DOWNSTATE
HEALTH SCIENCES UNIVERSITY

University Hospital of Brooklyn
College of Medicine
School of Graduate Studies
College of Nursing
School of Health Professions
School of Public Health

Fellowship Training Program in Nephrology

Curriculum

Division of Nephrology
Department of Medicine
SUNY Downstate
Health Sciences
University

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INTRODUCTION TO THE CURRICULUM

The clinical training experience of the nephrology fellowship program at SUNY Downstate Health Sciences University, Brooklyn, NY is designed to provide outstanding practical and academic training in every aspect of nephrology and prepares fellows for a productive career afterwards. Over the last 50 years, there has been a dramatic increase in the body of knowledge relating to basic and clinical nephrology. This curriculum attempts to incorporate these advances and is an intensely academic one, designed not only to provide a broad knowledge of nephrology, but include the ability to integrate several equally important precepts- interpersonal skills, professional attitudes, humanistic qualities, and lifelong learning.

This Curriculum is the combined effort of key faculty members and previous and current SUNY Downstate fellows; therefore, this is a dynamic document. This Curriculum is a guide to what you are expected to learn in your 2 years as a Nephrology Fellow. It is also a guide to help you and the faculty meet these goals as you rotate through each phase of your fellowship. The general description, goals, objectives, expectation, and benchmarks of each rotation are described.

Feedback during the fellowship is of utmost importance. We need your feedback to assess how well we are meeting the goals as are outlined in this curriculum. Every year you will be given evaluation forms to rate the program and attendings that you worked with during each rotation. In addition, you are evaluated as well. At the completion of each rotation your attending will evaluate your performance and in addition, every 6 months you will meet with the Program Director to review these evaluations and discuss any problems or areas that have been identified that require additional help or intervention. These meetings can be during your 6-month milestone evaluations, where input is given to you to work on your weakness, we as faculty noticed during your prior 6 months. Milestones for non-US residency candidates will be initially at 3 months and then 6 monthly after that. You as a fellow can also request a meeting more frequently if you should sense the program needs more urgent corrections. There are (non-physician) members of the Nephrology team (including PA's, nurses, social workers, nephrology administrative staff and patients) who will also evaluate you to provide a "360 degree" view of your performance.

Our website (maintained by your program director and by SUNY Medical Arts Division) is a valuable resource for information about fellowship activities, archives of important lectures, journal clubs, biopsy conferences and renal grand rounds. The website can be found at: https://www.downstate.edu/education-training/fellowship-residency-programs/nephrology/index.html

PROGRAM ORGANIZATION AND STRUCTURE

Key Faculty

1. Moro O Salifu, MD, MPH, MBA
   Professor of Medicine
   Chief of Nephrology and Chair of Medicine.
2. Subodh J. Saggi, MD, MPH
   Professor of Medicine, Fellowship Program Director
   Site Director Downstate Health Sciences University, Director of Parkside Ambulatory Dialysis
   Director Extracorporeal therapies, Downstate
   Director Kidney Pancreas Transplant Program.
3. Barbara Delano, MD, MPH (Retired Teaching Faculty)
   Professor Emeritus, Mentor Nephrology Division
4. Clinton Brown, MD
   Professor of Medicine
   Chair IRB
5. Man Oh, MD
   Professor of Medicine
   Educational Course Director Nephrology
6. Mariana Markell, MD
   Professor of Medicine,
   Director Kidney Transplant.
7. Mary Mallappallil, MD
   Associate Professor of Medicine, Site Director Kings County Hospital
   CME course Director Nephrology
8. Gary Briefel, MD (Retired Teaching Faculty)
   Associate Professor of Medicine, Kings County Hospital
9. Susan Grossman, MD
   Fellowship Site Director Brooklyn VA.
10. Michel Marie-Alex, MD
    Director, Brooklyn VA Nephrology
11. Angelika Gruessner, PhD
    Professor, Biostatistics
12. Arye Kremer, MD
    Clinical Assistant Professor of Medicine, Interventional Nephrologist
    Medical Director In-patient Dialysis Downstate Health Sciences University
13. Okwudili Nnaji, MD
    Clinical Assistant Professor of Medicine, Attending Nephrologist, Kidney transplant
14. Isha Puri, MD
    Clinical Assistant Professor of Medicine, Attending Nephrologist, Kings County Hospital.
15. Sonalika Agarwal, MD
    Clinical Assistant Professor of Medicine, Attending Nephrologist Kings County Hospital
16. Cosmin Adrian, MD.
    Attending Nephrologist, Brooklyn VA.
17. Seema Chittale, MD
    Clinical Trials Coordinator.

