



الهيئة السعودية للتخصصات الصحية
Saudi Commission for Health Specialties

Pediatric Nephrology Fellowship



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

PREFACE

- The primary goal of this document is to enrich the training experience of postgraduate trainees by outlining the learning objectives to become independent and competent future practitioners.
- This curriculum may contain sections that outline some regulations of training; however, such regulations need to be sought from training’s “General Bylaws” and “Executive Policies” published by the Saudi Commission for Health Specialties (SCFHS), which can be accessed online through the official SCFHS website. In the case of discrepancy in regulation statements, the one stated in the most updated bylaws and executive policies will be the reference to apply.
- As this curriculum is subject to periodic refinements, please refer to the electronic version posted online for the most updated edition at www.scfhs.org.sa

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INTRODUCTION

The Saudi Pediatric Nephrology Fellowship Program is a well-established training program. We currently accept two fellows per training center at a time. Currently, nine training centers are accredited by the Saudi Commission for Health Specialties, distributed across the three major cities of the Kingdom. Our goal is to produce well-trained and proficient pediatric nephrologists. This is achieved by combining broad clinical exposure in pediatric nephrology and related disciplines with tailored research experience, attentive instruction, and learning opportunities.

In this updated curriculum, we adopted the CanMEDS framework, as this innovative, competency-based framework describes the core knowledge, skills, and attitude of physicians. This curriculum was intended to provide a broad framework for fellows and faculty to focus on teaching, learning, clinical experience, and professional development during the training program. Nevertheless, this is not intended to be the sole source of defining what is to be taught and learned during fellowship training. Fellows are expected to acquire knowledge and skills, develop appropriate attitudes and behaviors throughout their training program, and take personal responsibility in learning. They must learn from every patient to determine whether a particular condition or disease is mentioned in this curriculum.



FELLOWSHIP TRAINING PROGRAM STRUCTURE

What is new to this edition?

- The fellowship duration is two years, followed by an optional 3rd year track to be applicable after the official approvals
- Addition of one more Pediatric Hemodialysis block
- Addition of one more General Nephrology block
- Deletion of Adult Hemodialysis Block
- Addition of (renal imaging/pediatric urology) in one block as a replacement for two previous blocks: the Pediatric Urology block and Renal Radiology Block
- Two different tracks as an optional 3rd year with a separate fellowship certificate to be applicable after the official approval as it will be a separate fellowship after General Nephrology training.
- Modification of the promotion requirements: Deletion of the log block and addition of volunteer work/quality improvement projects (please refer to the Assessment Tools)
- Modification of the competency-based Education in each block

The Pediatric Fellowship Training Program consists of a well-structured, full-time, supervised 2-year training. This training includes:

A. Core rotations

- General Pediatric Nephrology: Inpatient, Consultation, Outpatient and Pediatric peritoneal dialysis
- Pediatric Hemodialysis
- Pediatric renal transplant

- Renal imaging/ Pediatric Urology
- Renal pathology
- Clinical Research

B. Electives

- Elective rotation allows fellows to gain concentrated experience in an area of interest.
- Fellows will have 4 weeks of elective rotation in the 2nd year
- Fellows have the right to choose from the above core rotations or other specialties related to pediatric nephrology, such as clinical renal genetic disorders, molecular genetics, immunology, laboratory, and clinical research. Fellows have the right to perform elective blocks in Saudi Arabia or abroad.

C. Track Blocks (Optional 3rd year) *

Two different tracks can be chosen during the 3rd year, with each track having 13 blocks. The choice will be decided after discussion with the program director and scientific committee members. The choice will be based on the career path of the trainee and the area of interest, as well as the available resources in the training institution. The structure will be based on a separate curriculum for the following fellowships:

Track 1: Pediatric Dialysis Fellowship Track

Track 2: Pediatric Renal Transplant Fellowship Track

*The 3RD Year track with the mentioned separate fellowship programs is conditioned by the approval of the respective committees in the Saudi Commission for Health Specialties SCFHS, and the applicability will be announced officially after approval.



Required Blocks for each year:

The rotations are based on a block system rather than months. Each block consists of 4 weeks.

	F1	F2
Block 1	General nephrology	General nephrology
Block 2	General nephrology	General nephrology
Block 3	General nephrology	General nephrology
Block 4	General nephrology	General nephrology
Block 5	General nephrology	General nephrology
Block 6	General nephrology	General nephrology
Block 7	General nephrology	Pediatric hemodialysis
Block 8	General nephrology	Pediatric Renal Transplant
Block 9	Pediatric hemodialysis	Pediatric Renal Transplant
Block 10	Pediatric hemodialysis	Clinical research
Block 11	Pediatric Renal Transplant	Elective
Block 12	Renal pathology	Renal imaging/ Pediatric Urology
Block 13	Vacation	Vacation

Rotations	Total number of blocks
General nephrology	14
Pediatric hemodialysis	3
Pediatric Renal transplant	3
Renal pathology	1
Renal imaging/ Pediatric Urology	1
Clinical research	1
Elective	1
Vacation	2
Total	26

<u>Guide for arranging General Nephrology Blocks</u>		
	<u>F1</u>	<u>F2</u>
<u>General nephrology</u>		
Inpatient*	1 to 3	1 to 3
Consultation*	1 to 3	1 to 3
Outpatient **	2	2
Total General Nephrology Blocks	8	6

*There are 1–3 blocks each in both types of blocks in inpatient and consultation. We recommend that the program director selects between inpatient and consultation blocks (the number of blocks will be based on the higher hospital load to maximize the trainee exposure). For example, in General Nephrology Blocks for F1, as the fellow needs eight blocks in general nephrology, the blocks can be given as follows: 3 inpatient blocks, 3 consultations blocks, and 2 outpatient blocks

** The number of Outpatient blocks is fixed for each year; there is no range for this block

OUTCOMES AND COMPETENCIES

Rationale

The Saudi Fellowship Training Program in Pediatric Nephrology is intended to ensure balanced clinical competence and prepare graduates within 2 years to deliver excellent general care to children with kidney diseases.

Overall Goal

The aim of the Pediatric Nephrology Fellowship Program is to provide a fellow with expertise gained through knowledge, skills, and attitudes to manage children with suspected or established renal diseases. The program outlined here provides enough instruction for fellows to develop appropriate competence in the field of pediatric nephrology in the period suggested.

Learning Outcomes

Successful fellows should acquire a broad-based understanding of the principles, knowledge, skills, and attitudes of Pediatric Nephrology. By the end of their training, fellows should have the ability to practice Pediatric Nephrology as follows:

Trainee Role	Goals and objectives
Medical Expert	<p>Develop expertise in these Specific Program Contents:</p> <ol style="list-style-type: none"> 1) Glomerular diseases 2) Hemolytic uremic syndrome 3) Hypertension 4) Acute renal failure and intensive care unit nephrology 5) Chronic renal failure 6) Acid-base disorders 7) Fluid and electrolyte disorders 8) Cystic and inherited diseases of the kidney 9) Tubulointerstitial disease and urinary tract infection 10) Disorders of divalent cations and mineral metabolism 11) Renal function testing 12) Pharmacology of drugs in renal disease 13) Pediatric peritoneal dialysis and pediatric hemodialysis 14) Pediatric renal transplant
Communicator	<ol style="list-style-type: none"> 1) Synthesize relevant information from the patient or family and document the patient's condition and progress accurately (in writing), with emphasis on the relevant issues. 2) Communicate clearly and effectively with patients and families with respect to their medical condition(s) and treatment plan. 3) Communicate effectively with health care professionals, and promptly produce complete, accurate, and informative letters to referring physicians. 4) Act as a consulting fellow to the medical house staff regarding nephrology patients. 5) To maintain up-to-date patient lists with relevant information for continuity of care and provide proper sign over to colleagues. 6) Communicate with secretaries regarding scheduling of outpatient clinics and other responsibilities.



Trainee Role	Goals and objectives
Collaborator	<ol style="list-style-type: none"> 1) Interact effectively with other healthcare professionals, in particular the attending staff, other trainees, nursing staff, dieticians, social workers, pharmacists, etc. 2) Contribute effectively and demonstrate the ability to accept and carry out decisions taken by a multidisciplinary team, consisting of other nephrologists, nursing staff, dieticians, social workers, pharmacists, psychiatrists, etc. 3) Identify and recognize the need and benefit of consulting other physicians and healthcare professionals, including surgeons and/or radiologists when access to dialysis is being planned, and consulting surgeons when transplantation is being contemplated. 4) Participate constructively in joint rounds with transplant surgery team members, and making sure that relevant "medical" issues are not overlooked. 5) Assure that nephrology patients are prepared for the operating room, that the surgeons are aware of the plans, and that nurses and other house staff are aware of the appropriate protocols. 6) Delegate specific tasks when appropriate. 7) When completing a research project, fellows should meet, communicate, and follow-up in a timely fashion on the recommendations made by research collaborators and personnel.

Trainee Role	Goals and objectives
<p style="text-align: center;">Manager</p>	<ol style="list-style-type: none"> 1) Effectively manage all nephrology services, including consultation, dialysis, continuous ambulatory peritoneal dialysis (CAPD), or transplant service. 2) Participate in administrative duties, e.g., acquire knowledge of the role of the medical dialysis director. 3) Work efficiently and effectively, i.e., manage his/her service, outpatient clinic, other academic activities, and personal life, simultaneously. 4) Conduct round daily on service patients, both independently and with the nephrologist. 5) Provide orders, including acute dialysis orders, to the hemodialysis unit in a timely fashion. Distinguish conditions requiring urgent versus non-urgent attention. Respond to emergencies in a timely fashion. 6) Establish a plan for timely lab review and decision-making when necessary. 7) Make him/herself known to the nurses and carry the bellhop so nurses can call the resident in case of emergencies or other issues. 8) Use limited hemodialysis nursing resources in a sensible manner with respect to treatment benefits. 9) Cover the on-call in the Emergency Room for inquiries regarding nephrology patients. 10) Use information technology (e.g., lab and pharmacy databases) to optimize patient care. 11) Utilize healthcare resources in a cost-effective way, including the utilization of scarce resources. 12) Participate in critical appraisal of his/her practice, e.g., audit, or quality assurance process.



Trainee Role	Goals and objectives
Health Advocate	<ol style="list-style-type: none"> 1) Counsel patients and families effectively, about nutrition, exercise, compliance with medications, smoking cessation, blood pressure control, risk factors to optimize the preservation of renal function, other risk factors to reduce cardiac risk, and other issues. 2) Refer patients appropriately to available resources that promotes preventive medicine. 3) Recognize the lifestyle and quality of life issues related to modalities of renal replacement therapy and be able to guide patients' decisions accordingly. 4) Inform house officers and physicians from other departments about the importance of risk factor modification in renal diseases. 5) In the case of inherited renal diseases (adult polycystic kidney disease in particular), to ensure that patients are informed and that appropriate screening measures are taken for other family members, when indicated. 6) To be able to counsel patients about the risk of transmission to their offspring and the risk/benefits of early detection in children. 7) Suggest family planning where appropriate. 8) Recognize impending dialysis access failure and take pro-active measures to correct.

Trainee Role	Goals and objectives
Scholar	<ol style="list-style-type: none"> 1) Find/retrieve and critically appraise sources of medical information. 2) Consistently demonstrate active participation in scholarly activities in the Department. 3) Teach medical students, residents, and other health-care professionals, both in formal settings (e.g., presentation at a conference) and in informal settings, or at the "bedside". 4) Contribute to the development of new knowledge, through the completion or participation in a research project.
Professional	<ol style="list-style-type: none"> 1) Apply knowledge of the professional codes and norms of behavior that governs the behavior of physicians in clinical practice (act in a responsible fashion) 2) Relate to patients in an empathic manner while maintaining the boundaries of a professional relationship. 3) Notify staff and secretaries in a timely fashion ahead of planned absence, when appropriate, and to arrange for back-up coverage during absence. 4) Apply knowledge of the legal codes and norms of behavior that governs the behavior of physicians in clinical practice. 5) Recognize his/her own limitations and seek advice when appropriate. 6) Recognize and resolve ethical issues as they arise in clinical practice, e.g., consent, confidentiality, advanced directives, management of incompetent patients, end of life care, and bioethical issues related to cadaveric and live kidney donation, etc. 7) Recognize the cultural/ethnic, gender, and socioeconomic diversity of the population. 8) Recognize and deal with unprofessional behavior in clinical practice.



