team activities ● Individual interview ● Institutional online training modules ● Self-assessment and personal learning plan
Curriculum Mapping	<ul style="list-style-type: none"> ●
Notes or Resources	<ul style="list-style-type: none"> ● This subcompetency is not intended to evaluate a fellow’s well-being, but to ensure each fellow has the fundamental knowledge of factors that impact well-being, the mechanisms by which those factors impact well-being, and available resources and tools to improve well-being. ● Accreditation Council for Graduate Medical Education. “Well-Being Tools and Resources.” https://dl.acgme.org/pages/well-being-tools-resources. Accessed 2022.

- ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” <https://www.abp.org/content/entrustable-professional-activities-subspecialties>. Accessed 2021.
- Hicks, Patricia J., Daniel Schumacher, Susan Guralnick, Carol Carraccio, and Ann E. Burke. 2014. “Domain of Competence: Personal and Professional Development.” *Academic Pediatrics* 14(2 Suppl): S80-97. <https://doi.org/10.1016/j.acap.2013.11.017>.
- Local resources, including employee assistance programs

Interpersonal and Communication Skills 1: Patient- and Family-Centered Communication	
Overall Intent: To establish a therapeutic relationship with patients and their families, tailor communication to the needs of patients and their families, and effectively navigate difficult/sensitive conversations	
Milestones	Examples
<p>Level 1 <i>Demonstrates respect and attempts to establish rapport</i></p> <p><i>Attempts to adjust communication strategies based upon patient/family expectations</i></p>	<ul style="list-style-type: none"> ● Introduces self and faculty member, identifies patient and others in the room, and engages all parties in health care discussion ● Attempts to initiate sensitive conversations ● Identifies need for trained interpreter with non-English-speaking patients
<p>Level 2 <i>Establishes a therapeutic relationship in straightforward encounters</i></p> <p><i>Adjusts communication strategies as needed to mitigate barriers and meet patient/family expectations</i></p>	<ul style="list-style-type: none"> ● In a 16-year-old patient struggling to take transplant medications, acknowledges the challenges associated with taking multiple medications and requiring frequent labs, while also emphasizing the importance of medication compliance and developing individualized strategies to improve medication compliance ● Uses non-judgmental language with practitioners, patients, and patients' families ● Initiates a discussion with a patient and the patient's family regarding risks and benefits of starting acute dialysis
<p>Level 3 <i>Establishes a culturally competent and therapeutic relationship in most encounters</i></p> <p><i>Communicates with sensitivity and compassion, elicits patient/family values, and acknowledges uncertainty and conflict</i></p>	<ul style="list-style-type: none"> ● Prioritizes and sets an agenda based on concerns of patient's parents at the beginning of a clinic visit in a child with CKD stage 4 ● Provides handouts with diagrams and pictures to communicate information to a patient/parent who is unable to read ● Routinely provides handouts and clinical summaries in the preferred language of the patient and patient's family ● Answers a patient's family's questions and guides discussion surrounding pros and cons of peritoneal dialysis versus hemodialysis, incorporating elicited family values and goals
<p>Level 4 <i>Establishes a therapeutic relationship in straightforward and complex encounters, including those with ambiguity and/or conflict</i></p> <p><i>Uses shared decision making with patient/family to make a personalized care plan</i></p>	<ul style="list-style-type: none"> ● Continues to engage patient's parents who refuse immunizations, addressing misinformation and reviewing risks/benefits to assuage these concerns in a manner that engages rather than alienates the family ● Facilitates sensitive discussions with patient/family and interdisciplinary team ● Asks questions in ways that validate patient identifiers and promote an inclusive environment ● While maintaining trust, engages family of a child with medical complexity along with other members of the multi-specialty care team in determining family wishes and expectations regarding initiating dialysis