Faculty from Affiliate Program's that Nephrology fellow interacts with and who assess fellows while they rotate through these Institutes for additional experience:

1. Jaime Uribarri, MD
   Professor of Medicine, Mount Sinai Hospital
   Director Home Dialysis Program, Division of Nephrology, Mount Sinai Health Systems
2. Vasishta Tatapudi, MD, Associate Professor, Department of Medicine at NYU Grossman School of Medicine, Program Director of the Transplant Nephrology Fellowship at the NYU Langone Transplant Institute

Administrative Staff in Nephrology:

1. Ms. Leancia Tam Administrator Nephrology

2. Ms. Dianne Edwards-Reid, Nephrology Fellowship Program Coordinator
3. Ms. Linda Edwards, Clinical and outpatient clinic coordinator.

The above faculty constitute the **Education and Curriculum Committee** and the **Clinical Competence Committee**. The committee meets annually to discuss fellow performance and education and make recommendations on curricular development and fellow remedial interventions and promotions.

COMPETENCY-BASED GOALS AND OBJECTIVES OF THE NEPHROLOGY FELLOWSHIP PROGRAM

ACGME CORE COMPETENCIES

In October 2019, ACGME updated Milestones for evaluation of Nephrology Fellowship trainees. Implementation of these milestones began July 1, 2021, for assessing fellows' competencies at each year of training. SUNY Downstate Nephrology Program follows these guidelines and accordingly promotes a fellow to the next year based on these competencies. Our Clinical Competency Committee (CCC) attests to the fellow's progress at intervals determined by ACGME guidelines and advises the Program Director should a fellow need remediation. Our Program Evaluation Committee (PEC) assesses the health of our training program and meets at frequencies determined by ACGME guidelines. PEC members have representation of a Nephrology fellow usually the Chief Fellow. Given the changing health care systems in US, given the changes requested in our system from patient's voice and mandates from Congress, given the advances based on science and advice from ACGME, our Nephrology Program also changes constantly adapting to such changes. It remains focused on the needs of our populations and community we serve and constantly incorporates required training of fellows in areas that need special attention based on input from many sources. Our program is also constantly updating new scientific methodologies into Nephrology such as special methods to assess renal pathologies and biopsy specimens, special interventional techniques to perform noninvasive access creations, or special methods to provide renal replacement therapies, or to incorporate Point of care Ultrasound (POCUS) training for you as fellows for better bedside assessment of patients. We have also been updating our fellowship education based on clinical trial data many of which we conduct here at SUNY Downstate all to help improving transplant outcomes or help improve the lives of patients with kidney diseases. Our program makes a special effort to recruit minority and underprivileged applicants and makes a concerted effort to recruit and train a diverse group of individuals to avoid disparities. In this effort Program Director works with the office of GME and Institution to align itself with Institution's vision and mission. We respect the LGBTQ community and have also incorporated their wellbeing within our program by giving access to them to a variety of support available to them here at SUNY Downstate.

In July 2001, the Accreditation Council for Graduate Medical Education (ACGME) introduced six defined areas in which fellows must attain competence over the course of their training. Current update of ACGME Milestones still holds those six pillars of assessment of each fellow but has expanded it to include narratives of your performance by the evaluator in more specific terms to our subspecialty. Our objective is to prepare physicians who have completed three years of residency training in Internal Medicine to become competent Nephrologists. Our program does recruit if we do not match for applicants who have completed 3 years of an International ACGME residency or a Non ACGME International Residency in their country or origin and who have had special extra training in Nephrology. All such applicants undergo an eligibility vetting procedure by our Office of the GME and our Institutional Oversight Committee prior to recruitment based on ACGME and our local guidelines. Such International non-US residency trained candidates cannot sit for their ABIM Nephrology subspecialty exam and neither practice Medicine in the US until they formally finish a 3-year residency in Internal Medicine in the US and take their ABIM Internal Medicine exams first. Nephrology training will provide the fellow with exposure to a wide variety of renal diseases and electrolyte abnormalities and a chance to perform the procedures necessary for the diagnosis and treatment of end-stage renal disease. The program will allow the trainees to assume increasing responsibility in the management of renal disease in ambulatory, in-patient and intensive care settings. Finally, trainees will be expected to initiate a research project, or a quality project or a safety project under the guidance of one or more faculty members as their mentors. Renal fellows are expected to learn patient care, supervisory, and teaching skills. They will expand

their medical knowledge base, as they apply evidence –based and cost-conscious strategies in patient care. Under the supervision of teaching attendings, fellows will develop progressive independence in their various responsibilities. As the most senior house staff members, fellows will recognize the important part they play as role models, counselors, and teachers to the more junior members of the teams. The consult fellows will serve as consultants to other services in the hospital and work with medical students educating them in the care of patients with renal diseases. Nephrology fellows rotate through 3 internal sites within our GME program and 2 external affiliate sites. Each internal sit is equipped with faculty that will focus on some very specific competences for you to achieve at the end of your rotation. Such site-specific competencies are outlined separately in documents attached below. The overarching goals for Nephrology curriculum is described below. You as a Nephrology fellow will be assessed by faculty during your several rotations in these following domains.