ELABORATION OF GENERAL CLINICAL PEDIATRIC NEPHROLOGY

SPECIFIC TRAINING OBJECTIVES

Glomerular Diseases

Program Content

Trainees should acquire a general understanding of the following areas:

- Structure and function of the normal glomerulus and how alterations lead to cardinal features of glomerular injury (proteinuria and reduced glomerular filtration rate [GFR]).
- Principal immunological mechanisms that cause human glomerular diseases and features that distinguish them on immunofluorescence and electron microscopy.
- Fundamental features of the normal immune response, awareness of the current concepts of autoimmunity, and factors that may be responsible for and mediate immunological glomerular injury.

Trainees should be familiar with and develop in-depth knowledge of the following:

- Causes, clinical decision-making, and treatment of common and uncommon causes of hematuria and proteinuria.
- The etiology and clinical findings of glomerular syndromes, including nephrosis, nephritis, and rapidly progressive glomerulonephritis (RPGN), manifesting as renal-limited processes or associated with systemic disease.

- Nephrotic syndrome: epidemiology, manifestations, pathology, pathophysiology, treatment, and complications; infantile nephrotic Syndrome; Primary nephrotic syndrome; minimal lesion nephrotic syndrome; focal and segmental glomerulosclerosis (FSGS), including its various pathological and clinical syndromes, and its association with conditions of reduced renal mass. The demographics, clinical course, and outcome of the clinicopathologic syndromes of "primary" focal sclerosis, including collapsing FSGS.
- Membranoproliferative glomerulonephritis and the clinical and pathological features of this disorder associated with hepatitis C.
- Membranous nephropathy, including the clinical, pathological, and diagnostic features of both idiopathic membranous nephropathy and secondary membranous disease, and in-depth knowledge of the controversies regarding its treatment.
- IgA nephropathy, especially its clinical course, natural history, and prognostic markers.
- Post-infectious glomerulopathies, including bacterial, viral, parasitic, rickettsial, and fungal infections, and their epidemiology, clinical course, and response to therapy, especially post-streptococcal infections.
- Necrotizing and crescentic glomerulonephritis.
- Anti-glomerular basement membrane disease.
- Immune complex diseases, including lupus nephritis, post-infectious glomerulonephritis, and Henoch-Schonlein purpura.
- Pauci-immune glomerulonephritis and small vessel vasculitis.
- Renal manifestations of other nephritis associated with systemic diseases: Henoch-Schonlein purpura, systemic lupus erythematosus, antiphospholipid disease, Wegener's granulomatosis, necrotizing vasculitis/polyarteritis, and diabetes mellitus.
- Hereditary glomerular diseases: Alport syndrome, Familial nephritis and idiopathic hematuria, Nail-patella syndrome, Fabry disease.



Patient Care Experience

Trainees should be familiar with and have experience in the following:

- Diagnosis and management of isolated proteinuria, hematuria, nephrotic syndrome, and acute glomerulonephritis.
- Serological evaluation of glomerulonephritis, including the diagnostic value and limitations of antiglomerular basement membrane (anti-GBM), antineutrophil cytoplasmic antibody (ANCA), antinuclear and antimicrobial antibodies, hypocomplementemia, and cryoglobulinemia.

Indications for complications of renal biopsy, as well as the morphological and immunohistological features of major glomerular diseases.

- Treatment of patients with nephrotic syndrome and acute glomerulonephritis, both renal-limited and secondary to systemic diseases, including medications, complications, and various immunosuppressive protocols.

Hemolytic Uremic Syndrome

Program Content

Trainees should acquire a general understanding of the following areas:

Structure and function of normal vessels and how alteration of these lead to the cardinal features of vascular injury (anemia, thrombocytopenia, and reduced GFR).

- Principal immunological mechanisms underlying human vascular diseases and the features that distinguish them on immunofluorescence and electron microscopy.

Fundamental features of the normal immune response and an awareness of current concepts of autoimmunity and the factors that may be responsible for and mediate immunologic vascular injury.

Trainees should be familiar with and develop an in-depth knowledge of the following:

- Infection-induced Secondary (HUS) Shiga toxin-producing *E. coli* (STEC) and *Streptococcus pneumoniae*: Epidemiology, pathogenesis, clinical manifestations, management outcome of HIV infection H1N1, non-infectious secondary causes, diagnosis, differential, evaluation, and treatment.
- Primary HUS: Complement-mediated HUS, epidemiology, pathogenesis, clinical manifestations, management, and outcomes.

Diabetes Mellitus And Diabetic Nephropathy

Program Content

- Epidemiology and course of nephropathy in insulin-dependent diabetes mellitus (IDDM)
- Pathophysiologic mechanisms and histologic manifestations of diabetic nephropathy (DN)



Modalities of therapy for end-stage renal disease (ESKD) in DN, including hemodialysis and peritoneal dialysis, kidney transplantation, and kidney–pancreas transplantation

Trainees should develop an in-depth knowledge of the following:

Various mechanisms by which diabetes mellitus (DM) may affect the kidneys and urinary tract

Clinical and histological features as well as the epidemiology and course of DGS in patients with IDDM and NIDDM

- Results of clinical trials designed to prevent DN or slow its progression

Relative merits of different modalities of therapy for ESKD in patients with diabetes, including hemodialysis and peritoneal dialysis, kidney transplantation, and kidney-pancreas transplantation.

Trainees should be familiar with:

- Definition, interpretation, prognostic value, and clinical use of microalbuminuria

Unique medical and surgical problems faced by patients with advanced DN and their management

Patient Care Experience

- Evaluation and management of patients with progressive insulin-dependent DN. Experience in the treatment of Hypertension, fluid-electrolyte disorders, hypoglycemia and hyperglycemia, and non-renal diabetic complications is needed.
- Evaluate and Manage patients with end-stage DN receiving hemodialysis and peritoneal dialysis.
- Evaluation of patients with DN for renal transplantation.
- Manage patients with DN during and after renal transplantation.

Hypertension

Program Content

Trainees must acquire knowledge and understanding of the following areas during their training.

- Epidemiology of hypertension and definitions following the most updated guidelines
- Pathogenesis and natural history of primary hypertension
- Evaluation of hypertensive patients
- Non-pharmacologic therapies of hypertension
- Pharmacology and clinical use of antihypertensive agents
- Hypertension in renal parenchymal disease during chronic dialysis and after renal transplantation
- Renovascular hypertension: pathogenesis, causes, clinical features, screening, diagnostic tests, and management
- Pheochromocytoma: pathophysiology, clinical features, diagnosis, and management
- Primary aldosteronism: pathophysiology, clinical features, diagnosis, and management

Other forms of secondary hypertension include Cushing's syndrome, congenital adrenal hyperplasia, coarctation of the aorta, thyroid disease, hyperparathyroidism, acromegaly, sleep apnea, and drugs.

- Hypertensive emergencies and urgencies

Patient Care Experience

Assess the severity of hypertension and end-organ damage. They should be familiar with the role of ambulatory blood pressure monitoring in the evaluation of hypertensive patients.



Define goals of treatment, be familiar with non-pharmacological modalities as well as the use and side effects of antihypertensive agents, and be able to make appropriate therapeutic choices in the context of comorbid conditions.

Evaluation and management of hypertension in renal parenchymal disease during chronic dialysis and renal transplantation.

Identification of symptoms and signs suggestive of secondary causes of hypertension, familiarity with various screening and diagnostic tests, and the management of these disorders.

- Evaluation and management of various hypertensive emergencies and urgencies

Acute Kidney Injury and Critical Care Nephrology

Program Content

- Normal regulation of renal and glomerular hemodynamics
- Differential diagnosis of acute kidney injury (AKI): Pathophysiology of prerenal azotemia
- Pathophysiology of intrinsic renal failure, including acute glomerular disease, acute tubular necrosis, and acute interstitial disease
- Pathophysiology of obstructive renal failure
- Mechanisms of AKI in the postoperative patient
- Mechanisms of AKI in patients with hepatobiliary disease
- Causes of AKI in patients with cancer and immunosuppression
- Causes of AKI in patients with sepsis
- Metabolic consequences of AKI:
- Evaluation and management of AKI:

Radiological and biochemical evaluations in AKI, role of kidney biopsy, and role of dialysis (PD, IHD, and CKRT with all its modalities)

- Hemodynamic monitoring of critically ill patients
- Management of electrolyte/acid-base disturbances in critically ill patients
- Fluid management of critically ill patients
- Use of vasoactive drugs in critically ill patients
- Role of extracorporeal therapy in the management of drug toxicity

Patient Care Experience

- Evaluation and Management of AKI.
- Evaluation and management of fluid electrolyte and acid-base disturbances in critically ill patients.
- Evaluation of hemodynamics and proper use of fluids and vasoactive drugs in critically ill patients.
- Use various dialytic techniques, including hemodialysis, peritoneal dialysis, and continuous venovenous hemodiafiltration.
- Use of extracorporeal therapy to remove specific toxins.
- Experienced at least one central line placement procedure

Chronic Kidney Disease

Program Content

- Various etiologies of chronic kidney disease (CKD)

Evaluation, diagnosis, and treatment of CKD resulting from glomerular, interstitial vascular, and obstructive processes, including the diagnosis and pathophysiological mechanism of CKD as well as systemic processes that lead to CKD, such as Diabetes, autoimmune diseases, hypertension, and ischemic kidney disease.

- Current concepts and the results of clinical studies pertaining to the role of hypertension, dietary composition, and divalent cations in the progression of chronic renal diseases



Predialysis management of CKD regarding diet, anemia, metabolic bone diseases, and drug dose adjustments

- Role of anemia in the management of patients with CKD, including management of anemia in chronic renal failure with the use of iron, erythropoietin, and other appropriate agents.

Indications for initiation of ESRD therapy and placement of ESRD access in patients with CKD

- Appropriate use of drugs, including dose modification, for patients with progressive CKD.

Interpretation of radiographic tests, including intravenous pyelography, computed tomography, ultrasound, and radionuclide scans, in patients with CKD.

Patient Care Experience

- Evaluation and Management of patients with CKD.
- Interpretation of voiding cystourethrograms, radiological studies, renal arteriography, and renal ultrasound for the diagnosis of CKD.
- Observe at least once and try to perform percutaneous renal biopsy under supervision.
- Interpretation and reading of renal biopsies, identification of histologic features, and assigning appropriate diagnoses.

Acid-Base Disorders

Program Content

- Acid-base chemistry and buffering
- Determinants of arterial carbon dioxide tension and carbon dioxide balance

Determinants of plasma bicarbonate concentration and hydrogen ion balance, including renal acidification processes and physiology of bicarbonate reabsorption, titratable acid excretion, and ammonium excretion

- Clinical evaluation of acid-base disorders

Renal tubular acidosis: pathogenesis, clinical features, causes, diagnosis, and management

- Uremic acidosis: acid-base homeostasis in ESRD

Other types of metabolic acidosis: pathogenesis, clinical features, causes, diagnosis, and management.