<p>Level 5 <i>Mentors others to develop positive therapeutic relationships</i></p> <p><i>Models and coaches others in patient- and family-centered communication</i></p>	<ul style="list-style-type: none"> ● Acts as a mentor for junior fellow disclosing bad news to a patient and the patient’s family ● Models and coaches the spectrum of difficult communication ● Develops a curriculum on patient- and family-centered communication, including navigating difficult conversations
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Direct observation ● Multisource feedback ● Standardized patients
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. ● Association of American Medical Colleges MedEdPORTAL. “Anti-Racism in Medicine Collection.” https://www.mededportal.org/anti-racism. Accessed 2022. ● Benson Bradley J. 2014. “Domain of Competence: Interpersonal and Communication Skills.” <i>Academic Pediatrics</i> 14(2 Suppl):S55-S65. https://www.acgme.org/Portals/0/PDFs/Milestones/InterpersonalandCommunicationSkillsPediatrics.pdf. Accessed 2020. ● Laidlaw, Anita, and Jo Hart. 2011. “Communication Skills: An Essential Component of Medical Curricula. Part I: Assessment of Clinical Communication: AMEE Guide No. 51.” <i>Medical Teacher</i> 33(1): 6-8. https://doi.org/10.3109/0142159X.2011.531170. ● Makoul, Gregory. 2001. “Essential Elements of Communication in Medical Encounters: the Kalamazoo Consensus Statement.” <i>Academic Medicine</i>. 76(4): 390-393. https://journals.lww.com/academicmedicine/Fulltext/2001/04000/Essential_Elements_of_Communication_in_Medical.21.aspx#pdf-link. ● Makoul, Gregory. 2001. “The SEGUE Framework for Teaching and Assessing Communication Skills.” <i>Patient Education and Counseling</i>. 45(1): 23-34. https://doi.org/10.1016/S0738-3991(01)00136-7. ● National LGBTQIA+ Health and Education Center: https://www.lgbtqiahealtheducation.org/.

Interpersonal and Communication Skills 2: Interprofessional and Team Communication Overall Intent: To communicate effectively with the health care team, including consultants	
Milestones	Examples
Level 1 <i>Respectfully requests a consultation, with guidance</i> <i>Identifies the members of the interprofessional team</i>	<ul style="list-style-type: none"> ● When asking for a cardiology consultation for a patient with Marfan syndrome, respectfully relays the diagnosis and requests for the team to evaluate the patient ● Acknowledges the contribution of each member of the multidisciplinary team to the patient
Level 2 <i>Clearly and concisely requests consultation by communicating patient information</i> <i>Participates within the interprofessional team</i>	<ul style="list-style-type: none"> ● When requesting a consultation from the infectious disease team for a dialysis patient admitted to the intensive care unit with a new fever, discusses the past central line-associated bloodstream infection (CLABSI) from the dialysis catheter, including microbiology results, treatment regimen, and sensitivities ● Sends a message in the EHR to the dietician of a metabolic patient to discuss increasing the protein restriction
Level 3 <i>Formulates a specific question for consultation and tailors communication strategy</i> <i>Uses bi-directional communication within the interprofessional team</i>	<ul style="list-style-type: none"> ● After a consultation has been completed, communicates with the primary care team to verify they have received and understand the recommendations ● Contacts the metabolic team social worker to arrange for delivery of a specialized formula and completes the prescription
Level 4 <i>Coordinates consultant recommendations to optimize patient care</i> <i>Facilitates interprofessional team communication</i>	<ul style="list-style-type: none"> ● Initiates a multidisciplinary meeting to develop shared care plan for a patient with Denys-Drash syndrome ● Explains to the rest of the team, as well as the patient’s parents, the rationale and benefits of using continuous renal replacement therapy (CRRT) as opposed to intermittent hemodialysis (IHD) in a critically ill postoperative patient; explains regional citrate anti-coagulation to the surgical team ● Asks other members of the health care team to repeat back recommendations to ensure understanding ● Leads the morning interprofessional huddle on the inpatient unit ● Effectively navigates racial discrimination or microaggressions from a colleague as pertains to the patient