Patient Care:

- Principal Educational Goals:
  - Develop interviewing skills with a special emphasis on kidney diseases, assess for the possibility of presence of hereditary kidney diseases by a proper family history. Fellows need to present themselves in a professional manner of an esteemed Institution and a member of a highly educated team, have proper IDs to present themselves and they must dress properly to address a patient. They must not allow themselves to be interrupted constantly by looking at their cell phones, sending text messages while they interview a patient. They must learn to excuse themselves and perform such tasks outside the medical examination room.
  - Develop physical examination skills to assess proper Blood pressure measurements, fundoscopic examination for diabetic and hypertensive retinopathy, cardiovascular disease and fluid status assessment, abdominal examination, neurological assessment for neuropathy and vascular assessment for planning a fistula for chronic dialysis.
  - Generate and prioritize differential diagnosis and learn when special imaging techniques or a kidney biopsy or ordering renal specific tests or a genetic test are needed.
  - Develop rational, evidence-based management strategies based on information you receive on the tests you have ordered.
  - All along a fellow will learn to remain sensitive to patients wishes, their autonomy, privacy of their medical records, maintain cultural sensitivity, work with many team members involved in the care of the patient such as Nurses, medical house staff, and students, social workers, case managers and administrative staff with respect, communicate with them timely in a respectful manner, not ignore their questions or their requests for information and guide them in making an informed decision. Fellows need to learn when to incorporate proper translational service use to elicit a better history.

- By the end of **1st Year of Fellowship**, one must be able to:
  - Elicit a proper patient's correct history and the context in which the illness or symptoms occur.
  - Develop verbal and nonverbal communication skills to facilitate communication, elicit the emotional content of the interview, and provide comfort.

- Ensure patient's understanding of kidney diseases, different stages of chronic kidney disease, difference between acute kidney injury and chronic kidney disease, and other terms used.
- Perform an appropriate, technically correct physical examination
- Synthesize pertinent renal data into a differential diagnosis
- Recognize psychosocial and cultural issues that may affect patient compliance and outcomes.
- Accept personal responsibility to follow-up on patient care plans and test results and filling their medications and refills. Fellows must help obtain prior authorization for special medications and work with other team members involved with this function.
- Formulate a diagnostic and therapeutic plan without supervision
- Apply appropriate preventative care for the patient with kidney disease seen in an outpatient setting. Address life style management, weight reduction, proper blood sugar control proper BP control and low salt diet, etc.
- Overcome barriers to communication, including those derived from cultural differences or physical and mental impairment
- Generate an appropriate differential diagnosis in all patients to guide the next level of diagnostic tests or a treatment plan
- Develop an evidence-based therapeutic and diagnostic management plan independently for most patients.
- Coordinate patient care among all members of the health care team
- Establish and identify oneself as a responsible and responsive team leader
- Counsel and educate patients and families about kidney disease
- Develop skills for end of life and palliative care discussions and planning for the ill patient with CKD and ESRD
- Optimize discharge planning and follow-up in the nephrology clinic or dialysis unit. Arrange education for advanced CKD patient obtain knowledge about all renal replacement therapies including transplant, preemptively creating an AV access, or successfully transitioning a patient to home dialysis.
- Perform procedures (urine microscopy, temporary catheters, renal biopsy) required by the ABIM.

- In addition, by the end of **the 2nd Year of Fellowship**, one should be able to:
  - Use the interview to identify cognitive impairment, anxiety, denial, and defensiveness and be able to manage each during the interview
  - Independently perform the procedures (urine microscopy, temporary catheters, renal biopsy) required by the ABIM
  - Efficiently evaluate and manage patients in the inpatient and outpatient setting at the level of a nephrology sub-specialist
  - Function competently as a nephrology consultant
  - Coordinate patient care among all members of the healthcare team and demonstrate leadership skills to promote multidisciplinary management
  - Demonstrate effective ability to lead end of life and palliative

care discussions and planning for the ill patient with CKD and ESRD.

- Identify disparities in care, access to care and help mitigate those.

Medical Knowledge:

- Principal Educational Goals:
  - Expand clinically applicable knowledge base of basic and clinical nephrology sciences. Fellows must read and gather knowledge from various sources, such as textbooks, up to date, nephrology journals and from teaching rounds. All fellows need to get a good grasp of anatomy, genetics, physiology, pathophysiology pharmacology and therapeutics for managing a patient with kidney diseases.
  - Develop and apply an analytical approach to renal diseases and nephrology. Fellows need to understand how faculty analyzes a case and take a similar approach.
  - Learn to access and evaluate nephrology literature relevant to patient care.