Metabolic alkalosis: pathogenesis, clinical features, causes, diagnosis, and management

Respiratory acidosis pathogenesis, clinical features, causes, diagnosis, and management

Respiratory alkalosis: pathogenesis, clinical features, causes, diagnosis, and management

- Mixed acid-base disturbances

Patient Care Experience

- Experienced in the following areas in both outpatient and inpatient settings:
- Assessment of the accuracy of acid-base parameters and interpretation of serum and urine acid-base data, including the anion gap.
- Determination from the patient's history, physical findings, and laboratory data, the nature of the prevailing acid-base disorder, and whether a simple or mixed acid-base disorder was present.
- Evaluation and management of renal tubular acidosis, uremic acidosis, and acid-base homeostasis in ESRD and all types of metabolic acidosis
- Evaluation and management of metabolic acidosis and alkalosis.
- Evaluation and management of respiratory acidosis and alkalosis.
- Evaluation and management of mixed acid-base disorders.



Fluid And Electrolyte Disorders

Program Content

Physiology of sodium balance, including sensors of extracellular volume, effector systems, tubular sodium transport processes, and regulation of renal sodium excretion.

- Hypovolemia: pathophysiology, causes, clinical features, diagnosis, and management
- Edematous disorders: pathophysiology, causes, clinical features, diagnosis, and management.
- Clinical use and complications of diuretics

Physiology of water balance, including tonicity sensors, effector systems, countercurrent mechanism for urine concentration, cellular physiology of collecting duct water reabsorption, and regulation of water excretion by the kidneys.

- Hyponatremia: pathophysiology, causes, clinical features, diagnosis, and management
- Hypernatremia: pathophysiology, causes, clinical features, diagnosis, and management
- Evaluation and management of patients with polyuria

Physiology of potassium balance, including regulation of transcellular potassium movement, tubular transport processes for potassium reabsorption and secretion, and regulation of potassium excretion by the kidneys

- Hypokalemia: pathophysiology, causes, clinical features, diagnosis, and management.
- Hyperkalemia: pathophysiology, causes, clinical features, diagnosis, and management
- Disorders of sodium, water, and potassium balance in ESRD

Patient Care Experience

Assessment of the validity and relevance of serum and urine electrolyte measurements in patient management.

Assessment of volume status (including the interpretation of central venous pressure), as well as recognizing and managing hypovolemic and edematous disorders.

- Identification of the use and complications of diuretic therapy.
- Evaluation and management of hyponatremia in acute and chronic settings.
- Evaluation and management of hypernatremia in acute and chronic settings.
- Evaluation and management of patients with polyuria.

Evaluation and management of patients with hypokalemia or hyperkalemia. The patient underwent both acute and long-term management of these disorders.

Evaluation and management of sodium, water, and potassium disorders in ESRD patients

Cystic and Inherited Diseases of The Kidney

Specific disorders:

- Autosomal recessive polycystic kidney disease
- Autosomal dominant polycystic kidney disease
- Glomerulocystic disease
- Multicystic renal dysplasia
- Acquired cystic kidney disease
- Solitary cysts
- Medullary cystic disease
- Medullary sponge disease

Tubular disorders:

- Glucosuria



- Phosphate wasting syndrome
- Bicarbonate wasting syndrome
- Renal tubular acidosis
- Fanconi syndrome and cystinosis
- Disorders of sodium handling
- Disorders of potassium handling
- Diabetes insipidus
- Disorders of vitamin D metabolism

Tubulointerstitial Disease and Urinary Tract Infection

Program Content

Trainees should acquire a general understanding of the following:

Structure and function of the normal renal tubules and interstitium

Pathophysiological mechanisms of acute and chronic interstitial diseases:

- Immunologically mediated interstitial nephritides
- Interstitial scarring because of primary glomerular and vascular diseases
- Reflux nephropathy
- Obstructive nephropathy

Pathophysiology of interstitial diseases:

- Immunopathogenic and non-immune mechanisms
- Relationship with glomerular function
- Association with major tubular defects, including diabetes insipidus, acidification, and potassium excretion
- Effects of acute and chronic urinary obstruction

Diagnostic procedures: Assessment of tubular defects, evaluation of obstruction and definition of acute and chronic interstitial nephritis.

Pathogenesis and treatment of bacterial urinary tract infections: Major pathogenic causes, appropriate antibiotic choices, and appropriate workups.

Patient Care Experience

Development of in-depth knowledge in the following:

Clinical features, causes, course, and treatment of acute allergic interstitial nephritis

Clinical features, predisposing factors, complications, bacteriological profiles, and APN treatment of acute pyelonephritis

Management of patients with symptomatic and asymptomatic bacteriuria, including familiarity with in depth management

Clinical and radiological features, course and treatment of reflux nephropathy (chronic pyelonephritis), analgesic nephropathy, and differential diagnosis of papillary necrosis.

Identification of the following: Pathological features of acute and chronic interstitial nephritis and clinical laboratory tests to evaluate tubular function, concentrating ability, urine acidification, potassium handling, and various reabsorptive functions

Disorders of Divalent Cation and Mineral Metabolism

Program Content

- Calcium and phosphorus balance in humans
- Renal handling of calcium, magnesium, and phosphorus

Physiology of calciotropic hormones, specifically parathyroid hormone, vitamin D, calcitonin, and parathyroid hormone-related peptide.

Integrated view of calciotropic hormone regulation in normal situations and in the context of acute and chronic renal failure



- Bone physiology

Methods to diagnose and treat different types of renal osteodystrophy, interpretation of bone biopsies, and experience in the interpretation of bone biopsies in patients with chronic renal disease

Pathogenesis and treatment of calcium nephrolithiasis, urate nephrolithiasis, oxalate nephrolithiasis-infected stones, and cystine stones.

- Surgical procedures necessary for the treatment of stone disease

Patient Care Experience

- Different types of renal osteodystrophy
- Hyper- and hypocalcemia, hyper- and hypophosphatemia, and hypo- and hypermagnesemia
- Various forms of nephrolithiasis (significant exposure)
- Interpretation of bone biopsies

Renal Function Testing

Program Content

- Urinalysis, including dipstick and sediment
- Measurement of renal plasma flow and GFR, including interpretation of serum creatinine concentration and calculation of clearance rate.
- Measurement of renal concentrating and diluting capacity
- Measurement of microalbuminuria
- Measurement of proteinuria using semi-quantitative and quantitative methods
- Assessment of urinary acidification
- Assessment of renal sodium and potassium handling

Renal radiology:

- Urography

- Ultrasonography
- Radionuclide scans
- Computed tomography
- Magnetic resonance imaging
- Renal circulation imaging (angiography)

Patient Care Experience

- Urinalysis
- Accurate and timely complete collection of urine for renal function testing, proteinuria, and microalbuminuria
- Fractional excretion of electrolytes
- Renal function clearance studies

Pharmacology of Drugs in Kidney Diseases

Program Content

- Principles of drug pharmacokinetics
- Renal handling of drugs and chemicals
- Mechanisms of drug metabolism
- Drug prescribing in disease states and during dialysis
- Relevant drug-drug interactions
- Mechanisms of drug nephrotoxicity
- Management of drug-induced renal diseases
- Therapeutic drug monitoring
- Renal transplant immunosuppression

Patient Care Experience

Diagnosis and management of patients with different drug-induced renal problems.

Indications of therapeutic drug monitoring.



Prescribing and adjusting drug dosage in patients with renal dysfunction.

Accessing drug and poison information.

Identification of the common overdoses, poisoning and the need for extracorporeal therapy.

Prescribing immunosuppression for renal transplantation

Communicator

Communication with patients and families.

Target Performance: Establishing exceptional rapport, putting patients/family at ease, providing clear explanations, and providing excellent listening skills.

Written communication with referring physician.

Target Performance: Develop and write letters that are prompt, concise, comprehensive, accurate, and informative.

Verbal communication with referring physician

Target Performance: to display exemplary communication with the primary doctor while demonstrating respect, responsibility, and clinical competence.

Communication with nephrology team

Target Performance: to develop concise, comprehensive, informative notes.

Display exemplary communication with other physicians, while demonstrating respect and responsibility.

Collaborator

Describe the roles and responsibilities of other members of the health care team

- Target Performance: To display a superior understanding of the roles and responsibilities of other healthcare team members and to understand how they are best able to contribute to patient care collaboratively.

Work effectively with an inter-professional team to assess, plan, provide, and integrate care.

- **Target Performance:** To work as an active team member whose leadership qualities others recognize, has the ability to achieve best results in difficult situations without antagonizing others.

Works well with other healthcare team members to prevent, negotiate, and resolve inter-professional conflict.

- **Target Performance:** To anticipate situations where conflicts may arise, take steps to avoid them, listen effectively to other healthcare team members' concerns, negotiate effectively, and show leadership in addressing them.

Manager

- Time management
 - **Target Performance:** to use time efficiently to optimize professional performance and learning.
- Clinical priority setting
 - **Target Performance:** consistently and expertly set priorities among multiple patient care demands.
- Team management
 - **Target Performance:** To provide house staff with superb support, backup, and feedback.
- Resource management
 - **Target Performance:** Consistently and expertly set priorities among multiple patient care demands.
- Quality assurance

Target Performance: To initiate quality assurance projects.



Health Advocate

- Individual health
 - Target Performance: To consistently take a proactive and preventive approach to patient care and effectively lobby on a patient's behalf.
- Hospital setting
 - Target Performance: To display exemplary performance in the role of advocate for local patients with renal disease.
- Population health
 - Target Performance: To display exemplary performance in the role of advocate and decrease the burden of illness from renal disease within the Saudi population.

Scholar

- Personal Education Strategies
 - Performance Target: To show well-developed self-assessment and self-directed learning skills.
- Evidence-based medicine
 - Performance Target: To be a superb critical thinker who regularly integrates his/her critical appraisal-structured approach into patient care.
- Contribution to the teaching of others (patients, house staff, other members of the healthcare team)
 - Performance Target: To display enthusiasm in teaching to help create a good learning environment.
- Contribution to rounds and other formal learning events
 - Performance Target: To develop superior quality presentations—quality equivalent to those of the faculty members—and excellent use of literature.

Professional

- Honesty, integrity, and compassion
- Target Performance: To consistently demonstrate integrity, honesty, compassion, and respect for diversity
- Professional obligations
 - Target Performance: To show an in-depth understanding of the medical, legal, and professional obligations of a nephrologist.
- Professional behavior
 - Target Performance: To consistently meet deadlines, be punctual, monitor patients, and provide follow-up.
- Ethical behavior
 - Target Performance: To display an in-depth understanding of the principles of ethics and consistently apply them in clinical situations, as well as impart ethical teaching to the team.
- Awareness of limitations
 - Target Performance: To consistently be aware of ones limitations, consistently seek assistance or feedback to compensate for limitations, and accept advice graciously.



OUTPATIENT CLINIC ROTATION-SPECIFIC OBJECTIVES

Medical Expert

Goals

- Learning outpatient management skills to allow timely and efficient achievement of patient outcomes and recognize the need for urgent inpatient management.
- Learning consultant skills in the context of outpatient internal medicine patient care.
- Developing dictation skills.
- Developing independent management of common multi-system illnesses.
- Interacting with patients and their illnesses in a long-term relationship.
- Identification of an approach for the diagnosis and management of a wide variety of problems.
- Assessing the priority and urgency of patient issues and managing their own appointment schedules to accommodate them.
- Prioritize patient care issues and appropriately plan follow-up.
- Recognizing when a patient requires urgent care due to rapidly progressive presentations.

Manager

Goals

- Learning the skills of arranging care both within and outside the clinical setting for the timely and efficient achievement of outcomes.
- Assessing the priority and urgency of patient issues and managing their appointment schedules to accommodate them.
- Prioritize patient care issues and appropriately plan follow-up.
- Recognizing when a patient requires specialized care that can only be provided in the context of a transplant program.

Professional

Goals

- Recognizing and acting on professional duties of ambulatory experience.
- Attending ambulatory experiences with punctuality and reliability.
- Completing tasks, including documentation, follow-up tests, and other aspects of patient care.
- Demonstrating professional attitudes in interactions with patients, families, office staff, and other healthcare professionals both in the office and between visits.

