

Nephrology

Certification Examination Blueprint

Purpose of the exam

The exam is designed to evaluate the knowledge, diagnostic reasoning, and clinical judgment skills expected of the certified nephrologist in the broad domain of the discipline. The ability to make appropriate diagnostic and management decisions that have important consequences for patients will be assessed. The exam may require recognition of common as well as rare clinical problems for which patients may consult a certified nephrologist.

Exam content

Exam content is determined by a pre-established blueprint, or table of specifications. The blueprint is developed by the ABIM and is reviewed annually and updated as needed for currency. Trainees, training program directors, and certified practitioners in the discipline are surveyed periodically to provide feedback and inform the blueprinting process.

The primary medical content categories of the blueprint are shown below, with the percentage assigned to each for a typical exam:

Medical Content Category	% of Exam
Sodium and Water Abnormalities	8%
Acid-Base and Potassium Disorders	9%
Calcium, Phosphorus, and Magnesium Disorders and Stones	4%
Chronic Kidney Disease	22%
Hypertension	10%
Tubular, Interstitial, and Cystic Disorders	4%
Glomerular and Vascular Disorders	12%
Kidney Transplantation	11%
Pharmacology	5%
Acute Kidney Injury and Intensive Care Unit Nephrology	15%
	100%

Exam questions in the content areas above may also address clinical topics in adolescent medicine, critical care medicine, clinical epidemiology, geriatric medicine, and nutrition that are important to the practice of nephrology.

Exam format

The exam is composed of multiple-choice questions with a single best answer, predominantly describing patient scenarios. Questions ask about the work done (that is, tasks performed) by physicians in the course of practice:

- Making a diagnosis
- Ordering and interpreting results of tests
- Recommending treatment or other patient care
- Assessing risk, determining prognosis, and applying principles from epidemiologic studies
- Understanding the underlying pathophysiology of disease and basic science knowledge applicable to patient care

Clinical information presented may include patient photographs, ultrasound images, angiograms, micrographs, radiographs, electrocardiograms, and other media to illustrate relevant patient findings.

A tutorial including examples of ABIM exam question format can be found at <http://www.abim.org/certification/exam-information/nephrology/exam-tutorial.aspx>.

The blueprint can be expanded for additional detail as shown below. Each of the medical content categories is listed there, and below each major category are the content subsections and specific topics that *may* appear in the exam. Please note: actual exam content may vary.

Sodium and Water Abnormalities	8% of Exam
Hyponatremia	3%
Hypotonic	
Syndrome of inappropriate antidiuretic hormone secretion (SIADH)	
Hypervolemic	
Low solute intake	
Thiazides	
Other hypotonic (secondary adrenal insufficiency)	
Hypertonic	
Isotonic (pseudohyponatremia)	

Hypernatremia or serum hyperosmolality	<2%
Osmotic diuresis	
Urea	
Glucose	
Water diuresis	
Central diabetes insipidus	
Nephrogenic diabetes insipidus	
Other water diuresis (physiologic saline diuresis)	
Other hypernatremia or serum hyperosmolality (hypodipsia; extrarenal water loss)	
Salt excess (edema)	2.5%
Heart failure	
Cirrhosis	
Nephrotic syndrome	
Chronic kidney disease	
Salt depletion	<2%
Renal sodium losses	
Postobstructive diuresis	
Post-acute kidney injury diuresis	
Salt-wasting nephropathy	
Diuretics	
Other renal sodium losses (chemotherapy-induced)	
Extrarenal sodium losses	
Polyuria	<2%
Primary polydipsia	
Other polyuria (iatrogenic)	

Acid-Base and Potassium Disorders	9% of Exam
--	-------------------

Metabolic acidosis	3.5%
Metabolic acidosis (normal anion gap)	
Renal tubular acidosis (normokalemic or hypokalemic)	
Renal tubular acidosis (hyperkalemic)	
Nonrenal causes	
Metabolic acidosis (elevated anion gap)	
Lactic acidosis	
Ketoacidosis	
Toxins	
Uremic	
Other metabolic acidosis (low anion gap in multiple myeloma)	

Metabolic alkalosis	<2%
Associated with normal or low blood pressure	
Renal origin	
Other metabolic alkalosis associated with normal or low blood pressure (chemotherapy-induced; hypokalemia; post-hypercapnic)	
Associated with high blood pressure	
Adrenal	
Other metabolic alkalosis associated with high blood pressure (malignant hypertension)	
Respiratory acid-base disturbances	<2%
Respiratory acidosis	
Respiratory alkalosis	
Mixed acid-base disturbances	<2%
Potassium disturbances	3.5%
Hyperkalemia	
Pseudohyperkalemia	
Transcellular shifts	
Medication-induced	
Genetic abnormalities	
Other tubular disorders (hepatitis-associated)	
Postsurgical	
Other hyperkalemia (peritoneal dialysis)	
Hypokalemia	
Transcellular shifts	
Renal losses	
Nonrenal losses	
Other hypokalemia (combined therapeutic hypothermia and barbiturate coma)	