- By the end of **1st Year of Fellowship**, one must be able to:
  - Demonstrate knowledge of commonly encountered nephrology problems
  - Perform a thorough literature search for pertinent renal issues
  - Describe basic pathophysiology for common nephrology and hypertension-related conditions
  - Follow-up on questions regarding optimal, evidence-based patient care
  - Develop skills for effective case presentation and discussion of optimizing medical care for all types of renal diseases

- In addition, by the end of **the 2nd Year of Fellowship**, one should be able to:
  - Demonstrate improvement in performance on objective knowledge assessment (KSAP and NephSAP)
  - Demonstrate knowledge and understanding of commonly encountered inpatient and ambulatory nephrology problems
  - Demonstrate knowledge of nephrology literature analysis particularly what Standards of care are and which agencies such as KDIGO or ASN or NKF put out as guidelines. Identify patients whose care deviated from what Standard of Care should have been and why.
  - Demonstrate informatics skills to promote evidence-based medicine and quality care application
  - Solidify knowledge base by educating others (medical students, residents, PAs, co-fellows, faculty)
  - Demonstrate a level of knowledge appropriate for level of training compared with one's peers
  - Demonstrate in-depth pathophysiology for common and uncommon
  - nephrology conditions
  - Apply critical reading skills to current nephrology literature

- Read and review key journal publications on a regular basis

Interpersonal & Communication Skills:

- Principal Educational Goals
  - Communicate effectively with patients with kidney disease and their families
  - Communicate effectively with physician colleagues at all levels
  - Communicate effectively with all non-physician members of the health care team to assure comprehensive and timely care of patients with all forms of kidney disease
  - Maintain comprehensive, legible records
  - Learn to communicate effectively through concise, logical, and clinically useful discharge summaries

- By the end of **the 1st Year of Fellowship**, one must be able to:
  - Ensure patients' understanding of nephrology and other terms used
  - Write appropriate nephrology admission and progress notes
  - Communicate effectively with patients, families, nurses, and other staff
  - Present nephrology cases accurately and succinctly on rounds
  - Document all clinical responses to patient care needs legibly in the chart
  - Develop skills to address frustration with our current healthcare system, or programmatic issues in a productive and constructive manner
  - Deliver bad news to patients with kidney disease (and their families) with empathy
  - Create clinically useful discharge summaries for nephrologists and other health care providers
  - Work effectively as a leader of the nephrology health care team
  - Demonstrate effective listening skills and reliable responsiveness to the needs of students, residents, and co-fellows as well as the opinions and requests of multidisciplinary team members
  - Provide education and counseling to patients, families, and colleagues
  - Communicate effectively with other consultants and primary care doctors to coordinate effective care and follow-up for the patient with kidney disease

- In addition, by **the 2nd Year of Fellowship,** one should be able to:
  - Deliver polished and professional formal presentations on all nephrological issues and renal diseases
  - Perform effective nephrology consultations
  - Work effectively as a leader of the nephrology health care team
  - Demonstrate skill in handling all difficult patient care situations
  - Communicate near misses or mismanagement issues with the healthcare providers involved in an educational manner

Professionalism:

- Principal Educational Goals
  - Display the elements of professionalism: altruism, accountability, excellence, duty, honor and integrity, and respect for others
  - Display the principles of confidentiality, integrity, and conformed consent
  - Recognize the signs of diminished professionalism, including abuse of power, arrogance, greed, misrepresentation, impairment, lack of conscientiousness and conflict of interest
- By the end of **the 1st Year of Fellowship**, one must be able to:
  - Demonstrate respect, compassion, integrity, and responsiveness towards patients, families, colleagues, and all members of the nephrology health care team
  - Demonstrate a personal sense of altruism by consistently acting in one's patients' best interest
  - Demonstrate accountability by being punctual, completing patient care tasks, attending conferences, completing administrative tasks, responding to calls answering emails not texting during presentations and lectures.
  - Demonstrate understanding of the basic principles of patient autonomy
  - Demonstrate leadership, serve as a role model for colleagues

- In addition, by **the 2nd Year of Fellowship** one should be able to:
  - Recognize and address physician impairment
  - Conduct clinical nephrology research with honesty, integrity, and protection of patients' rights

Practice-Based Learning and Improvement

- Principal Educational Goals:
  - Identify and acknowledge gaps in personal knowledge and skills in the care of one's patients
  - Analyze nephrology practice experiences
  - Develop and implement strategies for filling gaps in knowledge and skills
- By the end of **the 1st Year of Fellowship,** one must be able to:
  - Acknowledge limitations and errors and when to ask for assistance
  - Perform directed study based on faculty feedback
  - Seek and accept feedback from peers and faculty
  - Participate in quality improvement activities and root cause analysis

- In addition, by the end of **the 2nd Year of Fellowship,** one should be able to:
  - Perform directed study based on results of faculty feedback
  - Analyze one's own practice by reviewing quality improvement projects
  - Teach students, residents and peers effectively about various renal issues
  - Use patient care errors to teach students, residents, and peers
  - Use information technology to enhance care of complex patients

with kidney disease

- Analyze and improve one's own practice by reviewing charts through audits

Systems-Based Practice

- Principal Educational Goals:
  - Understand and utilize the multidisciplinary resources necessary to care optimally for hospitalized patients with kidney disease
  - Learn to collaborate with other members of the health care team to assure comprehensive care of the patient with kidney disease
  - Use evidence-based, cost-conscious strategies in the care of patients with all forms of kidney disease
  - Learn to analyze complex systems of care to result in improved patient outcomes