Health Advocate

Goals

- Acting consistently to advance the care of ambulatory patients within the healthcare system.
- Consistently linking patients to needed programs and services.
- Demonstrate understanding of government funding of therapy and consistently act to ensure their patients' access to therapies through these programs as needed.



- Identifying barriers (e.g., financial, social, and psychological) to patients' care and developing plans to overcome them.
- Promoting disease prevention among patients and facilitating preventative measures.

Scholar

Goals

- Identifying learning needs and addressing them to develop a comprehensive understanding of the content area.
- Developing a personal learning plan that covers the core learning objectives of rotation.
- Maintaining knowledge of the field on an ongoing basis and being aware of resources

Communicator

Goals

- Communicating clearly, empathically, and effectively with patients, families, and other care providers.
- Demonstrating effective tools for gathering historical information from patients and their families.
- Addressing patients' concerns and views during care.
- Providing patients with essential information related to diagnosis, prognosis, and treatment in a clear and understandable manner that encourages patient autonomy and participation in care decisions.
- Documenting patient encounters clearly and accurately (including disclosure of side effects or risks of treatment), phone conversations, and other communication with patients.
- Clearly communicating the relevant issues of a patient to a transplant program when there is a need for advice or transfer of care.

C. Collaborator

Goals

Working and collaborating with other providers to improve the care of patients.

Seeking and incorporating the advice of other practitioners in the care of their patients.

Working closely with patients and families to promote cooperation and adherence to treatment recommendations.



HEMODIALYSIS SPECIFIC TRAINING OBJECTIVES

General Overview and Description:

The hemodialysis dialysis rotation consists of three blocks distributed over 2 years. Hemodialysis training aims to provide exposure to a wide range of kidney disorders and to dialysis management. During this rotation, the trainee will be responsible for addressing acute, short-, and long-term dialysis therapy.

Roles and Responsibilities:

1. Daily:

- a. Review scheduled patients for dialysis with nurses.
- b. Review all acute or newly identified issues with the consultant and communicate the plan with the nurses.
- c. Review of new and pending laboratory results and adjust dialysis prescription as indicated.
- d. Trainees should focus on managing critical issues during dialysis sessions, such as intradialytic hypotension.
- e. Arrange with appropriate services for urgent consultations.

2. Over the week:

- a. The fellow should conduct a thorough physical examination of all dialysis patients and evaluate the treatment efficacy (achievement of dry weight).
- b. Plan for upcoming admissions/interventions (e.g., anticoagulation changes and changes in dialysis schedule).

3. A comprehensive review of each patient should be performed at least once a month. A session with the consultant should include a review of the following:
 - a. Dialysis specific issues
 - 1) Dialysis prescriptions
 - 2) Access and complications
 - 3) Calculation of dialysis adequacy
 - 4) Dry weight
 - b. Blood pressure
 - c. Fluid and nutritional status
 - d. Bloodwork
 - e. Comorbidities and follow up as needed
 - f. Medication review and updating it the system
 - g. Psychosocial issues
 - h. Transplant status

Medical Expert

Goals:

It is mandatory to cover the following topics during the three-block HD Rotation.

1. Physiology of HD, including urea Kinetic Modeling, and its principles and clinical application
2. Equipment: Lines, dialyzers, and machines.
3. Dialyzer Reactions: Presentation and Management.
4. Access: choice, initiation, monitoring, and management of complications.
5. Dialysis frequency and frequent dialysis.
6. Management of hypotension/hypertension in patients on HD.
7. Dry weight and fluids status assessment.
8. Management of anemia in patients on HD.
9. Management of mineral bone disease in patients on HD.



10. Appropriate management of line infection.

11. Water treatment in the dialysis unit.

Self-Teaching Curriculum:

1. Demonstration of hemodialysis machine setup.
2. Machine safety and alarm.
3. Choice of dialyzer/lines.
4. Composition of dialysis bath.
5. Water treatment and testing.

Communicator and Collaborator:

The fellow is expected to provide excellent clinical care and communicate with physicians, nurses, allied health professionals, and patients/family at the Consultant Pediatric Nephrologist level.

Objectives:

During HD rotation, the fellow is expected to develop competency in:

1. Demonstrate all seven CanMEDS core competencies, while learning the basic skills required to manage chronic HD patients.
2. Demonstrate the principles and practice of HD, including types of vascular access and the advantages/disadvantages related to each class.
3. Demonstrate the technology of HD related to HD machines and dialyzers.
4. Write HD prescriptions considering different choices using a patient-centered approach.
5. Assess HD adequacy, including the use of urea kinetic modeling.
6. Evaluation and management of medical complications in patients during and between dialysis and other extracorporeal therapies and an understanding of their pathogenesis and prevention.
7. The pharmacology of commonly used medications and their kinetic and dosage alteration with HD.
8. Addressing the nutritional status and requirements of patients on HD.

9. Describing the psychosocial, economic, and ethical issues of dialysis.
10. Explaining dialysis water treatment, delivery systems, and dialyzer reuse.
11. Identifying end-of-life care and pain management in patients undergoing chronic dialysis.
12. Practice a team approach in the care of patients on HD.



PERITONEAL DIALYSIS SPECIFIC TRAINING OBJECTIVES

General Overview and Description:

Peritoneal Dialysis (PD) rotations consist of blocks distributed over two years. Trainees are expected to work under the supervision of nephrology consultants.

Roles and responsibilities:

1. Develop management strategies for acute issues with PD nurse and review with the consultant.
2. Review new laboratory results with adjustment of dialysis prescription and medications as indicated.
3. Manage new medical problems in conjunction with PD nurses, including machine troubleshooting and medical management.
4. Appropriate services should be arranged for (urgent) consultations and communication with allied health professionals as required.
5. Attend PD clinics and meetings, and make treatment decisions with appropriate supervision, which should include:
 - a. A thorough examination and interim history taking for scheduled PD
 - b. A comprehensive review of the following:
 - 1) Laboratory parameters and trends
 - 2) Medications review and reconciliation
 - 3) PD catheter and complications
 - 4) Inspection and adjustment of dialysis prescription

- 5) Dry weight
- 6) Growth
- 7) Blood pressure/fluid and nutritional status
- 8) Comorbidities and required follow up
- 9) Psychosocial issues
- 10) Review of transplant status

Medical Expert

Goals:

Trainees must cover the following topics during the rotation:

1. Physiology of PD
2. Dialysis Solutions/composition; choice, initiation, and monitoring
3. Dialysis Adequacy principles and clinical application
4. Peritoneal Equilibration Test: Principles and Clinical Application
5. UF and UF failure
6. PD prescriptions – CAPD, CCPD, NIPD, Tidal
7. Equipment including IPD setups
8. Infectious complications – Peritonitis & exit site infection
9. Non-infectious complications
10. Management of patients on PD: Anemia, CKD-MBD, and Nutritional

Self-Teaching Curriculum:

1. Demonstration of Home Choice Cyclor setup
2. Home Choice alarms/troubleshooting
3. Transfer set change
4. PD contamination
5. Twin bag exchange
6. Peritoneal Equilibration Test
7. Adequacy calculations



Communicator and Collaborator:

The fellow is expected to provide excellent clinical care and communicate with physicians, nurses, allied health professionals, and patients/family at the consultant pediatric nephrologist level.

Objectives:

During PD rotation, the trainee is expected to develop competency in the following:

1. Demonstrating principles and practices of PD, including the establishment of peritoneal access, the principle of dialysis catheters, and the choice of appropriate PD catheters.
2. Demonstrate the PD technology, including the use of PD cyclers, setup, and function.
3. Write PD prescriptions, while considering the different choices and solutions in a patient-centered approach.
4. Assess PD adequacy, including the use of urea kinetic modeling and weekly creatinine clearance.
5. Interpret of PET and its relevance to PD prescription.
6. Management of PD complications, including peritonitis and its treatment, exit site and tunnel infections and their management, hernias, and other less common complications and management
7. Appropriate use of drugs, including dose modifications for dialysis patients.
8. Address the nutritional status and requirements of patients on PD.
9. Describing the psychosocial, economic, and ethical issues of dialysis.
10. Identifying end-of-life care and pain management in patients undergoing chronic dialysis.
11. Practice a team approach in the care of patients on PD.

KIDNEY TRANSPLANT TRAINING OBJECTIVES

Introduction:

Fellows will have the chance to rotate in renal transplant blocks, and experience the evaluation and management of acute and chronic renal transplant care.

A. Medical Expert

Goals:

- Managing common medical problems that occur in recipients of renal transplants.
- Performing a fluent history and physical examination of a renal transplant patient.
- Generating a focused diagnosis and management plan for new referrals and follow-up visits.
- Being conversant with the pharmacology, mechanisms of action, dosing, monitoring, and side effect profile of the following medications: Cyclosporine, Tacrolimus, Mycophenolate Mofetil, Sirolimus, Azathioprine, and Prednisone.
- Identifying appropriate changes in a patient's immunosuppressive regimen based on clinical events and/or side effects.
- Recognizing and managing common opportunistic and non-opportunistic infections in renal transplant patients, such as pneumonia, urinary tract infections, cellulitis, and CMV infection.
- Recognizing and managing common non-renal medical issues post-transplantation, including hypertension, hyperlipidemia, new-onset diabetes, osteoporosis, chronic kidney disease, metabolic bone disease, and anemia.



- Identifying the indications for renal transplant biopsy.
- Recognizing the appropriate cancer screening in renal transplant patients.
- Managing chronic kidney disease in a renal transplant recipient and ensuring timely referral to appropriate pre-dialysis care and initiation of renal replacement therapy in a patient with a failed graft.
- Performing a pre-transplant assessment, including the selection of appropriate tests and counseling of patients regarding the risks and benefits of transplantation.

B. Program Content

- Immunology/Immunogenetics
- Transplant Pharmacology
- Organ Sharing and Allocation
- Infectious diseases in transplantation/pre- and post-transplantation
- Metabolic complications and cardiovascular disease following transplantation

Immunology/Immunogenetics:

At the end of the Learning Unit, the trainee should be able to know the normal immune response to allografts, including mechanisms responsible for acute and chronic cellular and humeral rejection and the inflammatory response to allografts.

Immunogenetics and tissue typing, cross-matching, and surveillance of panel reactive and donor-specific antibodies

Differences between CDC complement-dependent cytotoxicity, complement-dependent cytotoxicity-antihuman globulin (CDCAHG) and flow cytometry

Virtual cross-matching

Difference between PRA and DSA

Difference between PRA and crossmatch

Transplant Pharmacology: At end of the Learning Unit, the trainee should be able to know the basic principles of pharmacology, the mechanisms of action, and side effects of immunosuppressant agents, including glucocorticoids, azathioprine, mycophenolate mofetil, cyclosporine, tacrolimus, sirolimus, and monoclonal and polyclonal antibodies.

Basic principles of the pharmacology of non-immunosuppressive medications used in transplant for the prophylaxis of infection and treatment of concurrent illnesses, with an emphasis on anticipating and managing drug interactions.

Organ Sharing and Allocation: At the end of the Learning Unit, the trainee should know:

Methods of kidney allocation, Effect of different allocation algorithms on organ distribution.

