

ABIM invites diplomates to help develop the Nephrology MOC blueprint

Based on feedback from physicians that MOC assessments should better reflect what they see in practice, in 2016 the American Board of Internal Medicine (ABIM) invited all certified nephrologists to provide ratings of the relative frequency and importance of blueprint topics in practice.

This review process, which resulted in a new MOC exam blueprint, will be used on a periodic basis to inform and update all MOC assessments created by ABIM, including the Knowledge Check-In introduced in 2018. No matter what form ABIM's assessments ultimately take, they will need to be informed by front-line clinicians sharing their perspective on what is important to know.

A sample of over 400 nephrologists, similar to the total invited population of nephrologists in age, gender, geographic region, and time spent in direct patient care, provided the blueprint topic ratings. The ABIM Nephrology Exam Committee and Board have used this feedback to update the blueprint for MOC assessments (beginning with the Fall 2016 administration of the 10-year MOC exam).

To inform how exam content should be distributed across the major blueprint content categories, ABIM considered the average respondent ratings of topic frequency and importance in each of the content categories. A second source of information was the relative frequency of patient conditions in the content categories, as seen by certified nephrologists and documented by national health care data (described further under *Content distribution* below).

To determine prioritization of specific exam content within each major medical content category, ABIM used the respondent ratings of topic frequency and importance to set thresholds for these parameters in the exam assembly process (described further under *Detailed content outline* below).

Purpose of the Nephrology MOC exam

MOC assessments are designed to evaluate whether a certified nephrologist has maintained competence and currency in the knowledge and judgment required for practice. The MOC assessments emphasize diagnosis and management of prevalent conditions, particularly in areas where practice has changed in recent years. As a result of the recent blueprint review by ABIM diplomates, future assessments place less emphasis on rare conditions and focus more on situations in which physician intervention can have important consequences for patients. For conditions that are usually managed by other specialists, the focus will be on recognition rather than on management.

Exam format

The traditional 10-year exam is composed of 220 single-best-answer multiple-choice questions, of which 50 are new questions that do not count in the examinee's score. The Knowledge Check-In is composed of 90 single-best-answer multiple-choice questions, of which a small portion are new questions that do not count in the examinee's score (more information on how exams are developed can be found at abim.org/about/exam-information/exam-development.aspx). Examinees taking the traditional 10-year MOC exam will have access to an external resource (e.g., UpToDate®) for the entire exam. Examinees taking the Knowledge Check-In will have access to an external resource for the entire exam. Most questions describe patient scenarios and ask about the work done (that is, tasks performed) by physicians in the course of practice:

- **Diagnosis:** making a diagnosis or identifying an underlying condition
- **Testing:** ordering tests for diagnosis, staging, or follow-up
- **Treatment/Care Decisions:** recommending treatment or other patient care
- **Risk Assessment/Prognosis/Epidemiology:** assessing risk, determining prognosis, and applying principles from epidemiologic studies
- **Pathophysiology/Basic Science:** understanding the pathophysiology of disease and basic science knowledge applicable to patient care

Clinical scenarios presented take place in outpatient or inpatient settings as appropriate to a typical Nephrology practice. Clinical information presented may include patient photographs, ultrasound images, angiograms, micrographs, radiographs, electrocardiograms, and other media to illustrate relevant patient findings.

Tutorials for the traditional 10-year MOC exam and for the Knowledge Check-In, including examples of ABIM exam question format, can be found at abim.org/maintenance-of-certification/exam-information/nephrology/exam-tutorial.aspx.

Content distribution

Listed below are the major medical content categories that define the domain for the Nephrology MOC exam and Knowledge Check-In. The relative distribution of content is expressed as a percentage of the total exam. To determine the content distribution, ABIM considered the average respondent ratings of topic frequency and importance. To cross-validate these self-reported ratings, ABIM also considered the relative frequency of conditions seen in Medicare patients by a cohort of certified nephrologists. Informed by these data, the Nephrology Exam Committee and Board have determined the content category targets shown below.

CONTENT CATEGORY	Target %
Sodium and Water Abnormalities	7%
Acid-Base and Potassium Disorders	9%
Calcium, Phosphorus, and Magnesium Disorders and Stones	4%
Chronic Kidney Disease	25%
Hypertension	10%
Tubular, Interstitial, and Cystic Disorders	4%
Glomerular and Vascular Disorders	11%
Kidney Transplantation	10%
Pharmacology	5%
Acute Kidney Injury and Intensive Care Unit Nephrology	15%
Total	100%

The Nephrology MOC assessments may cover other dimensions of medicine as applicable to the medical content categories, such as adolescent medicine, critical care medicine, clinical epidemiology, geriatric medicine, ethics, and nutrition.