<p>Level 5 <i>Maintains a collaborative relationship with referring providers that maximizes adherence to practice recommendations</i></p> <p><i>Coaches others in effective communication within the interprofessional team</i></p>	<ul style="list-style-type: none"> ● Routinely leads a multidisciplinary care conference ● Mediates a conflict among members of the health care team
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> ● Direct observation ● Global assessment ● Medical record (chart) audit ● Multi-source feedback ● Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> ●
<p>Notes or Resources</p>	<ul style="list-style-type: none"> ● ABP. “Entrustable Professional Activities for Subspecialties: Nephrology.” https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. ● ACAPT. “NIPEC Assessment Resources and Tools.” https://acapt.org/about/consortium/national-interprofessional-education-consortium-(nipec)/nipec-assessment-resources-and-tools. Accessed 2020. ● Dehon, Erin, Kimberly Simpson, David Fowler, Alan Jones. 2015. “Development of the Faculty 360.” <i>MedEdPORTAL</i> 11:10174. http://doi.org/10.15766/mep_2374-8265.10174. ● Fay, David, Michael Mazzone, Linda Douglas, Bruce Ambuel. 2007. “A Validated, Behavior-Based Evaluation Instrument for Family Medicine Residents.” <i>MedEdPORTAL</i>. 2007. https://www.mededportal.org/doi/10.15766/mep_2374-8265.622. Accessed 2020. ● François, Jose. 2011. “Tool to Assess the Quality of Consultation and Referral Request Letters in Family Medicine.” <i>Canadian Family Physician</i> 57(5):574–575. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3093595/. Accessed 2020. ● Green, Matt, Teresa Parrott, and Graham Cook. 2012. “Improving Your Communication Skills.” <i>BMJ</i>. 344:e357. https://doi.org/10.1136/bmj.e357. ● Henry, Stephen G., Eric S. Holmboe, and Richard M. Frankel. 2013. “Evidence-Based Competencies for Improving Communication Skills in Graduate Medical Education: A Review with Suggestions for Implementation.” <i>Medical Teacher</i>. 35(5):395-403. https://doi.org/10.3109/0142159X.2013.769677. ● Interprofessional Education Collaborative Expert Panel. 2011. “Core Competencies for Interprofessional Collaborative Practice: Report of an Expert Panel.” Washington, D.C.: Interprofessional Education Collaborative. https://www.aacom.org/docs/default-source/insideome/ccrpt05-10-11.pdf?sfvrsn=77937f97_2. Accessed 2020.

- Roth, Christine G., Karen W. Eldin, Vijayalakshmi Padmanabhan, and Ellen M. Freidman. 2019. "Twelve Tips for the Introduction of Emotional Intelligence in Medical Education." *Medical Teacher* 41(7): 1-4. <https://doi.org/10.1080/0142159X.2018.1481499>.

Interpersonal and Communication Skills 3: Communication within Health Care Systems Overall Intent: To effectively communicate using a variety of tools and methods	
Milestones	Examples
<p>Level 1 <i>Records accurate information in the patient record</i></p> <p><i>Identifies the importance of and responds to multiple forms of communication (e.g., in-person, electronic health record (EHR), telephone, email)</i></p>	<ul style="list-style-type: none"> ● Corrects progress note after attending identifies outdated plan ● If using copy/paste/forward in EHR, goes back to make changes to note after doing so ● Identifies team, departmental, and institutional communication tools, methods, and hierarchies for patient care needs, concerns, and safety issues
<p>Level 2 <i>Records accurate and timely information in the patient record</i></p> <p><i>Selects appropriate method of communication, with prompting</i></p>	<ul style="list-style-type: none"> ● Provides organized and accurate documentation that supports the treatment plan and limits extraneous information ● Avoids biased or stigmatized language in notes (e.g., “challenges with medication compliance” instead of “won’t take medications”) ● Completes clinic notes in a timely manner ● Responds to refill requests and patient messages
<p>Level 3 <i>Concisely documents updated, prioritized, diagnostic and therapeutic reasoning in the patient record</i></p> <p><i>Aligns type of communication with message to be delivered (e.g., direct and indirect) based on urgency and complexity</i></p>	<ul style="list-style-type: none"> ● Produces documentation that reflects complex clinical thinking and planning, and is concise, but may not contain contingency planning (i.e., if/then statements) ● Requests additional resources and contacts attending immediately when a patient develops concerning findings or complications ● Sends email to patient’s oncology team overnight with a non-urgent question rather than paging oncology on call
<p>Level 4 <i>Documents diagnostic and therapeutic reasoning, including anticipatory guidance</i></p> <p><i>Demonstrates exemplary written and verbal communication</i></p>	<ul style="list-style-type: none"> ● Produces documentation that is consistently accurate, organized, and concise; reflects complex clinical reasoning and frequently incorporates contingency planning ● Communicates effectively and proactively with collaborating physicians and teams about communication gaps in order to prevent recurrence
<p>Level 5 <i>Models and coaches others in documenting diagnostic and therapeutic reasoning</i></p>	<ul style="list-style-type: none"> ● Leads teams by modeling a range of effective tools and methods of communication that fit the context of a broad variety of clinical encounters