Infectious diseases in transplantation/pre- and post-transplantation: At the end of the Learning Unit, trainees should know:

Common infections post-transplant (pneumonia and urinary tract infections)

Opportunistic infections (CMV, EBV, BK, varicella and others)

Viral hepatitis (B, C)

HIV

Metabolic complications and cardiovascular disease following transplantation:

Hypertension, Hyperlipidemia, Diabetes mellitus, and bone diseases

Ethics of transplantation: At the end of the Learning Unit, trainees should know the following:

Definition of brain death

Ethical issues related to donation after cardiac death

Ethical issues associated with living donation

Ethical issues related to organ allocation systems, including the concepts of equality and utility



C. Patient care experience

- Pre-transplant: Education, counseling, and evaluation of donors and recipients
- Immediate post-operative management: Evaluation and management of effective circulating volume, falling urine output, and primary non-function of the transplanted kidney
- Early post-transplant management: Establishment of adequate immune suppression; diagnosis and therapy of rejection, infection, thrombotic microangiopathy, and urological and vascular complications; diagnosis and management of drug interactions and toxicities
- Long-term post-transplant management: Assessment of the adequacy of immunosuppression; management of complications of long-term immunosuppression, along with medication-induced allograft dysfunction, recurrence of the primary disease, de novo post-transplant glomerulonephritis, post-transplant polycythemia, vascular necrosis, dyslipidemia, glucose intolerance, liver function abnormalities, lymphoproliferative diseases, and cancers that affect the skin and other organs

D. Communicator

Goals:

- Explain clearly to patients and families the risks and benefits of transplantation, the outcomes of the different types of transplants, and the results of transplantation compared to dialysis.
- Explaining to families the structure of the waiting list for transplantation, the concept of sensitization, and the meaning of a positive crossmatch.
- Communicating with other members of the transplant team, such as transplant coordinators, nurses, transplant surgeons, and other consultants.

- Establishing positive therapeutic relationships between patients and their families, that is characterized by understanding, trust, respect, empathy, and confidentiality.
- Collecting information not only about the disease but also about the patient's beliefs, concerns, and expectations regarding the illness.
- Recognizing that being a good communicator is an essential function of a physician and that effective patient-physician communication can foster patient satisfaction and compliance, as well as influence the manifestations and outcomes of a patient's illness.
- Delivering information to patients and their families in a humane manner and in such a way that it is understandable, encourages discussion, and promotes patients' participation in decision-making to the degree that they wish. In particular, fellows must demonstrate the ability to discuss problems related to transplant failure, the role of the advanced directive, and the management of death from renal failure.
- Documenting relevant information from the patient or family and documenting the patient's condition and progress accurately (in writing), with an emphasis on relevant issues.
- Maintaining up-to-date patient lists with relevant information for continuity of care and to provide proper sign-over to colleagues.
- Effective communication with healthcare professionals. Produce letters to referring physicians that are written promptly, and are complete, accurate, and informative.
- Demonstrating effective consultation skills, including the ability to establish good relationships with peers and other health professionals, effectively providing and receiving information related to patient care, and preparing documentation that is timely and accurate (written or verbal).
- Recognizing the importance of communication among peers and other health professionals involved in the care of individual patients, such that the roles of



these professionals are delineated and consistent messages are delivered to patients and their families.

- Communicating with admin members regarding the scheduling of outpatient clinics and other responsibilities. Demonstrating skills in working with others who present significant communication challenges, such as anger or confusion, or an ethno-cultural background different from the physician's.

E. Collaborator

Goals:

- Interacting effectively with other healthcare professionals, in particular, the attending staff, other trainees, nursing, clinical nutrition, social work, pharmacy, physiotherapy, hospital management, biomedical technicians, transplant surgeons, etc.
- Developing a care plan (including investigation, treatment, and continuing care) for a patient with complications following kidney transplantation in collaboration with members of the interdisciplinary team.
- Participating in inter-professional team meetings and contributing expertise while demonstrating the ability to accept, consider, and respect the opinions of other team members.
- Communicating effectively with the members of an interdisciplinary team in the resolution of conflicts, provision of feedback, and where appropriate, to assume a leadership role.
- Identifying and recognizing the need and benefit of consulting other physicians and healthcare professionals, including surgeons and/or radiologists when access to dialysis and/or transplantation is being planned, and to participate constructively in joint rounds with transplant surgery team members, and making sure that relevant "medical" issues are not overlooked.

- To ensure that transplant candidates are prepared for the operating room, surgeons are aware of the plans, and nurses and house staff are aware of the appropriate protocols.
- Delegating specific tasks when appropriate.

F. Manager

Goals:

- Learning how to effectively manage kidney transplant services. Participating in administrative duties, for example, acquiring knowledge of the role of transplant nephrology staff.
- Demonstrating the ability to use time effectively to balance the requirements for patient care in particular services, outpatient clinics, other academic activities, and personal life.
- Performing rounds daily on patients, both independently and with the staff transplant nephrologists.
- Provide orders, including immune suppression for acute rejection or post-transplant management in a timely fashion. Distinguishing between conditions requiring urgent versus non-urgent attention. To respond to emergencies in a timely manner.
- Establishing a plan for timely laboratory review and decision-making when necessary.
- Introducing one's self to nurses and caregivers.
- Utilization of information technology (e.g., laboratory and pharmacy databases) to optimize patient care.
- Developing clinical decisions and judgments based on sound evidence for the benefit of individual patients and the population with renal disease, balancing the advocacy role for individuals with societal needs in the monitoring and allocation of finite resources (including renal transplant organs).



- Participation in critical appraisal of his/her practice, for example, an audit or quality assurance process.
- The role of the kidney transplant expert as a manager within the healthcare system, directing the clinical aspects of assessment prior to transplantation, acute management following kidney transplantation, and long-term follow-up programs, including planning, budgeting, and evaluation of these patient care programs.

G. Health Advocate

Goals:

- Counselling patients and families effectively, nutrition, exercise, compliance with medications, smoking cessation, blood pressure control, risk factors to optimize the preservation of allograft function, and other risk factors to reduce cardiac risk. To be able to refer patients appropriately to available resources that promote preventive medicine.
- Identifying current “at risk” groups within their practice population, apply available knowledge about prevention to these groups (i.e. high immune risk patients, patients at risk for recurrent disease in graft), and contribute “group data” for a better understanding of health problems within the population (i.e. Saudi center for organ transplantation (SCOT)).
- Explaining, to house officers and physicians from other departments, the importance of risk factor modification in recipients of kidney transplantation. In the case of inherited renal diseases (autosomal recessive polycystic kidney disease, autosomal dominant polycystic kidney disease, congenital HUS, etc.), to ensure that patients are informed and that appropriate screening measures are undertaken for other family members, when indicated. To counsel patients about the risk of transmission to offspring and the risks and benefits of early detection in children. To suggest family planning where appropriate.

- Recognizing the role of kidney transplantation experts in advocating to decrease the burden of illness (at a community or societal level) from complications of kidney transplantation through the Saudi Society of Nephrology and SCOT.
- Promoting kidney transplantation as the optimal treatment for ESRD.
- Describing how public policy is developed, identifying current policies that affect health, either positively or negatively (i.e., substance abuse, access to dialysis), and citing examples of how policies have been changed because of actions by physicians.
- The key issues under debate regarding changes in the Saudi health care system indicate how these changes might affect societal health outcomes pertinent to kidney transplantation (i.e., organ sharing across provinces and access to kidney transplantation).

H. Scholar

Goal:

- Demonstrating commitment to life-long learning and the ability to develop, implement, and monitor a personal strategy for continuing education using the skills of self-assessment (ability to identify gaps in knowledge and expertise) and self-directed learning (ability to formulate a plan to fill the gap).
- Demonstrating the effective use of information technology in the provision of clinical care and continued learning.
- Demonstrating the principles of learning and apply that understanding in his /her own learning, as well as in his/her teaching of others (students, residents, colleagues, other professionals, and patients) both in formal settings (e.g., presentation at a conference) and informal settings, or at the "bedside".
- Demonstrating active participation in scholarly activities in the department on an ongoing basis.



I. Professional

Goals:

- Displaying attitudes is commonly accepted as essential to professionalism, including the ability to deliver high-quality care with integrity, honesty, compassion, and sensitivity toward cultural and gender issues.
- Demonstrating appropriate strategies to maintain and advance professional competence.
- Evaluation of one's abilities, knowledge, skills, and limitations of professional competence.
- Notifying staff and admin members in a timely fashion ahead of planned absences and, when appropriate, arrange for backup coverage during absence.
- Recognizing the cultural and socioeconomic diversity of the population.

Personal/Professional Boundary

Objectives: Adopting specific strategies to heighten personal and professional awareness and explore and resolve interpersonal difficulties in professional relationships. Balancing consciously personal and professional roles and responsibilities and demonstrating ways to resolve conflicts and role strain.

Recognizing self-limitations and seek advice when appropriate.

Objectives Related to Ethics and Professional Bodies:

Recognizing the professional, legal, and ethical codes to which physicians are bound.

Applying the bioethical principles involved in the donation and allocation of living and deceased donor organs.

CLINICAL RESEARCH

Pediatric Nephrology fellows are expected to engage in scholarly activities and research during their training. Pediatric nephrology training is a critical requirement. Case series research, clinical research projects, and basic science projects are all part of the research scope. Early submission of research proposals to the Research Ethics Board should be considered as soon as possible. The faculty member who will be supervising trainees will be available to talk about their concepts and research strategy. Faculty members will investigate this situation. The faculty members will examine the results of the project and discuss the significance of the findings. Fellows are expected to complete a poster or platform presentation of the project and submit at least one manuscript in a peer-reviewed journal by the end of their training. The Fellowship Program Director is responsible for ensuring that all fellows are involved in research and scholarly activities.

Goals and objectives:

1. Medical expert

- Demonstrates understanding of the relevant medical facts of the study question

2. Communicator:

- Effectively present his/her research data (verbal or written)

3. Collaborator:

- Meet, engage, and follow-up on the recommendations of research collaborators and staff promptly while undertaking a research project.
- To collaborate on research or quality management programs with clinical colleagues.



- Interact well with the supervisor and other members of the research team (Research Ethics Board, allied health personnel, clerical workers, statisticians, etc.)
4. Manager:
- Demonstrate attention to details and organization
5. Health Advocate:
- Maintain patient safety within the context of clinical research studies
6. Scholar:
- To be able to find/retrieve and critically appraise sources of medical information.
 - To consistently demonstrate active participation in scholarly activities in the Department.
 - To teach medical students, residents, and other healthcare professionals, both in formal settings (e.g., presentation at a conference) and informal settings, or at the "bedside."
 - To contribute to the development of new knowledge through the completion of participation in a research project.
 - Put forward a research question (clinical, fundamental, or population health)
 - Create a proposal to address the specific research question
 - Identify, consult, and collaborate with appropriate subject experts to conduct an appropriate literature review based on the research subject.
 - Propose a strategy for addressing the research question.
 - Complete the research outlined in the proposal
 - Disseminate the results of the research at their Saudi Council Research Day
 - Demonstrate the ability to evaluate relevant literature for his or her studies critically.

7. Professional:

- Demonstrate integrity and honesty regarding research methodology, the proportion of work completed by the individual, and project results.
- Meet research target timelines, including completing and submitting a research summary/manuscript on the SCFHS Research Day.
- Ensure that patients' data are always maintained confidential



RENAL IMAGING/PEDIATRIC UROLOGY

A. Medical Expert

Definition: As medical experts, pediatric fellows integrate all CanMEDS Roles, applying medical knowledge, clinical skills, and professional attitudes in their provision of patient-centered care. The medical expert is the central physician in the CanMEDS framework.