- By the end of **the 1st Year of Fellowship,** one must be able to:
  - Collaborate with discharge planners to arrange safe and appropriate discharges for patients with kidney disease
  - Involve social workers in care of patients with kidney disease
  - Recognize the systematic complexities that affect patient outcomes
  - Function as the nephrology team leader within a multidisciplinary team
  - Serve as a patient advocate in the outpatient and inpatient setting
  - Develop a working knowledge of various care systems and the most appropriate disposition for patients with kidney disease

- By the end of **the 2nd Year of Fellowship,** one should be able to:
  - Direct other subspecialty, surgical, nutritional, podiatric and social service consultations for patients with kidney disease
  - Use systemic approaches to reduce errors and effectively transition kidney disease patients between care settings
  - Strive to optimize patient follow-up by effective discharge planning to the nephrology clinic or dialysis unit
  - Promote medication reconciliation
  - Practice effective allocation of health care resources to avoid compromising quality of care
  - Recognize system deficiencies/complexities and strive for system improvement for patients with kidney disease

CORE COMPETENCIES FOR NEPHROLOGY

The nephrology training program at Downstate Health Sciences University provides cutting-edge training in all aspects of nephrology. Fellows rotate through 3 sites at each year and in addition to 2 external sites in their second year for the purposes of getting home dialysis experience and multiorgan transplants. Protected time is provided for vacation at each year and in the second year for research. Fellows in the Nephrology Critical Care pathway get an additional rotation in the ICU. Fellows are assigned mentors form the start who guide them throughout the fellowship and manage their research projects. First year Fellows are also assigned to partner with their assigned second year fellow to learn procedures, seek guidance in navigating the systems.

The nephrology training program provides an in-depth exposure to the broad spectrum of renal diseases and electrolyte abnormalities encountered in clinical nephrology. The Nephrology service evaluates these problems on a consultation basis for all of Downstate Health Sciences University, Kings County and Brooklyn VA Hospitals. The consultation service consists of an attending from the renal division, the clinical fellow, PA, and on occasions medical residents (PGY 1, or 2 or PGY 3), and at times senior medical students or external rotators from other hospitals with whom Downstate Health Sciences University has a Program Letter of Agreement for training purposes. The fellow's role is primarily that of directing the management of the consultations while providing maximal educational benefits to the service and the general medical house staff. Many renal biopsies are done each year performed under the direction of the Program Director and other trained nephrologists and renal histopathology services provided from Cornell University, New York or from an outsourced for biopsies from Kings County, in close collaboration with the clinical renal service. The training program has a full-time program director and site directors that coordinate biopsy interpretations for fellows to learn from. The faculty are all board-certified in Internal Medicine and in Nephrology who provide teaching in the form of didactic lectures in various areas.

The Nephrology-Critical Care fellow is a unique fellowship line where fellows are exposed to the renal problems encountered in all ICU's including trauma ICU, Neuro ICU, CTICUS, SICU, etc. They do 2 years of Core Nephrology and then one year of CCM. Core Nephrology fellows as well as Nephro-CCM fellows learn acute renal failure in the ICU, workup of patients with sepsis and multi organ failure, evaluate candidates for multi organ transplant, and gain technical knowledge of many assist devices for patients in these settings who have renal dysfunction, require hemodynamic monitoring or immunosuppressive medication modification in transplant recipients. Some rotations like CTICU are at affiliate programs until SUNY DMC can establish their own CTICU program. Such determinations are made by the Pulmonary CCM program.

The dialysis and transplantation units are an integral part of the renal training program. The transplant program is run jointly by the Medicine, Surgery, Urology and Pediatric services. The attending nephrologist makes daily rounds and medical and surgical fellows care for the dialysis and transplant patients as part of their training. Approximately 100 renal transplants are performed yearly. The in-center dialysis facilities consist of an extremely dynamic 6 station unit providing acute and chronic dialysis training. Patients with active medical problems return to Downstate Health Sciences University or Kings County or the VA Hospital system for acute care and dialysis, while those who are stable are rapidly returned to satellite facilities. Downstate Health Sciences University patients primarily go to Downstate Parkside Dialysis unit. The CAPD program at Downstate Health Sciences University is still growing and cares for over 10-20 stable ambulatory patients receiving peritoneal dialysis or home hemodialysis. The clinical fellow is, thus, rapidly exposed to the full spectrum of acute and chronic problems that can arise in dialysis patients. In order for a fellow to gain more in-depth experience in home dialysis therapies exposure to larger volumes of patients are required for which Downstate Health Sciences University Fellowship program has an affiliate agreement with Mount Sinai Hospital system under the direction of Dr. Jaime Uribarri for a second-year fellow to rotate for one month. Similarly, for a fellow to gain experience in multi organ transplant and to get experience in performing transplant kidney biopsies Downstate Health Sciences University has an affiliate agreement with NYU under the supervision of Dr. Judith Benstein and Dt. Vasishta Tatpudi for a second-year fellow to rotate at NYU for a month. However,

if the volume of transplant picks up at Downstate Health Sciences University where by the fellows can get the experience required by ABIM for transplant purposes here at SUNY DMC, then the rotation to NYU shall be converted to an elective for the purposes of multi organ transplant exposure training purposes.