<p><i>Coaches others in written and verbal communication</i></p>	<ul style="list-style-type: none"> • Designs and facilitates the improvement of systems that integrates effective communication among teams, departments, and institutions • Leads a team to discuss implementation and dissemination of preferred pronouns/names into EHR
<p>Assessment Models or Tools</p>	<ul style="list-style-type: none"> • Direct observation • Medical record (chart) audit • Multisource feedback • Simulation
<p>Curriculum Mapping</p>	<ul style="list-style-type: none"> •
<p>Notes or Resources</p>	<ul style="list-style-type: none"> • ABP. "Entrustable Professional Activities for Subspecialties: Nephrology." https://www.abp.org/content/entrustable-professional-activities-subspecialties. Accessed 2021. • Benson, Bradley J. 2014. "Domain of Competence: Interpersonal and Communication Skills." <i>Academic Pediatrics</i>.14(2 Suppl): S55-S65. https://doi.org/10.1016/j.acap.2013.11.016. Accessed 2020. • Bierman, Jennifer A., Kathryn Kinner Hufmeyer, David T. Liss, A. Charlotta Weaver, and Heather L. Heiman. 2017. "Promoting Responsible Electronic Documentation: Validity Evidence for a Checklist to Assess Progress Notes in the Electronic Health Record." <i>Teaching and Learning in Medicine</i>. 29(4): 420-432. https://doi.org/10.1080/10401334.2017.1303385. • Haig, Kathleen M., Staci Sutton, and John Whittington. 2006. "SBAR: A Shared Mental Model for Improving Communications Between Clinicians." <i>Joint Commission Journal on Quality and Patient Safety</i>. 32(3):167-75. https://doi.org/10.1016/s1553-7250(06)32022-3. • Iverson, Cheryl. 2020. "Nomenclature." <i>AMA Manual of Style: A Guide for Authors and Editors, 11th ed.</i> New York. doi: 10.1093/jama/9780190246556.003.0014. Accessed 2022. • Levey, Andrew S., Kai-Uwe Eckardt, Nijsje M. Dorman, Stacy L. Christiansen, Ewout J. Hoorn, Julie R. Ingelfinger, Lesley A. Inker, et al. 2020. "Nomenclature for Kidney Function and Disease: Report of a Kidney Disease: Improving Global Outcomes (KDIGO) Consensus Conference." <i>KDIGO Conference Report</i>. 97(6)1117-1129. doi:10.1016/j.kint.2020.02.010. • Starmer, Amy J., Nancy D. Spector, Rajendu Srivastava, April D. Allen, Christopher P. Landrigan, Theodore Sectish, and I-PASS Study Group. 2012. "I-Pass, a Mnemonic to Standardize Verbal Handoffs." <i>Pediatrics</i> 129.2:201-204. https://doi.org/10.1542/peds.2011-2966.

To help programs transition to the new version of the Milestones, the ACGME has mapped the original Milestones 1.0 to the new Milestones 2.0. Indicated below are the subcompetencies that are similar between versions. These are not exact matches, but are areas that include similar elements. Not all subcompetencies map between versions. Inclusion or exclusion of any subcompetency does not change the educational value or impact on curriculum or assessment.

Milestones 1.0	Milestones 2.0
PC1: Provide transfer of care that ensures seamless transitions	SBP4: System Navigation for Patient-Centered Care – Transitions in Care
PC2: Make informed diagnostic and therapeutic decisions that result in optimal clinical judgement	PC2: Acute Kidney Injury PC4: Chronic Kidney Disease PC5: Transplant PC6: Fluids, Electrolytes, and Acid-Based Disorders PC7: Hypertension PC8: Glomerular Disease MK1: Clinical Reasoning
PC3: Develop and carry out management plans	PC3: Chronic Dialysis Therapy PC2: Acute Kidney Injury PC4: Chronic Kidney Disease PC5: Transplant PC6: Fluids, Electrolytes, and Acid-Based Disorders PC7: Hypertension PC8: Glomerular Disease ICS1: Patient- and Family-Centered Communication
PC4: Provide appropriate role modeling	PBLI2: Reflective Practice and Commitment to Personal Growth
	PC1: Organization and Prioritization of Patient Care
	PC9: Competence in Procedures
MK1: Locate, appraise, and assimilate evidence from scientific studies related to their patients’ health problems	MK2: Physiology and Pathophysiology PBLI1: Evidence Based and Informed Practice
SBP1: Work effectively in various health care delivery settings and systems relevant to their clinical specialty	SBP3: System Navigation for Patient Centered Care – Coordination of Care SBP6: Physician Role in Health Care Systems
SBP2: Coordinate patient care within the health care system relevant to their clinical specialty	SBP3: System Navigation for Patient Centered Care – Coordination of Care SBP4: System Navigation for Patient-Centered Care – Transitions in Care SBP5: Population and Community Health