Key and Enabling Competencies for fellows at this level must be able to:

- Functions effectively as pediatric fellows with increasing levels of responsibility according to their years of training. All CanMEDS roles must be integrated to provide optimal, ethical, and patient-centered medical care.
- Perform a consultation, including the presentation of well-documented assessments and recommendations in written and/or verbal form in response to a request from another healthcare professional.
- Identify and appropriately respond to relevant ethical issues arising in patient care.
- Demonstrate the ability to prioritize professional duties when faced with multiple patients and problems.
- Demonstrate compassionate and patient-centered care.
- Recognize and respond to ethical dimensions in medical decision-making.
- Demonstrate medical expertise in situations other than patient care, such as providing expert legal testimony or advising governmental agencies.
- Establish and maintain clinical knowledge, skills, and attitudes appropriate to urology

- Apply knowledge of clinical, socio-behavioral, and fundamental biomedical sciences relevant to urology.
- Demonstrate knowledge of the mechanism of action and physiological effects of therapeutic technologies relevant to urology.
- Describe the CanMEDS framework of competencies relevant to urology.
- Apply lifelong learning skills of the scholar role to implement a personal program to keep up to date and enhance areas of professional competence.
- Contribute to the enhancement of quality care and patient safety in their practice by integrating the best available evidence and practices.
- Perform a complete and appropriate assessment of a patient
- Identify and explore issues to be effectively addressed in a patient encounter, including the patient's context and preferences.
- Elicit a history that is relevant, concise, and accurate to context and preferences for the purposes of prevention, health promotion, diagnosis, and/or management.
- Perform a complete and appropriate assessment of a patient
- Identify and explore issues to be effectively addressed in a patient encounter, including the patient's context and preferences.
- Elicit a history that is relevant, concise, and accurate to the context and preferences for the purposes of prevention, health promotion, diagnosis, and/or management.
- Perform a focused physical examination that is relevant and accurate for the purposes of prevention, health promotion, diagnosis, and/or management.
- Select medically appropriate investigative methods in a resource-effective and ethical manner.
- Demonstrate effective clinical problem-solving skills and judgment to address patient problems, including interpreting available data and integrating information to generate differential diagnoses and management plans.
- Use preventive and therapeutic interventions effectively



- Implement a management plan in collaboration with a patient and his/her family.
- Demonstrate appropriate and timely application of preventive and therapeutic interventions relevant to urology.
- Ensure appropriate informed consent is obtained for therapies.
- Ensure patients receive appropriate end-of-life care
- Appropriately use and interpret diagnostic tests that are relevant to urology
- Demonstrate effective, appropriate, and timely performance of diagnostic procedures relevant to their practice.

Renal Imaging:

A. Medical Expert

Goals:

- Knowledge
 - To recognize basic radiological anatomy and variants thereof.
 - To understand the basic physical principles behind radiological techniques.
 - To learn the indications and absolute and relative contraindications for various contrast media.
 - To recognize the appropriate indications and contra-indications of various radiological techniques.
 - To recognize radiological emergencies and common pathologies, and understand their management.
 - To list the most important differential diagnostic possibilities for imaging findings.
- Level Skills
 - To identify and manage contrast reactions.
 - To appropriately perform and prescribe radiological examinations.

- To recognize and describe imaging techniques and findings.
- To generate an accurate and informative radiological report.
- To perform basic imaging related non-interventional procedures.
- To perform basic imaging post-processing and analysis.

B. Communicator

- To demonstrate effective communication skills when dealing with patients, their families, staff, and when referring to clinical services.
- To communicate critical findings directly to the referring physician in a timely fashion.
- To document pertinent conversations with the clinician in the report.
- To generate well-organized reports and accurately convey relevant findings, diagnoses, and recommendations.
- To communicate effectively with patients and families with empathy.
- Recognize the physical and psychological needs of patients and their families undergoing radiological investigations and/or treatment, including the need for culture, race, and gender.
- To develop effective oral skills, including individual consultation and case presentations, radiology conferences, and scholarly work.

C. Collaborator

Goals:

- To demonstrate good consulting skills when interacting with other physicians and health team members.
- To interact appropriately with the Radiology Department and hospital staff, while demonstrating a team approach to patient care.
- To work effectively as part of a multidisciplinary team for daily patient management.
- To actively participate in multidisciplinary team meetings.



- To work with clinical colleagues on research or quality improvement projects.

D. Manager

Goals:

- To manage time effectively in order to ensure productiveness and timeliness of service provision.
- To consider available imaging resources when planning care, using them effectively and efficiently.
- To prioritize radiological studies based on urgency and clinical needs.
- To manage night duty responsibilities efficiently and effectively.

E. Health Advocate

Goals:

- To provide a safe environment for patients and staff.
- To minimize risk to patients undergoing radiological studies.
- To apply the ALARA, principle ALARA is an acronym for As Low As Reasonably. Achievable. This is a radiation safety principle for minimizing radiation doses and releasing radioactive
- To recognize quality improvement opportunities within the imaging environment.
- To apply quality improvement methods for the enhancement of patient and staff safety.
- To apply appropriate advanced radiation reduction strategies in patient care.
- To participate in imaging-related community or healthcare facility awareness efforts.

F. Scholar

Goals:

- To set personal learning goals and objectives during rotations.
- To focus on basic introductory texts relevant to each rotation.
- To know how to search for scientific information in the medical literature.
- To teach medical students, technologists, and peers.
- To contribute to teaching files.

G. Professional

Goals:

- To adhere to relevant Islamic principles, medical ethics, and medical-legal requirements.
- To act as a role model and mentor to junior staff.
- To deliver the highest quality care with integrity, honesty, and compassion.
- To exhibit appropriate personal and interpersonal professional behavior.
- To assess one's own performance, strengths, limitations and weaknesses.
- To maintain patient and family confidentiality.
- To demonstrate a sense of accountability.
- To demonstrate a commitment to his/her patients, profession, and society, and to his/her personal development.



RENAL PATHOLOGY

Renal pathology is a branch of anatomical pathology. It is divided into subspecialties. The primary objective of the rotation is for the fellow to gain experience in this area. Fellow should identify common medical renal diseases by the end of the course and react appropriately when faced with controversial cases.

GENERAL OBJECTIVES

1. Develop diagnostic skills in the pathological features of kidney diseases.
2. Recognize cases that need further review or consultation.
3. To be able to write relevant reports and understand related terminology.
4. Understand the basics of specimen collection and fixation.
5. Understand the fundamentals of technical procedures.
6. Understand surgical pathology quality assurance.
7. Attend and participate in surgical pathology and continuing medical education to further the trainee's educational skills.

SPECIFIC OBJECTIVES

The fellow will have learned the following skills and will be able to perform the following tasks upon successful completion of training.

1. Medical expert

- Demonstrate diagnostic skills in diagnosing renal pathology specimens with medical diseases of the kidney in a timely and precise manner.
- Gain specific knowledge and apply it to clinical practice.

2. Communicator:

- Discuss cases with other surgical pathologists and members of the healthcare team regarding diagnosis and prognosis.

3. Collaborator:

- Discuss issues regarding diagnosis and prognosis with other surgical pathologists and members of the healthcare team.

4. Manager:

- Utilize resources of the pathology laboratory effectively to achieve an accurate diagnosis.
- Carefully allocate scarce healthcare resources.
- In a healthcare environment, function safely and efficiently.
- Optimize patient care, lifelong learning, and other programs by using information technology.

5. Health Advocate:

- Maintain patient safety within the context of renal pathology.

6. Scholar:

- Develop, introduce, and monitor the trainee's surgical pathology continuing education plan.
- Appraise medical information sources critically, and identify the best sources for clinical reporting.
- To facilitate the effective learning of patients, residents, students, and other health professionals.

7. Professional:

- Exhibit appropriate personal and interpersonal professional behaviors.
- Practice renal pathology in an ethical manner compatible with a physician's responsibilities.
- Demonstrate gender, culture, and ethnicity-related expertise, skills, and attitudes essential to anatomical pathology.



TEACHING METHODS

The teaching process in postgraduate fellowship training programs is mainly based on the principles of adult learning theory. Trainees feel the importance of learning and play active roles in the content and process of their own learning. The training programs implement the adult learning concept on each feature of the activities, where the fellows are responsible for their own learning requirements. Trainees will get a chance to learn from many teaching methods, including the following:

Academic half-day, with topic reviews and case discussions,

Journal Clubs,

Other activities, such as morbidity-mortality meetings, grand rounds, pathology rounds, urology meetings, and dialysis collaborative multi-disciplinary meetings.

Annual Research Day at the end of the year.

These teaching methods are to run in dedicated training time that is classified into the following three formal teaching activities:

- **Program Specific Learning Activities**
- **Universal topics**
- **General Learning Opportunities**

1.1. Program Specific learning activities:

Program-specific activities are educational activities specifically designed and intended for trainees' teaching during their training time. Trainees are required to attend these activities, and non-compliance can subject trainees to disciplinary actions. It is advisable to link attendance and participation in these activities to continuous assessment tools (see the formative assessment section below).

Program administration should support these activities by providing protected time for trainees to attend these activities and allow them to participate in them.

A) Program Academic half-day:

Every week at least 2–4 h of formal training time (commonly referred to as *academic half day*) should be reserved. Formal teaching time is an activity that is planned in advance with an assigned tutor, time slots, and venue. Formal teaching time excludes bedside teaching and clinic postings. The academic half-day covers the core specialty topics that are determined and approved by the pediatric nephrology scientific council aligned with pediatric nephrology-defined competencies and teaching methods. The core specialty topics ensure that important clinical problems of the specialty are well taught. It is recommended that lectures be conducted in an interactive case-based discussion format. The learning objectives of each core topic need to be clearly defined, and it is preferable to use pre-learning material. Whenever applicable, core specialty topics should include workshops, team-based learning (TBL), and simulation, if available, to develop skills in core procedures. Regional supervisory committees, in coordination with academic and training affairs, program directors, and chief fellows should work together to ensure the planning and implementation of academic activities, as indicated in the curriculum. There should be active involvement of the trainee in the development and delivery of the topics under faculty supervision; the involvement of trainees might be in the form of delivery, content development, research, etc. The educator should ensure that each topic is stratified into three categories in the following learning domain: knowledge, skill, and attitude.

The recommended number of half-days conducted annually is 40 sessions per training academic year, with reserving time for other forms of teaching methods, such as journal clubs and clinical/practical teaching. Through the fellowship training committee, program directors and chief fellows in coordination with academic and training affairs and regional supervisory committees should work together to ensure the planning and implementation of academic activities, as



indicated in the curriculum. This should aim for the efficient use of available resources and optimize the exchange of expertise.

The following is a table with examples of topics that illustrate the half-day activities as it spans over the course of 1 year (or cycle of teaching if more than 1 year is required to cover all the topics).

#	Date	Time	Presenter	Session
1	15/3	X	Program Director	Welcoming TO The Program
2	29/3	X	X	Anemia in CKD Case base study**
3	12/4	X	X	AKI in neonate Journal club*
4	26/4	X	X	Immunosuppressive medications used in transplant
5	24/5	X	X	Sickle cell nephropathy
6	7/6	X	X	Renal involvement in vasculitis
7	21/6	X	X	PD adequacy and PET Case base study**
8	5/7	X	X	Renovascular HTN and management of HTN crisis
9	26/7	X	X	Infections induced kidney diseases Journal club*
10	9/8	X	X	Management of AKI after cardiac surgery in CHD patient
11	23/8	X	X	Infections post-transplant Case base study**
12	6/9	X	X	Dialysis management of hyperammonemia
13	20/9	X	X	Bartter disease
14	4/10	X	X	Renal manifestations in metabolic diseases
15	18/10	X	X	C3 glomerulopathy

#	Date	Time	Presenter	Session
16	1/11	X	X	Primary hyperoxaluria
17	15/11	X	X	IgA/HSP nephropathy
18	6/12	X	X	Crescentic GN
19	20/12	X	X	Renal manifestations in genetic syndromes
20	3/1	X	X	DM nephropathy

*journal club could be done in the evening or during the half day.

**case based study could be done at the evening time or during the half day

B) Practice-based learning:

Training exposures during bedside, laboratory, dialysis procedures, CRRT, and other work-related activities, including courses and workshops (e.g., simulations if available, standardized patients, and bedside teaching) represent excellent targets for learning. Trainees are expected to build their capacity through self-directed learning.

On the other hand, practice-based learning allows the educator to supervise trainees to become competent in the required program practical skills that ensure fulfilling the knowledge, psychomotor, and/or attitude learning domains. Each trainee is required to maintain a logbook documenting the procedures observed, performed under supervision, and performed independently. It is preferable to determine the minimum number of procedures to be performed before training completion and the minimum number needed to maintain competency after certification.