Downstate Health Sciences University offers an optional third year fellowship depending on availability of funding for such lines an additional year of training in Interventional Nephrology, or a year in Transplant. Downstate Health Sciences University will be expanding additional year experience in ESRD Administrative services as well as home dialysis or Geriatric Nephrology or Renal pathology in the future.

Specific Program Content

The fellow is expected to gain experience in a wide variety of renal disease. The specific entities are detailed below: Every year, a questionnaire will be sent out to the fellows to gauge the depth of exposure and to see if extra steps could be taken to deal with areas that are deficient.

1. Glomerular diseases
2. Diabetes mellitus and diabetic nephropathy
3. Hypertension
4. Acute renal failure and intensive care unit nephrology
5. Chronic renal failure
7. Acid-base disorders
8. Fluid and electrolyte disorders
9. Cystic and inherited diseases of the kidney
10. Tubulointerstitial disease and urinary tract infection
11. Disorders of mineral and bone metabolism
12. Transplantation
13. Renal disease in pregnancy
14. Renal function testing
15. Pharmacology of drugs in renal disease
16. Professionalism and ethical conduct
17. Research design, methods. and responsible conduct

Glomerular Diseases

I. PROGRAM CONTENT

A. Trainees should acquire a general understanding of the following areas:

1. Structure and function of the normal glomerulus and how alteration of these leads to the cardinal features of glomerular injury (proteinuria and reduced GFR)
2. Principal immunologic mechanisms causing human glomerular diseases and the features that distinguish them by immunofluorescence and electron microscopy
3. 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 glomerular injury

B. Trainees should be familiar with and develop an in-depth knowledge of:

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

C. Trainees should develop an in-depth knowledge of idiopathic glomerular diseases with respect to pathology, clinical features and response to treatment of:

1. Minimal change nephropathy presenting in adolescents and adults, especially the response to corticosteroid treatment, the development of acute renal failure in adults. and the association with malignant tumors
2. Membranoproliferative glomerulonephritis, including types I, II, and III, and the clinical and pathological features of this disorder in association with hepatitis C and cryoglobulinemia

3. Focal segmental glomerulosclerosis (FSGS), including its various pathological and clinical syndromes and the association with conditions of reduced renal mass. The demographics, clinical course, and outcome of the clinicopathologic syndromes of 'primary" focal sclerosis, including collapsing FSGS, glomerular tip lesion, and perihilar FSGS
4. 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 treatment of this disease
5. IgA nephropathy, especially its clinical course, natural history, and prognostic markers
6. Post infectious glomerulopathies, including bacterial, viral, parasitic, rickettsial, and fungal infections, and their epidemiology, clinical course, and response to therapy, especially with respect to HIV infections

D. Trainees should develop an in-depth knowledge of glomerular diseases associated with systemic diseases with respect to pathology, clinical and serological features, and response to treatment of:
1. Necrotizing and crescentic glomerulonephritis
a. Anti-glomerular basement membrane disease
b. Immune complex diseases, including lupus nephritis, postinfectious glomerulonephritis, and Henoch-Schonlein purpura
c. Pauci-immune glomerulonephritis and small vessel vasculitis

2. Renal manifestations of other rheumatic disorders, including systemic sclerosis, Sjogren's syndrome, mixed connective tissue disease, rheumatoid arthritis, Bechet's syndrome, relapsing polychondritis, and familial Mediterranean fever

3. Renal disease in the dysproteinemias, including multiple myeloma, amyloidosis, fibrillary glomerulopathy/immunotactoid glomerulopathy, and mixed cryoglobulinemia

II. PATIENT CARE EXPERIENCE

A Trainees should be familiar with and have experience in:
1. Diagnosis and management of patients with isolated proteinuria, hematuria, nephrotic syndrome, and acute glomerulonephritis
2. Serological evaluation of glomerulonephritis, including the diagnostic value and limitations of antiglomerular basement membrane (anti-GBM), ANCA, antinuclear and anti-microbial antibodies, hypocomplementemia, and cryoglobulinemia
3. Indications for and complications of renal biopsy, as well as the morphological and immunohistological features of the major glomerular diseases
4. Treatment of patients with nephrotic syndrome and acute glomerulonephritis, both renal-limited and secondary to systemic diseases, including the indications, complications, and value of various immunosuppressive protocols

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Diabetes Mellitus and Diabetic Nephropathy

I. PROGRAM CONTENT

A. Trainees should. acquire a general understanding of current concepts of the pathophysiology of diabetic glomerulosclerosis (DGS), including:
1. Epidemiology and course of nephropathy in insulin dependent diabetes mellitus (IDDM) and non-insulin-dependent diabetes mellitus (NIDDM)
2. Pathophysiologic mechanisms and histologic manifestations of diabetic nephropathy (DN)
3. Strategies for prevention of DN
4. Therapy of established DN
5. Modalities of therapy for end-stage renal disease (ESRD) in DN, including hemodialysis and peritoneal dialysis, kidney transplantation, and kidney pancreas transplantation