	ICS1: Patient- and Family-Centered Communications ICS2: Interprofessional and Team Communication
SBP3: Incorporate considerations of cost awareness and risk-benefit analysis in patient and/or population-based care as appropriate	SBP5: Population and Community Health SBP6: Physician Role in Health Care Systems
SBP4: Work in inter-professional teams to enhance patient safety and improve patient care quality	SBP1: Patient Safety ICS2: Interprofessional and Team Communication
SBP5: Participate in identifying system errors and implementing potential systems solutions	SBP1: Patient Safety SBP2: Quality Improvement
PBL11: Identifying strengths, deficiencies, and limits to one's knowledge and expertise	PBL11: Evidence Based and Informed Practice PBL12: Reflective Practice and Commitment to Personal Growth
PBL12: Systematically analyze practice using quality improvement methods, and implement changes with the goal of practice improvement	SBP2: Quality Improvement PBL12: Reflective Practice and Commitment to Personal Growth
PBL13: Use information technology to optimize learning and care delivery	PBL11: Evidence Based and Informed Practice PBL12: Reflective Practice and Commitment to Personal Growth ICS3: Communication within Health Care Systems
PBL14: Participate in the education of patients, families, students, residents, fellows, and other health professionals	SBP5: Population and Community Health PBL11: Evidence Based and Informed Practice ICS1: Patient- and Family-Centered Communications
PROF1: Professional Conduct: High standards of ethical behavior which includes maintaining appropriate professional boundaries	PROF1: Professional Behavior PROF2: Ethical Principles
PROF2: Trustworthiness that makes colleagues feel secure when one is responsible for the care of patients	PBL11: Evidence Based and Informed Practice PROF1: Professional Behavior PROF3: Accountability/Conscientiousness ICS1: Patient- and Family-Centered Communications
PROF3: Provide leadership skills that enhance team functioning, the learning environment, and/or the health care delivery system/environment with the ultimate intent of improving care of patients	ICS2: Interprofessional and Team Communication ICS3: Communication within Health Care Systems PROF2: Ethical Principles PROF3: Accountability/Conscientiousness
PROF4: The capacity to accept that ambiguity is part of clinical medicine and to recognize the need for and to utilize appropriate resources in dealing with uncertainty	PROF2: Ethical Principles ICS1: Patient- and Family-Centered Communication PBL11: Evidence Based and Informed Practice
	PROF4: Well-Being

Pediatric Nephrology Supplemental Guide

ICS1: Communicate effectively with physicians, other health professionals, and health-related agencies	ICS2: Interprofessional and Team Communication ICS3: Communication within Health Care Systems
ICS2: Work effectively as a member or leader of a health care team or other professional group	ICS2: Interprofessional and Team Communication PBLI2: Reflective Practice and Commitment to Personal Growth PROF3: Accountability/Conscientiousness
ICS3: Act in a consultative role to other physicians and health professionals	MK1: Clinical Reasoning ICS2: Interprofessional and Team Communication ICS3: Communication within Health Care Systems

Available Milestones Resources

Milestones 2.0: Assessment, Implementation, and Clinical Competency Committees Supplement, 2021 - <https://meridian.allenpress.com/jgme/issue/13/2s>

Milestones Guidebooks: <https://www.acgme.org/milestones/resources/>

- *Assessment Guidebook*
- *Clinical Competency Committee Guidebook*
- *Clinical Competency Committee Guidebook Executive Summaries*
- *Implementation Guidebook*
- *Milestones Guidebook*

Milestones Guidebook for Residents and Fellows: <https://www.acgme.org/residents-and-fellows/the-acgme-for-residents-and-fellows/>

- *Milestones Guidebook for Residents and Fellows*
- *Milestones Guidebook for Residents and Fellows Presentation*
- *Milestones 2.0 Guide Sheet for Residents and Fellows*

Milestones Research and Reports: <https://www.acgme.org/milestones/research/>

- *Milestones National Report*, updated each fall
- *Milestones Predictive Probability Report*, updated each fall
- *Milestones Bibliography*, updated twice each year

Developing Faculty Competencies in Assessment courses - <https://www.acgme.org/meetings-and-educational-activities/courses-and-workshops/developing-faculty-competencies-in-assessment/>

Assessment Tool: Direct Observation of Clinical Care (DOCC) - <https://dl.acgme.org/pages/assessment>

Assessment Tool: Teamwork Effectiveness Assessment Module (TEAM) - <https://team.acgme.org/>

Improving Assessment Using Direct Observation Toolkit - <https://dl.acgme.org/pages/acgme-faculty-development-toolkit-improving-assessment-using-direct-observation>

Remediation Toolkit - <https://dl.acgme.org/courses/acgme-remediation-toolkit>

Learn at ACGME has several courses on Assessment and Milestones - <https://dl.acgme.org/>