Fellows are encouraged to attend renal biopsy procedures as much as possible and to master the dialysis procedure initiation, priming, and troubleshooting any events during the dialysis procedure with the supervision of the faculties.

C) Morning report:

Morning reports are case-based teaching sessions, and are common to many training programs with varying purposes and focuses. The goals of morning reports are to teach efficient handover strategies and case presentation skills, allow discussion of the management of interesting cases, and enhance problem-solving and multidisciplinary team skills.

1.2. Universal Topics

Universal topics are educational activities developed by the SCFHS and are intended for all specialties. Priority will be given to the following topics:

- High value
- Interdisciplinary and integrated
- Require expertise that might be beyond the availability of the local clinical training sites

Universal topics have been developed by SCFHS and are available, such as e-learning via personalized access for each trainee (to access online modules). Each universal topic will have self-assessment at the end of the module. Universal topics were distributed throughout the training period.

Intent:

These are high-value interdisciplinary topics of utmost importance to the trainee. The reason for delivering the topics centrally is to ensure that every trainee receives high-quality teaching and develops essential core knowledge. These topics were common to all specialties.

The included topics should meet one or more of the following criteria:

- Impactful: These are topics that are common or life-threatening
- Interdisciplinary: Topics that are difficult to teach by a single discipline
- Orphan: Topics that are poorly represented in the undergraduate curriculum
- Practical: Topics that trainees will encounter in hospital practice

Development and Delivery:

Core topics for the PG curriculum will be centrally developed and delivered by the Commission through an e-learning platform. A set of preliminary learning outcomes for each topic will be developed. Content experts, in collaboration with the central team, may modify the learning outcomes.

These topics will be didactic in nature, with a focus on the practical aspects of care. These topics will have more content than workshops and other planned face-to-face interactive sessions.

The suggested duration of each topic is 1 hour and 30 minutes.

Assessment:

The topics are delivered in a modular fashion. At the end of each Learning Unit, there is an online formative assessment. After the completion of all topics, there will be a combined summative assessment in the form of context-rich MCQs. All trainees must attain minimum competency in summative assessment. Alternatively, these topics can be assessed in a summative manner along with a specialty examination.

We have selected the applicable modules for the Pediatric Nephrology Fellowship Program.

The following table shows the selected universal topics and the training year in which each topic should be completed.

Training Year	Modules		Topics name	
	Number	Name	Number	Name
F1	Module-1	Introduction	Topic-5	Safe drug prescribing
			Topic- 4	Sepsis; SIRS; DIVC
	Module-4	Medical and Surgical Emergencies	Topic-17	Management of hypotension
			Topic-18	Management of hypertension



Training Year	Modules		Topics name	
	Number	Name	Number	Name
	Module -5	Acute Care	Topic-25	Management of fluid in the hospitalized patient
			Topic-26	Management of electrolyte imbalances
F2	Module-7	Ethics and Healthcare	Topic-33	Patient advocacy
			Topic-34	Organ Transplantation
F3	Module-7	Ethics and Healthcare	Topic-35	Autonomy and Treatment Refusal
			Topic-36	Death and Dying

Module 1: Introduction

First year fellows should complete topic 1 and topic 3 from this Module

1- Safe drug prescribing

3- Sepsis; SIRS; DIVC

Safe drug prescribing:

At the end of the learning unit, trainees should be able to:

- Recognize the importance of safe drug prescribing in healthcare
- Describe various Adverse Drug Reactions with examples of commonly prescribed drugs that can cause such reactions.
- Apply principles of drug-drug, drug-disease, and drug-food interactions in common situations
- Apply principles of prescribing drugs in special situations such as renal failure and liver failure
- Apply principles of prescribing drugs in the elderly, pediatric age group patients, and pregnancy and lactation
- Promote evidence-based cost-effective prescribing

- g) Discuss ethical and legal framework governing safe-drug prescribing in Saudi Arabia

Sepsis, SIRS, DIVC:

At the end of the learning unit, trainees should be able to do the following:

- a) Explain the pathogenesis of sepsis, SIRS, and DIVC
- b) Identifying patient-related and non-patient-related predisposing factors for sepsis, SIRS, and DIVC
- c) Recognize a patient at risk of developing sepsis, SIRS, and DIVC
- d) Describe the complications of sepsis, SIRS, and DIVC
- e) Apply the principles of management of patients with sepsis, SIRS, and DIVC
- f) Describe the prognosis of sepsis, SIRS, and DIVC

Module 4: Medical and Surgical Emergencies

First Year Fellows should complete topic 4 from this module

4- Management of hypotension and hypertension

At the end of the learning unit, you should be able to do the following:

- a) Categorize patients who have hypotension or hypertension
- b) Identify patients who need prompt medical attention
- c) Generate preliminary diagnoses based history and physical examination
- d) Order and interpret urgent investigations
- e) Provide appropriate immediate management to patients
- f) Refer the patients to the next level of care, if needed

Module 5: Acute Care

First year fellows should complete Topic 5 and 6 from this Module

5- Management of fluid in the hospitalized patient

6- Management of electrolyte imbalances



Management of Fluid in Hospitalized Patients:

At end of the learning unit, trainees should be able to do the following:

- a) Review physiological basis of water balance in the body
- b) Assess a patient for his/her hydration status
- c) Recognize a patient with over and under hydration
- d) Order fluid therapy (oral as well as intravenous) for a hospitalized patient
- e) Monitoring fluid status and response to therapy through history, physical examination, and selected laboratory investigations

Management of Acid-Base Electrolyte Imbalances:

At the end of the learning unit, trainees should be able to do the following:

- a) Review physiological basis of electrolyte and acid-base balance in the body
- b) Identify diseases and conditions that are likely to cause or are associated with acid/base and electrolyte imbalances.
- c) Correct electrolyte and acid-base imbalances
- d) Perform careful calculations, checks, and other safety measures while correcting the acid-base and electrolyte imbalances.
- e) Monitor response to therapy through history, physical examination and selected laboratory investigations

Module 7: Ethics and Healthcare

2nd year fellows should complete Topic 3 and 4 from this Module.

3rd year fellows should complete topic 5 and 6 from this Module.

3- Patient advocacy

4- Ethical issues: transplantation/organ harvesting; withdrawal of care

5- Ethical issues: treatment refusal; patient autonomy

6- Role of doctors in death and dying

Patient Advocacy:

At the end of the learning unit, you should be able to

- a) Define patient advocacy
- b) Recognize patient advocacy as a core value governing medical practice
- c) Describe the role of patient advocates in the care of patients
- d) Develop a positive attitude towards patient advocacy
- e) Be a patient advocate in conflicting situations
- f) Be familiar with local and national patient advocacy groups

Ethical issues: Transplantation/organ harvesting; withdrawal of care.

At the end of the learning unit, you should be able to:

- a) Apply key ethical and religious principles governing organ transplantation and withdrawal of care
- b) Be familiar with the legal and regulatory guidelines regarding organ transplantation and withdrawal of care
- c) Counsel patients and families in the light of applicable ethical and religious principles
- d) Guide patients and families to make informed decisions

Ethical issues: Treatment refusal; patient autonomy:

At the end of the Learning Unit, you should be able to do the following:

- a) Predict situations where a patient or family is likely to decline prescribed treatment
- b) Describe the concept of 'rational adults' in the context of patient autonomy and treatment refusal
- c) Analyze key ethical, moral, and regulatory dilemmas in treatment refusal
- d) Recognize the importance of patient autonomy in the decision making process



- e) Counsel patients and families who decline medical treatment while considering the best interest of the patients

Role of Doctors in Death and Dying:

At end of the Learning Unit, you should be able to:

- a) Recognize the important role a doctor can play in the dying process
- b) Provide emotional as well as physical care to a dying patient and family
- c) Provide appropriate pain management to a dying patient
- d) Identify suitable patients and refer such patients to palliative care services

1.3. General Learning Opportunities:

Formal training time should be supplemented by other practice-based learning (PBL), such as:

- Journal Club** (at least 2 Journal clubs for each fellow per year) .
- Grand rounds** (weekly meeting).
- Involvement in quality improvement committees and meeting
- Continuous professional activities (CPD) relevant to specialty (conferences and workshops recommended by Local and International Nephrology Societies, such as American Society Of Nephrology ASN and International Pediatric Nephrology Association IPNA)
- Morbidity and Mortality (M&M) ** (at least once per months meeting) .

ASSESSMENT AND EVALUATION:

1. Purpose of Assessment

Assessment plays a vital role in the success of post-graduate training. Assessment guides trainees and trainers to achieve defined standards, learning outcomes, and competencies. On the other hand, the assessment provides feedback to learners and faculty members regarding curriculum development, teaching methods, and quality of the learning environment. A reliable and valid assessment is an excellent tool for assessing curriculum alignment between objectives, learning methods, and assessment methods. Finally, assessment assures patients and the public that health professionals are safe and competent to practice.

Assessment can serve the following purposes:

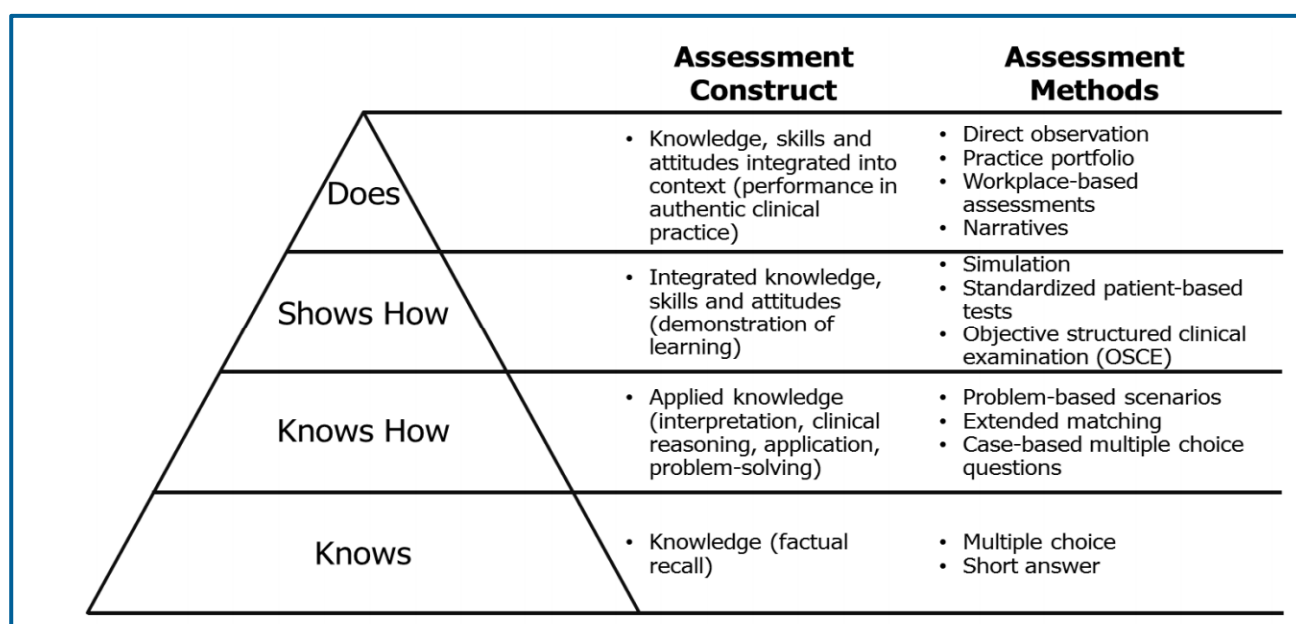
- a. **Assessment for learning:** Trainers use information from trainees' performances to inform their learning for improvement. This enables educators to use information about trainees' knowledge, understanding, and skills to provide feedback to trainees about learning and how to improve.
- b. **Assessment as learning:** Involving trainees in the learning process enables them to monitor their progress. Trainees use self-assessment and educators' feedback to reflect on their progress. This helps to develop and support the trainees' metacognitive skills. Assessment of learning is crucial in helping students become lifelong learners.
- c. **Assessment of learning:** This demonstrates the achievement of learning. It is a graded assessment and usually counts towards the trainee's end-of-training degree.