B. Trainees should develop an in-depth knowledge of:
1. Various ways in which diabetes mellitus (DM) may affect the kidneys and urinary tract
2. Cardinal clinical and histological features, as well as the epidemiology and course of DGS in

patients with IDDM and NIDDM
3. Results of clinical trials designed to prevent DN or slow its progression
4. Relative merits of different modalities of therapy for ESRD in diabetic patients, including hemo- and peritoneal dialysis, kidney transplantation, and kidney-pancreas transplantation

C. Trainees should be familiar with:
1. Definition, interpretation, prognostic value, and clinical use of "microalbuminuria"
2. Unique medical and surgical problems facing patients with advanced DN as well as their management

II. PATIENT CARE EXPERIENCE

A. Trainees must have experience in the evaluation and management of patients with progressive diabetic nephropathy, both insulin-dependent and non-insulin-dependent. Experience with treatment of blood pressure, fluid-electrolyte disorders, glycemia, and non-renal diabetic complication is needed.

B. Trainees must have experience in the evaluation and management of patients with end- stage diabetic nephropathy who are receiving hemodialysis and peritoneal dialysis.

C. Trainees must have experience with the evaluation of patients with diabetic nephropathy for renal transplantation.

D. Trainees must have experience managing patients with diabetic nephropathy during and after renal transplantation.

Hypertension

I. PROGRAM CONTENT

A. Trainees must acquire knowledge and understanding of the following areas during the course of their training:
1. Epidemiology of hypertension
2. Pathogenesis and natural history of primary hypertension
3. Evaluation of the hypertensive patient
4. Nonpharmacologic therapies of hypertension
5. Pharmacology and clinical use of antihypertensive agents
6. Hypertension in renal parenchymal disease during chronic dialysis and after renal transplantation
7. Renovascular hypertension: pathogenesis, causes. clinical features, screening and diagnostic tests, and management
8. Oral contraceptive-induced hypertension
9. Pheochromocytoma: pathophysiology, clinical features, diagnosis, and management
10. Primary aldosteronism: pathophysiology, clinical features, diagnosis, and management
11. Other forms of secondary hypertension: Cushing's syndrome, congenital adrenal hyperplasia, coarctation of the aorta, thyroid disease, hyperparathyroidism, acromegaly, sleep apnea, and drugs

1. Hypertensive emergencies and urgencies

II. PATIENT CARE EXPERIENCE

A. Trainees should be familiar with and have experience in the following areas in both the outpatient and inpatient setting:

1. Trainees must be able to 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 the hypertensive patient.

2. Trainees must be able to define goals of treatment, be familiar with the nonpharmacologic 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.

3. Trainees must be familiar with the management of hypertension in renal parenchymal disease during chronic dialysis and after renal transplantation.

4. Trainees must be able to identify symptoms and signs suggestive of secondary causes of

hypertension and be familiar with the various screening and diagnostic tests as well as the management of these disorders.

5. Trainees must become familiar with the management of the various hypertensive emergencies and urgencies.

Acute Renal Failure and Intensive Care Unit Nephrology

I. PROGRAM CONTENT

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

1. Normal regulation of renal and glomerular hemodynamics
2. Differential diagnosis of acute renal failure
   a. Pathophysiology of prerenal azotemia
   b. Pathophysiology of intrinsic renal failure. including acute glomerular diseases, acute tubular necrosis, and acute interstitial disease
   c. Pathophysiology of obstructive renal failure
3. Mechanisms of acute renal failure (ARF) in the postoperative patient
4. Mechanisms of ARF in patients with hepatobiliary disease
5. Causes of ARF in patients with cancer and immunosuppression
6. Causes of ARF in patients with AIDS
7. Metabolic consequences of ARF
   a. Hormonal
   b. Nutritional
   c. Electrolyte
   d. Acid-base
   e. Volume
8. Evaluation and management of ARF
   a. Radiologic techniques in ARF
   b. Biochemical evaluation of ARF
   c. Role of the renal biopsy in ARF
   d. Nondialytic therapy
   e. Dialytic therapies
      i. Role of hemodialysis
      ii. Role of peritoneal dialysis
      iii. Role of continuous therapy
9. Hemodynamic monitoring of the critically ill patient
10. Management of electrolyte/acid-base disturbances in the critically ill patient
11. Fluid management of the critically ill patient
12. Use of vasoactive drugs in the critically ill patient
13. Role of extracorporeal therapy in the management of drug overdose, specifically ethylene glycol, methanol. lithium, theophylline, salicylate, and barbiturate

II. PATIENT CARE EXPERIENCE

A. Trainees must have experience in the evaluation and management of acute renal failure.

B. Trainees must have experience in the evaluation and management of fluid-electrolyte and acid-base disturbances in the critically ill patient.