How the blueprint ratings are used to assemble the MOC assessments

Blueprint reviewers provided ratings of relative frequency in practice for each of the detailed content topics in the blueprint and provided ratings of the relative importance of the topics for each of the tasks described in *Exam format* above. In rating importance, reviewers were asked to consider factors such as the following:

- High risk of a significant adverse outcome
- Cost of care and stewardship of resources
- Common errors in diagnosis or management
- Effect on population health
- Effect on quality of life
- When failure to intervene by the physician deprives a patient of significant benefit

Frequency and importance were rated on a three-point scale corresponding to low, medium, or high. The median importance ratings are reflected in the *Detailed content outline* below. The Nephrology Exam Committee and Board, in partnership with the physician community, have set the following parameters for selecting MOC assessment questions according to the blueprint review ratings:

- At least 75% of exam questions will address high-importance content (indicated in green)
- No more than 25% of exam questions will address medium-importance content (indicated in yellow)
- No exam questions will address low-importance content (indicated in red)

Independent of the importance and task ratings, no more than 15% of exam questions will address low-frequency content (indicated by “LF” following the topic description).

The content selection priorities below are applicable beginning with the Spring 2017 MOC exam and are subject to change in response to future blueprint review.

Note: The same topic may appear in more than one medical content category.

Detailed content outline for the Nephrology MOC Exam and Knowledge Check-In

✔ – **High Importance:** At least 75% of exam questions will address topics and tasks with this designation.

◐ – **Medium Importance:** No more than 25% of exam questions will address topics and tasks with this designation.

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SODIUM AND WATER ABNORMALITIES (7% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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HYPONATREMIA (3% of exam)

Hypotonic					
Syndrome of inappropriate antidiuretic hormone secretion (SIADH)	✔	✔	✔	✔	✔
Hypervolemic	✔	✔	✔	✔	✔
Low solute intake	✔	✔	✔	◐	◐
Thiazides	✔	✔	✔	✔	✔
Other hypotonic (secondary adrenal insufficiency) LF	◐	◐	✔	◐	◐
Hypertonic					
Isotonic (pseudohyponatremia) LF	✔	◐	◐	◐	◐

HYPERNATREMIA OR SERUM HYPEROSMOLALITY (<2% of exam)

Osmotic diuresis					
Urea LF	◐	◐	◐	◐	◐
Glucose	✔	✔	✔	◐	◐
Water diuresis					
Central diabetes insipidus LF	✔	✔	✔	◐	◐
Nephrogenic diabetes insipidus LF	✔	✔	✔	◐	◐
Other water diuresis (physiologic saline diuresis)	◐	◐	◐	◐	◐
Other hypernatremia or serum hyperosmolality (hypodipsia; extrarenal water loss)	✔	✔	✔	◐	◐

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SODIUM AND WATER ABNORMALITIES <i>continued...</i> (7% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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SALT EXCESS (EDEMA) (2.5% of exam)

Heart failure	✔	✔	✔	✔	✔
Cirrhosis	✔	✔	✔	✔	✔
Nephrotic syndrome	✔	✔	✔	✔	✔
Chronic kidney disease	✔	✔	✔	✔	✔

SALT DEPLETION (<2% of exam)

Renal sodium losses					
Postobstructive diuresis	✔	✔	✔	✔	✔
Post-acute kidney injury diuresis	✔	✔	✔	✔	⚡
Salt-wasting nephropathy LF	⚡	⚡	⚡	⚡	⚡
Cerebral salt wasting LF	⚡	⚡	⚡	⚡	⚡
Diuretics	✔	✔	✔	✔	✔
Other renal sodium losses (chemotherapy-induced) LF	⚡	⚡	⚡	⚡	⚡
Extrarenal sodium losses					
	⚡	⚡	⚡	⚡	⚡

POLYURIA (<2% of exam)

Primary polydipsia LF	✔	⚡	⚡	⚡	⚡
Other polyuria (iatrogenic) LF	⚡	⚡	⚡	⚡	⚡

ACID-BASE AND POTASSIUM DISORDERS (9% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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METABOLIC ACIDOSIS (3.5% of exam)

Metabolic acidosis (normal anion gap)					
Renal tubular acidosis (normokalemic or hypokalemic)	✔	✔	✔	⚡	⚡
Renal tubular acidosis (hyperkalemic)	✔	✔	✔	⚡	✔
Nonrenal causes	✔	✔	✔	⚡	⚡

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ACID-BASE AND POTASSIUM DISORDERS <i>continued...</i> (9% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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METABOLIC ACIDOSIS *continued... (3.5% of exam)*

Metabolic acidosis (elevated anion gap)					
Lactic acidosis	✔	✔	✔	✔	✔
Ketoacidosis	✔	✔	✔	✔	✔
Toxins	✔	✔	✔	⚠	⚠
Uremic	✔	✔	✔	✔	✔
Other metabolic acidosis (low anion gap in multiple myeloma)	LF ⚠	⚠	⚠	⚠	⚠

METABOLIC ALKALOSIS (<2% of exam)

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	LF ✔	✔	⚠	⚠	⚠
Other metabolic alkalosis associated with high blood pressure (malignant hypertension)	✔	✔	✔	⚠	⚠