Calcium, Phosphorus, and Magnesium Disorders and Stones	4% of Exam
--	-------------------

Disorders of calcium metabolism	<2%
Hypercalcemia	
Primary hyperparathyroidism	
Granulomatous diseases	
Malignancy	
Familial hypocalciuric hypercalcemia (FHH)	
Vitamin D toxicity	
Medications and vitamins	
Milk alkali syndrome	

Hypocalcemia	
Hypoparathyroidism	
Pseudohypoparathyroidism	
Medications	
Tissue deposition	
Vitamin D deficiency	
Disorders of phosphate metabolism	<2%
Hyperphosphatemia	
Decreased renal excretion	
Increased intake	
Tissue redistribution	
Hypophosphatemia	
Increased renal excretion	
Decreased intake and gastrointestinal absorption	
Tissue redistribution	
Genetic causes	
Disorders of magnesium metabolism	<2%
Hypermagnesemia	
Decreased renal excretion	
Increased intake	
Hypomagnesemia	
Increased renal excretion	
Decreased gastrointestinal absorption	
Nephrolithiasis	<2%
Calcium stones	
Idiopathic hypercalciuria	
Hypocitraturia	
Hyperoxaluria	
Primary hyperparathyroidism	
Distal renal tubular acidosis	
Other calcium stones (medullary sponge kidney; hypercalciuria in hypoparathyroidism)	
Uric acid stones	
Idiopathic	
Other uric acid (postileostomy)	
Struvite stones	
Cystine stones	
Drug stones	

Chronic Kidney Disease	22% of Exam
Kidney function parameters	<2%
Glomerular filtration rate	
Proteinuria	
Other kidney function parameters (glycemic control; biopsy)	
Etiologies of chronic kidney disease	<2%
Diabetic kidney disease	
Nondiabetic kidney disease	
Chronic glomerulonephritis	
Hypertensive nephropathy	
Chronic interstitial nephritis	
Genetic diseases	
Progression of chronic kidney disease	<2%
Chronic kidney disease complications	<2%
Hypertension	
Fluid overload	
Anemia and iron deficiency	
Hyperkalemia	
Acidosis	
Protein-energy wasting	
Other complications of chronic kidney disease (hyperparathyroidism; hypervitaminosis D; hyperphosphatemia)	
Stage IV and V chronic kidney disease	<2%
Advanced uremic symptoms	
Preparation for end-stage renal disease	
Initiation and discontinuation of maintenance dialysis	
Other stage IV and V chronic kidney disease (parathyroid hormone monitoring)	
End-stage renal disease	11.5%
Hemodialysis	
Adequacy and prescription	
Dialyzers and dialysate	
Vascular access	
Water treatment	
Hemodialysis complications	
Hypertension	
Hypotension	
Interdialytic weight gain	
Electrolyte abnormalities	

- Vascular access complications (clotting, dysfunction, infection)
- Other hemodialysis complications (embolism and thrombosis; heparin-induced thrombocytopenia; loss of residual renal function; hypoalbuminemia)

Peritoneal dialysis

- Adequacy and prescription
- Dialysate
- Catheters
- Other peritoneal dialysis issues (hyperkalemia)

Peritoneal dialysis complications

- Peritonitis and infections
- Ultrafiltration failure
- Other peritoneal dialysis complications (inguinal hernia; atrial fibrillation; peripheral edema)

Home hemodialysis

End-stage renal disease complications

- Anemia
- Cardiovascular disease
- Blood pressure abnormalities
- Other complications (hemolysis; hypoalbuminemia; thrombosis; calciphylaxis; uremic polyneuropathy)

Medical director responsibilities and conditions of coverage

Mineral bone disease

3%

Laboratory abnormalities

- Hyperphosphatemia
- Hyperparathyroidism
- Other laboratory abnormalities (calcium balance)

Renal osteodystrophy (and related pathophysiology)

- Osteitis fibrosis
- Adynamic bone disease
- Osteomalacia
- Mixed uremic osteodystrophy
- Other renal osteodystrophy, including low bone mass (osteoporosis)

Extraosseous and vascular calcification

- Medial calcification
- Calciphylaxis
- Other extraosseous and vascular calcification, including visceral organs