- d. **Feedback and evaluation:** Assessment outcomes will represent quality metrics that can improve the learning experience.

Miller’s Pyramid of Assessment provides a framework for assessing the trainees’ clinical competences which acts as a road map for the trainers to select the assessment methods to target different clinical competencies including “knows,” “knows how,” “shows how,” and “does”

For the sake of organization, assessment will be further classified into two main categories: *Formative and Summative*.



1. Adapted from Walsh CM. In-training gastrointestinal endoscopy competency assessment tools: Types of tools, validation, and impact. *Best Practice & Research Clinical Gastroenterology*. 2016 Jun 1;30(3):357-74.
2. Miller GE. Assessment of clinical skills, competencies, and performance *Acad Med*. 1990;65(9 Suppl): S63-7

2. Formative Assessment

2.1 General Principles

Trainees, as an adult learner, should strive for feedback throughout their journey of competency from “novice” to “mastery” levels. Formative assessment (also

referred to as continuous assessment) is the component of assessment that is distributed throughout the academic year and aims primarily to provide trainees with effective feedback.

It is advised that every 2 weeks, at least 1 h should be assigned by trainees to meet with their mentors in order to review performance reports (e.g., ITER, etc.). Input from the overall formative assessment tools will be utilized at the end of the year to determine whether individual trainees will be promoted from the current to the subsequent training level. Formative assessment will be defined based on scientific committee's recommendations (usually updated and announced for each individual program at the start of the academic year) (please refer to the website and discuss with your Program Director).

According to the executive policy on continuous assessment (available online: www.scfhs.org), formative assessment will have the following features that will be used based on Miller's pyramid:

- a. Multisource: Minimum four tools.
- b. Comprehensive: Covering all learning domains (knowledge, skills, and attitude).
- c. Relevant: Focusing on workplace-based observations.
- d. Competency-milestone oriented: Reflecting the trainee's expected competencies that match the trainee's developmental level.

Trainees must play an active role in seeking feedback during training. However, trainers are also expected to provide timely and formative assessments. The SCFHS will provide an e-portfolio system to enhance the communication and analysis of data arising from formative assessments.

Trainers and trainees are directed to follow the recommendations of the scientific committee regarding the updated forms, frequency, distribution, and deadlines related to the implementation of the evaluation forms.



2.2 Formative Assessment Tools

Pediatric Nephrology Fellowship			
Training Level : F1			
Assessment Tool	Program Requirement (<i>Total of 5 tools</i>)	Details & Description (all per academic year)	Score's Utility (Marking vs. Feedback)
Academic Activities		Each fellow will present minimum 4 presentations per year	Feedback
CBD		Case-Based Discussion – Clinical Decision making & reasoning skills at least 6 per year	Feedback
OSCE		OSCE is done 1 to 2 times per year	Marking
Research		At least one research project is required, the institutional ethical approval is required in the 1 st year, and the full manuscript required in the 2 nd year before graduation.	Feedback
Volunteering		Volunteering in Society awareness campaign or any health care related volunteer work (accredited 10 hours are required), a quality improvement project approved by the program director is an option replacing the volunteering	Feedback
ITERS		The continuous evaluation is required each block and each year.	Marking

Pediatric Nephrology Fellowship

Training Level : F2

Assessment Tool	Program Requirement (<i>Total of 5 tools</i>)	Details & Description (all per academic year)	Score's Utility (Marking vs. Feedback)
Academic Activities		Each fellow will present minimum 4 presentations per year	Feedback
CBD		Case-Based Discussion – Clinical Decision making & reasoning skills at least 6 per year	Feedback
EYPT-Local (Final Test)		End of year exam for F2 only required for graduation	Marking
OSCE		OSCE is done 1 to 2 times per year	Marking
Research		At least one research project is required, the institutional ethical approval is required in the 1 st year, and the full manuscript required in the 2 nd year before graduation.	Marking
Volunteering		Volunteering in Society awareness campaign or any health care related volunteer work (accredited 10 hours are required), a quality improvement project approved by the program director is an option replacing the volunteering	Feedback
ITERS		The continuous evaluation is required each block and each year	Marking



The evaluation of each component will be based on the following equation:

Percentage	< 50%	50-59.4%	60-69.4%	>70%
Description	Clear fail	Borderline fail	Borderline pass	Clear pass

To achieve unconditioned promotion, the candidate must score a minimum of “borderline pass” in all components.

- The program director can still recommend the promotion of candidates if the above is not met in some situations.
- If the candidate scored “borderline failure” in one or two components at maximum, these scores should not belong to the same area of assessment (for example, both borderline failures should not both be in skills).
- The candidate must have passed all other components and scored a minimum of clear pass in at least two components.

Please refer to the Fellowship program website for an updated information and updated blueprint www.scfhs.org.sa Example of promotion exam blueprint:

No.	Sections
1	Function of the Kidney in Children and Presentation of Kidney Disease and Neonatal Disorders
2	Acute Kidney Injury, HUS: Hemolytic Uremic Syndrome, Glomerulonephritis, Glomerular Disease and Nephrotic Syndrome
3	Chronic Kidney Disease
4	Hypertension and Diabetes and Kidney Disease
5	Congenital, Urology Abnormalities and Urinary Tract Infection
6	Tubulopathy, Childhood Vasculitis and Systemic Lupus Erythematosus
7	Cystic Kidney Disease and Nephrocalcinosis with Renal Calculi
8	Disorders of Fluid, Electrolyte, Acid Base Regulation, Calcium, Phosphate and Rickets

No.	Sections
9	Renal Management of Inborn Errors of Metabolism and Sickle Cell Disease
10	Renal Replacement, Peritoneal Dialysis, Hemodialysis and Plasmapheresis
11	Renal Transplantation, Immunosuppressive Therapy, Complication
Total	

Note:

See the SCFHS website for the most up-to-date information.

- The blueprint distributions of the examination may differ by up to +/-5% in each category.
- Percentages and content are subject to change at any time.
- Research, Ethics, Professionalism, and Patient Safety are incorporated within various domains.

3. Summative Assessment

3.1 General Principles

Summative assessment is a component of assessment that aims primarily to make informed decisions about trainees' competency. Compared to formative assessment, *summative assessment* does not aim to provide constructive feedback. For further details in this section, please refer to the general bylaws and executive policy of assessment (available online: www.scfhs.org). In order to be eligible to sit for the final exams, trainees will be granted "Certification of Training Completion" upon successful completion of all training rotations.

For Blueprint: please refer to the most updated version published on SCFHS website.

3.2. Final In-training Evaluation Report (FITER)

In addition to the approval of the completion of clinical requirements by the supervising committee, FITER is also prepared by program directors for each



fellow at the end of his or her final year of training. This report shall be the basis for obtaining the certificate of Training Program Completion as well as the qualification to sit for the final specialty examinations.

3.3 Certification of Training-Completion

To be eligible for the final examinations, each trainee is required to obtain “*Certification of Training-Completion*”. Based on the training bylaws and executive policy (please refer to www.scfhs.org) trainees will be granted “Certification of Training-Completion” once the following criteria is fulfilled:

- a) Successful completion of all training rotations.
- b) Completion of training requirements (e.g., volunteering, research, etc.) as outlined in FITER, which is approved by the scientific committee of the sub-specialty.
- c) Clearance from SCFHS training affairs ensures compliance with tuition payments and completion of universal topics.

“Certification of Training-Completion” will be issued and approved by the supervisory committee or its equivalent according to SCFHS policies.

3.4 Final Written & Practical Examinations

The final specialty examination is the summative assessment component that grants trainees certification of the specialty. It has two elements:

- a) Final written exam: To be eligible for this exam, trainees are required to have “Certification of Training-Completion”. The final written exam is in the form of MCQs; multiple-choice questions, dates, and further details are announced every year for all trainees. The exam follows the blue print that can be found in the following link.
- b) Final clinical/practical exam: Trainees will be required to pass the final written exam to be eligible to set for the final clinical/practical exam. The final clinical exam is in the form of an objective structured clinical examination OSCE with a minimum of four stations, which is scheduled at least once per year, and

candidates need to pass each station to pass the exam. Exam dates and further details are announced every year for all trainees.

For the most updated blueprint of final written and clinical/practical exams, please refer to the most updated version published on the SCFHS website.

<https://www.scfhs.org.sa/MESPS/TrainingProgs/TrainingProgsStatement/Pages/index.aspx>

For further details on the final exams, please refer to the general bylaws and executive policy of assessment (available online: www.scfhs.org).

Blueprint Outlines: The content of the following table is for demonstration only (please refer to the most updated version published on the SCFHS website).

The blueprints of the final written and clinical/practical examinations are shown in the following table:

Example of Written Exam Blueprint

No.	Sections	Percentage
1	Kidney Development and physiology	5%
2	Glomerular Diseases	15%
3	Tubular Diseases	15%
4	Kidney Involvement in Systemic Diseases	10%
5	Urinary Tract Disorders	10%
6	Hypertension	10%
7	Acute Renal Injury	10%
8	Chronic Renal Failure	15%
9	Kidney Transplantation	10%
Total		100%

Note:

- Blueprint distributions of the examination may differ up to +/-5% in each category
- Research, Ethics, Professionalism, and Patient Safety are incorporated within various domains
- Percentages and content are subject to change at any time.

See the SCFHS website for the most up-to-date information

For further details on the final exams, please refer to the General Bylaws of Training in Postgraduate Programs and General Assessment Bylaws (available online: www.scfhs.org).

Learning Domain	Summative Assessment Tools	Passing Score
Knowledge	<ul style="list-style-type: none">• Final Written Examination• Academic Activities• CBD	At least borderline pass in each tool in accordance with the standard setting method used by the executive administration of assessment
Skills	<ul style="list-style-type: none">• Objective Structured Clinical Examinations (OSCE)• Research• Volunteering	At least borderline pass in each tool in accordance with the standard setting method used by the executive administration of assessment
Attitude	FITER: In-Training Evaluation Report	Successfully pass FITER

XI. PROGRAM AND COURSE EVALUATION

The SCFHS applies various measures to evaluate the implementation of this curriculum. The training outcomes of this program will follow the quality assurance framework endorsed by the Central Training Committee at the SCFHS. Trainee assessment (both formative and summative) results will be analyzed and mapped to the curriculum content. Other indicators that will be incorporated are as follows:

- Report of the annual trainees' satisfaction survey.
- Reports from trainees' evaluation of faculty members.
- Reports from trainees' evaluation of rotations.
- Reports from the annual survey of program directors.
- Data available from program accreditations.
- Reports from direct field communications with trainees and trainers.

Goal-based Evaluation: Achievement of intended milestones will be evaluated at the end of each stage to assess the progress of curriculum delivery, and any deficiency will be addressed in the following stage using the time devoted to trainee-selected topics and professional sessions.

In addition to subject-matter opinions and best practices from benchmarked international programs, the SCFHS will apply a robust method to ensure that this curriculum will utilize all the data available during the revision of this curriculum in the future.

XII. POLICIES AND PROCEDURES

This curriculum represents the means and materials, and outlines the learning objectives with which trainees and trainers will interact to achieve the identified educational outcomes. The SCFHS has a full set of “General Bylaws of Training in Postgraduate Programs” and “Executive Policies” (published on the official SCFHS website) that regulate all training-related processes. The general bylaws of training, assessment, and accreditation, as well as executive policies on admission, registration, formative assessment and promotion, examination, trainees’ representation and support, duty hours, and leaves, are examples of regulations that need to be implemented. Under this curriculum, trainees, trainers, and supervisors must comply with the most updated bylaws and policies that can be accessed online (via the official SCFHS website).