RESPIRATORY ACID-BASE DISTURBANCES (<2% of exam)

Respiratory acidosis	✔	✔	✔	⚠	⚠
Respiratory alkalosis	⚠	⚠	⚠	⚠	⚠

MIXED ACID-BASE DISTURBANCES (<2% of exam)

Mixed acid-base disturbances	✔	✔	✔	⚠	✔
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ACID-BASE AND POTASSIUM DISORDERS <i>continued...</i> (9% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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POTASSIUM DISTURBANCES (3.5% of exam)

Hyperkalemia					
Pseudohyperkalemia	LF	⚡	⚡	⚡	⚡
Transcellular shifts		✔	✔	⚡	⚡
Medication-induced		✔	✔	✔	⚡
Genetic abnormalities	LF	⚡	⚡	⚡	✘
Other tubular disorders (hepatitis-associated)	LF	⚡	⚡	✘	⚡
Postsurgical		⚡	⚡	⚡	⚡
Other hyperkalemia (peritoneal dialysis)	LF	⚡	⚡	⚡	⚡
Hypokalemia					
Transcellular shifts		⚡	⚡	⚡	⚡
Renal losses		✔	✔	⚡	⚡
Nonrenal losses		⚡	⚡	⚡	⚡
Other hypokalemia (combined therapeutic hypothermia and barbiturate coma)	LF	⚡	⚡	✘	✘

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CALCIUM, PHOSPHORUS, AND MAGNESIUM DISORDERS AND STONES (4% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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DISORDERS OF CALCIUM METABOLISM (<2% of exam)

Hypercalcemia					
Primary hyperparathyroidism		✔	✔	✔	⚠
Granulomatous diseases	LF	⚠	⚠	⚠	⚠
Malignancy		✔	✔	✔	⚠
Familial hypocalciuric hypercalcemia (FHH)	LF	⚠	⚠	⚠	⚠
Vitamin D toxicity	LF	⚠	⚠	⚠	⚠
Medications and vitamins		⚠	⚠	⚠	⚠
Milk alkali syndrome	LF	⚠	⚠	⚠	⚠
Hypocalcemia					
Hypoparathyroidism	LF	⚠	⚠	⚠	⚠
Pseudohypoparathyroidism	LF	⚠	✘	✘	✘
Medications		✔	⚠	⚠	⚠
Tissue deposition	LF	⚠	⚠	⚠	⚠
Vitamin D deficiency		✔	✔	✔	⚠

DISORDERS OF PHOSPHATE METABOLISM (<2% of exam)

Hyperphosphatemia					
Decreased renal excretion		✔	✔	✔	✔
Increased intake		✔	⚠	✔	⚠
Tissue redistribution		⚠	⚠	⚠	⚠
Hypophosphatemia					
Increased renal excretion	LF	⚠	⚠	⚠	⚠
Decreased intake and gastrointestinal absorption	LF	⚠	⚠	⚠	⚠
Tissue redistribution	LF	⚠	⚠	⚠	⚠
Genetics causes	LF	⚠	⚠	✔	⚠

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CALCIUM, PHOSPHORUS, AND MAGNESIUM DISORDERS AND STONES <i>continued...</i> (4% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science

DISORDERS OF MAGNESIUM METABOLISM (<2% of exam)

Hypermagnesemia					
Decreased renal excretion	⚠	⚠	⚠	⚠	⚠
Increased intake	LF	⚠	⚠	⚠	⚠
Hypomagnesemia					
Increased renal excretion	⚠	⚠	⚠	⚠	⚠
Decreased gastrointestinal absorption	⚠	⚠	⚠	⚠	⚠

NEPHROLITHIASIS (<2% of exam)

Calcium stones					
Idiopathic hypercalciuria	⚠	⚠	⚠	⚠	⚠
Hypocitraturia	✔	⚠	✔	⚠	⚠
Hyperoxaluria	⚠	⚠	⚠	⚠	⚠
Primary hyperparathyroidism	✔	⚠	⚠	⚠	⚠
Distal renal tubular acidosis	✔	✔	✔	⚠	⚠
Other calcium stones (medullary sponge kidney; hypercalciuria in hypoparathyroidism)	LF	⚠	⚠	⚠	⚠
Uric acid stones					
Idiopathic	LF	⚠	⚠	⚠	⚠
Other uric acid (postileostomy)	LF	⚠	⚠	⚠	⚠
Struvite stones	LF	⚠	⚠	⚠	⚠
Cystine stones	LF	⚠	⚠	⚠	⚠
Drug stones	LF	⚠	⚠	⚠	⚠

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CHRONIC KIDNEY DISEASE (25% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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KIDNEY FUNCTION PARAMETERS (<2% of exam)

Glomerular filtration rate (creatinine clearance; estimated glomerular filtration rate)	✔	✔	✔	✔	⚠
Proteinuria	✔	✔	✔	✔	✔
Other kidney function parameters (glycemic control; biopsy)	✔	✔	✔	✔	✔