Special topics in chronic kidney disease	<2%
Epidemiology	
Ethical considerations	
Pregnancy	
Laboratory studies	
Dermatology	
Nephrotoxicity of environmental and occupational agents	
Lead	
Organic solvents	
Other nephrotoxicity of environmental and occupational agents (cadmium; mercury)	
Other special topics in chronic kidney disease (obesity)	

Hypertension	10% of Exam
Essential hypertension	3.5%
Isolated systolic hypertension	
Severe hypertension	
Resistant hypertension	
White coat hypertension	
Pseudohypertension	
Masked hypertension	
Other essential hypertension (stage 2 hypertension; thiazide effect)	
Secondary causes of hypertension	4%
Pheochromocytoma	
Renal vascular disease	
Dissection	
Atherosclerotic	
Hyperaldosteronism	
Adrenal adenoma	
Adrenal hyperplasia	
Genetic causes	
Liddle syndrome	
Dexamethasone suppressible hyperaldosteronism	
Other genetic causes (Hashimoto's thyroiditis; scleroderma renal crisis)	
Miscellaneous causes	
Renin-secreting tumor (juxtaglomerular cell tumor)	
Syndrome of apparent mineralocorticoid excess	
Coarctation	
Vasculitis and arteritis	

Tuberous sclerosis	
Sleep apnea	
Drug-induced	
Obstructive uropathy	
Renal compression (Page kidney)	
Cushing syndrome	
Other miscellaneous causes (chronic kidney disease; obesity)	
End-organ damage resulting from hypertension	<2%
Acute kidney injury	
Central nervous system and ophthalmologic	
Cardiac (left ventricular hypertrophy; heart failure)	
Hypertension in special situations	<2%
Pregnancy	
Stroke or subarachnoid bleeding	
Other hypertension in special situations	

Tubular, Interstitial, and Cystic Disorders	4% of Exam
Renal tubular disorders and Fanconi's syndrome	<2%
Drug-induced	
Crystal deposition	
Genetic	
Tubulointerstitial nephritis	2%
Acute	
Drug-induced	
Immune	
Infectious	
Other acute tubulointerstitial nephritis (multifactorial)	
Chronic	
Drug-induced	
Immune	
Granulomatous	
Toxins	
Hemoglobinopathy	
Urinary tract infection	
Other chronic tubulointerstitial nephritis (hypokalemic nephropathy; medullary cystic kidney)	

Renal cystic disease	<2%
Autosomal dominant polycystic kidney disease (ADPKD)	
Genetics	
Renal manifestations	
Nonrenal manifestations	
End-stage renal disease	
Drug-induced	
Renal mass	<2%

Glomerular and Vascular Disorders	12% of Exam
--	--------------------

Nephritic glomerular disorders, vasculitis, and vasculopathy	5%
IgA nephropathy and Henoch-Schönlein purpura	
Vasculitis and antineutrophil cytoplasmic antibody	
Anti-glomerular basement membrane disease	
Lupus nephritis	
Postinfectious glomerulonephritis	
Membranoproliferative glomerulonephritis and C3 glomerulopathies	
Cryoglobulinemic glomerulonephritis	
Crescentic glomerulonephritis	
Other disorders (rapidly progressive glomerulonephritis)	
Nephrotic and heavy-proteinuric glomerular disorders	5%
Minimal change disease	
Primary	
Secondary	
Focal segmental glomerulosclerosis	
Primary	
Secondary	
Genetic	
Membranous nephropathy	
Primary	
Secondary	
Paraprotein-related disorders	
Primary amyloidosis	
Secondary amyloidosis	
Light chain deposition disease and myeloma	
Other paraprotein-related disorders	
Fibrillary and immunotactoid glomerulonephritis	
Fabry's disease	
Other disorders (biopsy complication)	

Thin basement membrane nephropathy and Alport's syndrome	<2%
Thrombotic microangiopathies	<2%
Hemolytic uremic syndrome	<2%
Shiga toxin-mediated hemolytic uremic syndrome	
Atypical hemolytic uremic syndrome	
Drug-associated atypical hemolytic uremic syndrome (anticancer drugs, clopidogrel, interferon, quinine)	
Other atypical hemolytic uremic syndrome (pregnancy-associated)	
Scleroderma renal disease	<2%

Kidney Transplantation	11% of Exam
-------------------------------	--------------------

Pre-transplantation	<2%
Transplant immunology	
Detection of pre-transplant alloreactivity and immunologic evaluation of transplant candidates	
Potential kidney transplant recipient evaluation	
Glomerular filtration rate listing requirements	
Cancer concerns	
Infection concerns	
Cardiac concerns	
Age concerns	
Comorbidities	
Other potential kidney transplant recipient evaluation (recurrent autoimmune kidney disease)	
Potential living kidney donor	
Donor evaluation	
Risks	
Ethics	
Organ allocation	
Deceased donor wait list	
Organ shortage strategies	
Paired kidney donation and chains	
Transplantation	<2%
Indications	
Contraindications	
Deceased donor kidney transplantation	
Types	
Outcomes	