ETIOLOGIES OF CHRONIC KIDNEY DISEASE (<2% of exam)

Diabetic kidney disease	✔	✔	✔	✔	✔
Nondiabetic kidney disease					
Chronic glomerulonephritis	✔	✔	✔	✔	⚠
Hypertensive nephropathy	✔	✔	✔	✔	✔
Chronic interstitial nephritis	✔	✔	✔	⚠	⚠
Genetic diseases LF	⚠	⚠	⚠	⚠	⚠

PROGRESSION OF CHRONIC KIDNEY DISEASE (<2% of exam)

Progression of chronic kidney disease	✔	✔	✔	✔	✔
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CHRONIC KIDNEY DISEASE COMPLICATIONS (2% of exam)

Hypertension	✔	✔	✔	✔	✔
Fluid overload	✔	✔	✔	✔	✔
Anemia and iron deficiency	✔	✔	✔	✔	⚠
Hyperkalemia	✔	✔	✔	✔	✔
Acidosis	✔	✔	✔	✔	✔
Protein-energy wasting	⚠	⚠	⚠	⚠	⚠
Other complications of chronic kidney disease (hyperparathyroidism; hyperphosphatemia)	✔	✔	✔	✔	✔

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CHRONIC KIDNEY DISEASE <i>continued...</i> (25% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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STAGE IV AND V CHRONIC KIDNEY DISEASE (2.5% of exam)

Advanced uremic symptoms	✔	✔	✔	✔	⚡
Preparation for end-stage renal disease	<i>Not Applicable</i>	✔	✔	✔	<i>Not Applicable</i>
Initiation and discontinuation of maintenance dialysis	<i>Not Applicable</i>	✔	✔	✔	<i>Not Applicable</i>
Other stage IV and V chronic kidney disease (parathyroid hormone monitoring)	✔	✔	✔	✔	✔

END-STAGE RENAL DISEASE (12.5% of exam)

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 (hypokalemia and hyperkalemia)	✔	✔	✔	⚡	⚡

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CHRONIC KIDNEY DISEASE <i>continued...</i> (25% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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END-STAGE RENAL DISEASE *continued...* (12.5% of exam)

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	<i>Not Applicable</i>	⚠	⚠	⚠	<i>Not Applicable</i>

MINERAL BONE DISEASE (3% of exam)

Laboratory abnormalities					
Hyperphosphatemia	✔	✔	✔	✔	✔
Hyperparathyroidism	✔	✔	✔	✔	✔
Other laboratory abnormalities (calcium balance)	✔	✔	✔	⚠	⚠
Renal osteodystrophy (and related pathophysiology)					
Osteitis fibrosis	LF	⚠	⚠	⚠	⚠
Adynamic bone disease	LF	⚠	⚠	⚠	⚠
Osteomalacia	LF	⚠	⚠	⚠	⚠
Mixed uremic osteodystrophy	LF	⚠	⚠	⚠	⚠
Other renal osteodystrophy, including low bone mass (osteoporosis)		⚠	⚠	⚠	⚠

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CHRONIC KIDNEY DISEASE <i>continued...</i> (25% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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MINERAL BONE DISEASE *continued...* (3% of exam)

Extrasosseous and vascular calcification					
Medial calcification	⚠	⚠	⚠	⚠	⚠
Calciophylaxis	LF ✔	✔	✔	⚠	⚠
Other extrasosseous and vascular calcification, including visceral organs	LF ⚠	⚠	⚠	⚠	⚠

SPECIAL TOPICS IN CHRONIC KIDNEY DISEASE (<2% of exam)

Epidemiology	Not Applicable			⚠	⚠
Ethical considerations	Not Applicable		✔	⚠	Not Applicable
Pregnancy	LF	Not Applicable	✔	✔	⚠
Laboratory studies	✔	✔	Not Applicable	⚠	⚠
Dermatology	LF	⚠	⚠	⚠	✘

Nephrotoxicity of environmental and occupational agents

Lead	LF	⚠	⚠	⚠	⚠	✘
Organic solvents	LF	⚠	⚠	⚠	✘	✘
Other nephrotoxicity of environmental and occupational agents (cadmium; mercury)	LF	⚠	⚠	⚠	✘	✘

Other special topics in chronic kidney disease (obesity)

	⚠	⚠	⚠	⚠	⚠
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HYPERTENSION (10% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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ESSENTIAL HYPERTENSION (3.5% of exam)

Isolated systolic hypertension	✔	✔	✔	✔	⚠
Severe hypertension	✔	✔	✔	✔	✔
Resistant hypertension	✔	✔	✔	✔	✔
White coat hypertension	✔	✔	✔	✔	⚠

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HYPERTENSION <i>continued...</i> (10% of exam)		Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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ESSENTIAL HYPERTENSION *continued...* (3.5% of exam)

Pseudohypertension	LF	⚠	⚠	⚠	⚠	⚠
Masked hypertension	LF	⚠	⚠	⚠	⚠	⚠
General essential hypertension		✔	✔	✔	⚠	⚠

SECONDARY CAUSES OF HYPERTENSION (4% of exam)

Pheochromocytoma	LF	✔	✔	✔	⚠	⚠
Renal vascular disease						
Dissection	LF	✔	✔	✔	✔	⚠
Atherosclerotic		✔	✔	✔	✔	⚠
Hyperaldosteronism						
Adrenal adenoma	LF	✔	✔	✔	⚠	⚠
Adrenal hyperplasia	LF	⚠	✔	⚠	⚠	⚠
Genetic causes						
Liddle syndrome	LF	⚠	⚠	⚠	⚠	⚠
Cushing syndrome	LF	⚠	⚠	⚠	⚠	⚠
Dexamethasone suppressible hyperaldosteronism	LF	⚠	⚠	⚠	⚠	⚠
Other genetic causes (fibromuscular dysplasia)	LF	⚠	⚠	⚠	⚠	⚠

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HYPERTENSION <i>continued...</i> (10% of exam)		Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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SECONDARY CAUSES OF HYPERTENSION *continued... (4% of exam)*

Miscellaneous causes						
Renin-secreting tumor (juxtaglomerular cell tumor)	LF	⚠	⚠	⚠	⚠	⚠
Syndrome of apparent mineralocorticoid excess	LF	⚠	⚠	⚠	⚠	⚠
Coarctation	LF	⚠	⚠	⚠	⚠	⚠
Vasculitis and arteritis		✔	✔	✔	⚠	⚠
Tuberous sclerosis	LF	⚠	⚠	⚠	✘	⚠
Sleep apnea		✔	✔	✔	✔	⚠
Drug-induced		✔	✔	✔	⚠	⚠
Obstructive uropathy		✔	✔	✔	⚠	⚠
Renal compression (Page kidney)	LF	⚠	⚠	⚠	⚠	⚠
Other miscellaneous causes (chronic kidney disease; obesity; hypothyroidism)		✔	✔	✔	✔	⚠

END-ORGAN DAMAGE RESULTING FROM HYPERTENSION (<2% of exam)

Acute kidney injury		✔	✔	✔	✔	✔
Central nervous system and ophthalmologic		⚠	⚠	⚠	⚠	⚠
Cardiac (left ventricular hypertrophy; heart failure)		✔	✔	✔	✔	⚠

HYPERTENSION IN SPECIAL SITUATIONS (<2% of exam)

Pregnancy		✔	✔	✔	✔	⚠
Stroke or subarachnoid bleeding		✔	✔	✔	⚠	⚠
Other hypertension in special situations (nocturnal hypertension)	LF	⚠	⚠	⚠	⚠	⚠

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TUBULAR, INTERSTITIAL, AND CYSTIC DISORDERS (4% of exam)		Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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RENAL TUBULAR DISORDERS AND FANCONI'S SYNDROME (<2% of exam)

Drug-induced		✔	✔	✔	⚠	⚠
Crystal deposition	LF	⚠	⚠	⚠	⚠	⚠
Genetic	LF	⚠	⚠	⚠	✘	✘

TUBULOINTERSTITIAL NEPHRITIS (2% of exam)

Acute						
Drug-induced		✔	✔	✔	⚠	⚠
Immune	LF	⚠	⚠	⚠	⚠	⚠
Infectious	LF	⚠	⚠	⚠	⚠	⚠
Other acute tubulointerstitial nephritis (multifactorial)		⚠	⚠	⚠	⚠	⚠
Chronic						
Drug-induced		✔	✔	✔	⚠	⚠
Immune	LF	⚠	⚠	⚠	⚠	⚠
Granulomatous	LF	⚠	⚠	⚠	⚠	⚠
Toxins	LF	⚠	⚠	⚠	⚠	⚠
Hemoglobinopathy	LF	⚠	⚠	⚠	⚠	⚠
Urinary tract infection		✔	✔	✔	⚠	⚠
Other chronic tubulointerstitial nephritis (hypokalemic nephropathy; medullary cystic kidney)	LF	⚠	⚠	⚠	⚠	⚠

RENAL CYSTIC DISEASE (<2% of exam)

Autosomal dominant polycystic kidney disease (ADPKD)						
Genetics		✔	✔	✔	⚠	⚠
Renal manifestations		✔	✔	✔	✔	✔
Nonrenal manifestations		✔	✔	✔	⚠	⚠
End-stage renal disease		✔	✔	✔	✔	✔
Drug-induced	LF	⚠	⚠	⚠	⚠	⚠

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TUBULAR, INTERSTITIAL, AND CYSTIC DISORDERS <i>continued...</i> (4% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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RENAL MASS (<2% of exam)

Cystic	✔	✔	✔	⚡	⚡
Solid	✔	✔	✔	⚡	⚡

GLOMERULAR AND VASCULAR DISORDERS (11% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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NEPHRITIC GLOMERULAR DISORDERS, VASCULITIS, AND VASCULOPATHY (4.5% of exam)