Living donor kidney transplant	
Types	
Outcomes	
Post-transplantation	7%
Immunosuppression	
Induction	
Maintenance	
Short-term post-transplantation management	
Perioperative management and complications	
Graft dysfunction	
Long-term post-transplantation management	
Graft dysfunction	
Complications	
Other long-term post-transplantation management (graft failure)	
Rejection	
Hyperacute	
T cell	
Antibody-mediated	
Male and female fertility	
Pregnancy	
Male fertility	
Multiorgan and extrarenal transplantation	<2%
Ethics, society, and public policy	<2%

Pharmacology	5% of Exam
Basic pharmacology	<2%
Pharmacokinetics and other basic concepts	
Renal handling of drugs	
Principles of dialytic drug removal	
Drug selection in kidney disease	<2%
Antibiotics	
Vancomycin	
Aminoglycosides	
Other antibiotics (cephalosporins)	
Antineoplastic agents	
Antiviral agents	
Other drug selection in kidney disease (metformin; fentanyl)	

Nephrotoxicity of medications	2%
Principles and mechanisms of nephrotoxicity	
Antibacterial agents	
Aminoglycosides	
Vancomycin	
Antiviral agents	
Antifungal agents	
Antiparasitic agents	
Additional antimicrobials	
Pain medications	
Nonsteroidal anti-inflammatory drugs	
Fentanyl	
Gabapentin	
Tramadol	
Renin-angiotensin-aldosterone system (RAAS) blockade	
Angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, and renin inhibitors	
Aldosterone antagonists	
Antihypertensive agents	
Beta-adrenergic blockers	
Calcium channel blockers	
Minoxidil	
Antineoplastic chemotherapy agents	
Interferon	
Cisplatin	
Methotrexate	
Vascular endothelial growth factor inhibitors	
Immune checkpoint inhibitors	
Iodinated contrast and other imaging agents	
Lithium	
Supplements and herbs	
Aristolochic acid	
SGLT2 inhibitors	
Other nephrotoxicity of medications (cardiac glycosides; bisphosphonates)	
Nephrotoxicity of illicit drugs	<2%
Heroin and other intravenous drugs	
Ecstasy	
Cocaine	
Drug-drug interactions and adverse effects other than nephrotoxicity	<2%

Dialysis and other treatment of toxic substances	<2%
Ethylene glycol	
Methanol	
Other alcohols	
Lithium	
Other dialysis and treatment of toxic substances (salicylates; dialysis duration prescription)	

Acute Kidney Injury and Intensive Care Unit Nephrology	15% of Exam
---	--------------------

Hemodynamic (prerenal) acute kidney injury	4%
True volume depletion	
Renal	
Extrarenal	
Effective volume depletion	
Heart failure	
Cirrhosis	
Nephrotic syndrome	
Drugs	
Nonsteroidal anti-inflammatory drugs	
Calcineurin inhibitors	
Angiotensin-converting enzyme inhibitors and angiotensin receptor blockers	
Radiocontrast agents	
Other drugs (anticoagulants; interferon)	
Abdominal compartment syndrome	
Parenchymal (intrinsic) acute kidney injury	4.5%
Vascular	
Systemic diseases and vasculitis	
Atheroemboli	
Renal vein thrombosis	
Glomerular	
Drug-induced	
Infectious	
Other glomerular parenchymal acute kidney injury (relapsed microscopic polyangiitis)	
Tubular	
Ischemic	
Nephrotoxic	
Systemic disease	

Interstitial	
Drugs	
Systemic disease	
Malignancy (infiltrative)	
Postrenal acute kidney injury	<2%
Retroperitoneal and ureteral	
Idiopathic retroperitoneal fibrosis	
Malignancy	
Stones and crystals	
Bleeding	
Bladder, bladder outlet, and benign prostatic hyperplasia	
Renal replacement therapy	4%
Indications	
Solute accumulation	
Hemodynamic	
Acute kidney injury associated with intoxication	
Tumor lysis syndrome	
Techniques	
Intermittent hemodialysis	
Continuous renal replacement therapy	
Renal replacement therapy prescription	
Dialysate and replacement fluid	
Anticoagulation	
Complications	
Hemodynamic	
Citrate intoxication	
Other complications (dialysis disequilibrium syndrome)	
Intensive care unit nephrology	2%
Hemodynamic measures	
Intravenous fluids and volume status	
Ethics and palliative care	

January 2021