IgA nephropathy and Henoch-Schonlein purpura	✔	✔	✔	✔	⚡
Vasculitis and antineutrophil cytoplasmic antibody	✔	✔	✔	✔	⚡
Anti-glomerular basement membrane disease	LF	✔	✔	⚡	⚡
Lupus nephritis	✔	✔	✔	✔	✔
Postinfectious glomerulonephritis	LF	✔	✔	⚡	⚡
Membranoproliferative glomerulonephritis and C3 glomerulopathies	LF	✔	✔	⚡	⚡
Cryoglobulinemic glomerulonephritis	LF	✔	✔	⚡	⚡
Crescentic glomerulonephritis	✔	✔	✔	✔	⚡
Other disorders (rapidly progressive glomerulonephritis)	LF	✔	✔	✔	⚡

NEPHROTIC AND HEAVY-PROTEINURIC GLOMERULAR DISORDERS (4.5% of exam)

Minimal change disease					
Primary	✔	✔	✔	✔	⚡
Secondary	LF	✔	✔	⚡	⚡
Focal segmental glomerulosclerosis					
Primary	✔	✔	✔	✔	⚡
Secondary	✔	✔	✔	✔	⚡
Genetic	LF	⚡	⚡	⚡	⚡

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GLOMERULAR AND VASCULAR DISORDERS <i>continued...</i> (11% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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NEPHROTIC AND HEAVY-PROTEINURIC GLOMERULAR DISORDERS *continued...* (4.5% of exam)

Membranous nephropathy					
Primary	✔	✔	✔	✔	⚠
Secondary	✔	✔	✔	✔	⚠
Paraprotein-related disorders					
Primary amyloidosis	LF	✔	✔	✔	⚠
Secondary amyloidosis	LF	✔	✔	⚠	⚠
Light chain deposition disease and myeloma		✔	✔	✔	⚠
Fibrillary and immunotactoid glomerulonephritis	LF	⚠	⚠	⚠	⚠
Fabry's disease	LF	⚠	⚠	⚠	✘
Other disorders (biopsy complication)	LF	✔	✔	✔	✘

THIN BASEMENT MEMBRANE NEPHROPATHY AND ALPORT'S SYNDROME (<2% of exam)

Thin basement membrane nephropathy and Alport's syndrome	LF	⚠	✔	⚠	⚠
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THROMBOTIC MICROANGIOPATHIES (<2% of exam)

Thrombotic microangiopathies		✔	✔	✔	⚠
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HEMOLYTIC UREMIC SYNDROME (<2% of exam)

Shiga toxin-mediated hemolytic uremic syndrome	LF	✔	✔	✔	⚠
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Atypical hemolytic uremic syndrome

Drug-associated atypical hemolytic uremic syndrome (anticancer drugs, clopidogrel, interferon, quinine)	LF	✔	✔	✔	⚠
Other atypical hemolytic uremic syndrome (pregnancy-associated)	LF	✔	✔	✔	⚠

SCLERODERMA RENAL DISEASE (<2% of exam)

Scleroderma renal disease	LF	✔	✔	✔	⚠
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KIDNEY TRANSPLANTATION (10% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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PRE-TRANSPLANTATION (<2% of exam)

Transplant immunology					
Detection of pre-transplant alloreactivity and immunologic evaluation of transplant candidates	LF	⚠	⚠	Not Applicable	⚠
Desensitization	LF	Not Applicable		⚠	✘
Potential kidney transplant recipient evaluation					
Glomerular filtration rate listing requirements	Not Applicable		✔	✔	Not Applicable
Cancer concerns	Not Applicable	✔	✔	✔	⚠
Infection concerns	Not Applicable	✔	✔	✔	⚠
Cardiac concerns	Not Applicable	✔	✔	✔	⚠
Age concerns	Not Applicable		✔	⚠	Not Applicable
Comorbidities	Not Applicable	✔	✔	✔	⚠
Other potential kidney transplant recipient evaluation (recurrent autoimmune kidney disease)	Not Applicable	⚠	⚠	⚠	⚠
Potential living kidney donor					
Donor evaluation	Not Applicable	⚠	Not Applicable		
Risks	Not Applicable			⚠	Not Applicable
Ethics	Not Applicable		⚠	Not Applicable	
Organ allocation					
Deceased donor wait list	Not Applicable		✔	Not Applicable	
Organ shortage strategies	Not Applicable		⚠	Not Applicable	
Paired kidney donation and chains	LF	Not Applicable		⚠	Not Applicable

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KIDNEY TRANSPLANTATION <i>continued...</i> (10% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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TRANSPLANTATION (<2% of exam)

Indications	Not Applicable	✔	✔	✔	⚠
Contraindications	Not Applicable	✔	✔	✔	⚠

Deceased donor kidney transplantation

Types	Not Applicable	⚠	⚠	⚠	⚠
Outcomes	Not Applicable	✔	✔	✔	⚠

Living donor kidney transplant

Types	Not Applicable	✔	✔	⚠	⚠
Outcomes	Not Applicable	✔	✔	✔	⚠

POST-TRANSPLANTATION (7% of exam)

Immunosuppression						
Induction	LF	⚠	⚠	⚠	⚠	✘
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	LF	⚠	⚠	⚠	⚠	✘
T cell	LF	⚠	⚠	⚠	⚠	⚠
Antibody-mediated		✔	⚠	⚠	⚠	⚠

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KIDNEY TRANSPLANTATION <i>continued...</i> (10% of exam)		Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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POST-TRANSPLANTATION *continued... (7% of exam)*

Male and female fertility						
Pregnancy	LF	Not Applicable	⚡	⚡	⚡	⚡
Male fertility	LF	Not Applicable	⚡	⚡	⚡	✘

MULTIORGAN AND EXTRARENAL TRANSPLANTATION (<2% of exam)

Multiorgan and extrarenal transplantation	LF	⚡	⚡	⚡	⚡	✘
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ETHICS, SOCIETY, AND PUBLIC POLICY (<2% of exam)

Ethics, society, and public policy		Not Applicable	⚡	⚡	Not Applicable	Not Applicable
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PHARMACOLOGY (5% of exam)		Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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BASIC PHARMACOLOGY (<2% of exam)

Pharmacokinetics and other basic concepts		⚡	⚡	⚡	⚡	⚡
Renal handling of drugs		✔	⚡	✔	⚡	⚡
Principles of dialytic drug removal		Not Applicable		✔	⚡	⚡

DRUG SELECTION IN KIDNEY DISEASE (<2% of exam)

Antibiotics						
Vancomycin		Not Applicable		✔	✔	⚡
Aminoglycosides		Not Applicable		✔	⚡	⚡
Other antibiotics (cephalosporins)		Not Applicable		✔	⚡	⚡
Antineoplastic agents		Not Applicable		⚡	⚡	⚡
Antiviral agents		Not Applicable		⚡	⚡	⚡
Other drug selection in kidney disease (metformin; fentanyl)		Not Applicable		✔	✔	⚡

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PHARMACOLOGY <i>continued...</i> (5% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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NEPHROTOXICITY OF MEDICATIONS (2% of exam)

Principles and mechanisms of nephrotoxicity	<i>Not Applicable</i>	✔	✔	⚡
Antibacterial agents				
Aminoglycosides	⚡	⚡	✔	⚡
Vancomycin	✔	✔	✔	⚡
Antiviral agents				
	⚡	⚡	⚡	⚡
Antifungal agents				
Amphotericin B	LF ⚡	⚡	⚡	⚡
Antiparasitic agents	LF ✘	✘	✘	✘
Additional antimicrobials	⚡	⚡	⚡	✘
Pain medications				
Nonsteroidal anti-inflammatory drugs	✔	✔	✔	⚡
Fentanyl	LF ⚡	⚡	⚡	✘
Gabapentin	⚡	⚡	⚡	⚡
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	LF ⚡	⚡	⚡	⚡

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PHARMACOLOGY <i>continued...</i> (5% of exam)		Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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NEPHROTOXICITY OF MEDICATIONS *continued... (2% of exam)*

Antineoplastic chemotherapy agents						
Interferon	LF	⚠	✘	⚠	✘	✘
Cisplatin	LF	⚠	⚠	⚠	⚠	⚠
Methotrexate	LF	⚠	⚠	⚠	⚠	✘
Vascular endothelial growth factor inhibitors	LF	⚠	⚠	⚠	⚠	⚠
Iodinated contrast and other imaging agents		✔	✔	✔	✔	⚠
Lithium		✔	✔	✔	✔	⚠
Supplements and herbs						
Aristolochic acid	LF	⚠	⚠	⚠	⚠	✘
Other nephrotoxicity of medications (cardiac glycosides; bisphosphonates)		⚠	⚠	⚠	⚠	⚠

NEPHROTOXICITY OF ILLICIT DRUGS (<2% of exam)

Heroin and other intravenous drugs		⚠	⚠	⚠	⚠	⚠
Ecstasy	LF	⚠	⚠	⚠	⚠	⚠
Cocaine	LF	⚠	⚠	⚠	⚠	⚠

DRUG-DRUG INTERACTIONS AND ADVERSE EFFECTS OTHER THAN NEPHROTOXICITY (<2% of exam)

Drug-drug interactions and adverse effects other than nephrotoxicity		✔	⚠	✔	⚠	⚠
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DIALYSIS AND OTHER TREATMENT OF TOXIC SUBSTANCES (<2% of exam)

Ethylene glycol	LF	<i>Not Applicable</i>	✔	✔	✔	⚠
Methanol	LF	<i>Not Applicable</i>	✔	✔	✔	⚠
Other alcohols	LF	<i>Not Applicable</i>	⚠	⚠	⚠	⚠
Lithium	LF	<i>Not Applicable</i>	✔	✔	✔	⚠
Other dialysis and treatment of toxic substances (salicylates; dialysis duration prescription)	LF	<i>Not Applicable</i>	✔	✔	⚠	⚠

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ACUTE KIDNEY INJURY AND INTENSIVE CARE UNIT NEPHROLOGY (15% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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HEMODYNAMIC (PRERENAL) ACUTE KIDNEY INJURY (4% of exam)

True volume depletion					
Renal fluid losses	✔	✔	✔	✔	⚠
Extrarenal fluid losses	✔	✔	✔	✔	⚠
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 (tenofovir, cisplatin) LF	⚠	⚠	⚠	⚠	⚠
Abdominal compartment syndrome LF	✔	✔	✔	⚠	⚠

PARENCHYMAL (INTRINSIC) ACUTE KIDNEY INJURY (4.5% of exam)

Vascular					
Systemic diseases and vasculitis	✔	✔	✔	✔	⚠
Atheroemboli LF	✔	✔	✔	⚠	⚠
Renal vein thrombosis LF	✔	⚠	✔	⚠	⚠
Glomerular					
Drug-induced	✔	✔	✔	✔	⚠
Infectious	✔	✔	✔	⚠	⚠
General glomerular parenchymal acute kidney injury LF	✔	✔	✔	⚠	⚠

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LF – Low Frequency: No more than 15% of exam questions will address topics with this designation, regardless of task or importance.

ACUTE KIDNEY INJURY AND INTENSIVE CARE UNIT NEPHROLOGY <i>continued...</i> (15% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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PARENCHYMAL (INTRINSIC) ACUTE KIDNEY INJURY *continued... (4.5% of exam)*

Tubular					
Ischemic	✔	✔	✔	✔	✔
Nephrotoxic	✔	✔	✔	✔	⚠
Systemic disease	✔	✔	✔	⚠	⚠
Interstitial					
Drugs	✔	✔	✔	✔	⚠
Systemic disease	✔	✔	✔	⚠	⚠
Malignancy (infiltrative) LF	⚠	⚠	⚠	⚠	⚠

POSTRENAL ACUTE KIDNEY INJURY (<2% of exam)

Retroperitoneal and ureteral					
Idiopathic retroperitoneal fibrosis LF	⚠	⚠	⚠	⚠	⚠
Malignancy	⚠	⚠	⚠	⚠	⚠
Crystals and stones	✔	✔	✔	⚠	⚠
Bleeding (intrarenal hemorrhage) LF	⚠	⚠	⚠	⚠	⚠
Bladder, bladder outlet, and benign prostatic hyperplasia	✔	✔	✔	⚠	⚠

RENAL REPLACEMENT THERAPY (4.5% of exam)

Indications					
Solute accumulation (potassium, hydrogen ions, phosphate, urea)	✔	✔	✔	⚠	⚠
Hemodynamic	✔	✔	✔	✔	⚠
Acute kidney injury associated with intoxication	✔	✔	✔	✔	⚠
Tumor lysis syndrome	✔	✔	✔	✔	⚠

✔ – **High Importance:** At least 75% of exam questions will address topics and tasks with this designation.

⚠ – **Medium Importance:** No more than 25% of exam questions will address topics and tasks with this designation.

✘ – **Low Importance:** No exam questions will address topics and tasks with this designation.

LF – Low Frequency: No more than 15% of exam questions will address topics with this designation, regardless of task or importance.

ACUTE KIDNEY INJURY AND INTENSIVE CARE UNIT NEPHROLOGY <i>continued...</i> (15% of exam)	Diagnosis	Testing	Treatment/ Care Decisions	Risk Assessment/ Prognosis/ Epidemiology	Pathophysiology/ Basic Science
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RENAL REPLACEMENT THERAPY *continued...* (4.5% of exam)

Techniques					
Intermittent hemodialysis	<i>Not Applicable</i>	✔	✔	✔	✔
Continuous renal replacement therapy	<i>Not Applicable</i>	✔	✔	✔	✔
Renal replacement therapy prescription					
Dialysate and replacement fluid	<i>Not Applicable</i>	✔	✔	✔	✔
Anticoagulation	<i>Not Applicable</i>	✔	✔	✔	⚠
Complications					
Hemodynamic	✔	✔	✔	✔	⚠
Citrate intoxication	LF ⚠	⚠	⚠	⚠	⚠
Other complications (dialysis disequilibrium syndrome, electrolyte abnormalities)	LF ✔	✔	✔	⚠	⚠

INTENSIVE CARE UNIT NEPHROLOGY (<2% of exam)

Hemodynamic measures	<i>Not Applicable</i>	✔	✔	✔	✔
Intravenous fluids and volume status	✔	✔	✔	✔	✔
Ethics and palliative care	<i>Not Applicable</i>		✔	✔	<i>Not Applicable</i>