C. Trainees should have experience in the evaluation of hemodynamics and the proper use of fluids and vasoactive drugs in critically ill patients.

D. Trainees should have experience in the use of various dialytic techniques, including hemodialysis, peritoneal dialysis, and continuous venovenous hemodialysis.

E. Trainees should have experience in the use of extracorporeal therapy to remove specific toxins.

F. Trainees should have experience in the placement of central lines.

Chronic Renal Failure

1. PROGRAM CONTENT

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

1. Various etiologies of chronic renal failure (CRF)
2. Evaluation, diagnosis, and treatment of CRF resulting from glomerular, interstitial, vascular, and obstructive processes including:
   a. Diagnosis of glomerular processes
   b. Diagnosis of interstitial processes
   c. Diagnosis of prerenal processes
   d. Diagnosis of obstructive processes
   e. Diagnosis of systemic processes that led to CRF, specifically:
   i. Diabetes mellitus
   ii. Hypertension
   iii. Ischemic renal disease
3. Current concepts and the results of clinical studies pertaining to the role of hypertension, dietary composition, and divalent cations on the progression of chronic renal diseases
4. Predialysis management of CRF with particular regard to diet, anemia, metabolic bone diseases, and drug dose adjustments
5. Role of anemia in the management of patients with CRF
   a. Management of the anemia of chronic renal failure with the use of iron, erythropoietin and other appropriate agents
6. Indications for initiation of ESRD therapy and placement of ESRD access in patients with CRF
7. Appropriate use of drugs, including dose modification, for patients with progressive CRF
8. Interpretation of radiographic tests, including intravenous pyelography, computed tomography, ultrasound, and radionuclide scan, in patients with CRF

II. PATIENT CARE EXPERIENCE

A. Trainees must have at least one year of continuous outpatient clinic experience in the management of patients with CRF.

B. Trainees must have a sufficient number of patients to evaluate and manage so that they acquire expertise in the management of patients with glomerular, interstitial, and obstructive renal processes. In addition, trainees should have a sufficient number of patients to work with to be competent in the management of hypertension, anemia, and diabetes mellitus.

C. Trainees must be competent to interpret intravenous pyelograms, radiopharmaceutical studies, renal arteriography, and renal ultrasound in the diagnosis of patients with CRF.

D. Trainees must be competent to perform - and must have performed a sufficient number of- percutaneous renal biopsies.

E. Trainees must have interpreted an appropriate number of renal biopsies so that they are comfortable in reviewing histologic features and assigning appropriate diagnoses.

Dialysis

1. PROGRAM CONTENT

A. Types, advantages, disadvantages, complications, and management of acute and chronic hemodialysis and peritoneal dialysis access

B. Available water treatment and dialysis delivery machines for hemodialysis and connection and cycling systems for peritoneal dialysis

C. Currently available hemodialyzers and their advantages and disadvantages, with emphasis on differences in membrane composition, biocompatibility, and solute and water flux

D. Importance of and correct method of determining the dialysis prescription for hemodialysis and peritoneal dialysis and of monitoring the actual delivered dose of dialysis

E. Most common complications of hemodialysis, including hypotension, cramps, arrhythmias, hemolysis, and air embolism

F. Most common complications of peritoneal dialysis, including peritonitis, hypotension, hernias, dialysate leaks, and inadequate dialysis

G. Available techniques, advantages, and possible drawbacks of dialyzer reprocessing
H. Continuous dialytic therapies, including continuous arteriovenous hemodiafiltration and continuous venovenous hemodiafiltration
I. Nutritional considerations and management of ESRD patients
J. Evaluation and management of complications of ESRD, including anemia, renal osteodystrophy, dialysis amyloidosis, hypertension, hyperlipidemia, and acquired cystic disease
K. Appropriate use of drugs, including dose modifications for dialysis patients
L. Role of Medicare, the Health Care Financing Administration, Networks, US Renal Data System, and voluntary organizations/societies (e.g., National Kidney Foundation, the ASN, and the Renal Physicians Association) in the delivery and financing of care for ESRD patients

II. PATIENT CARE EXPERIENCE

A. Trainees must manage patients with acute renal failure requiring dialysis treatment including intermittent hemodialysis, continuous peritoneal dialysis, and the extracorporeal continuous renal replacement therapies.
B. Trainees must manage patients with chronic renal failure on maintenance hemodialysis longitudinally for a sufficient time to allow participation in the prescription of and monitoring of the dose of delivered dialysis. assessment and adjustment of the need for and dose of erythropoietin, evaluation and treatment of renal osteodystrophy, and ongoing evaluation of the dialysis access
C. Trainees must manage patients with chronic renal failure on maintenance peritoneal dialysis longitudinally as outlined above for hemodialysis patients. In addition. trainees must participate in the assessment of patients for suitability of various forms of dialytic therapy. along with a multidisciplinary team.

Acid-Base Disorders

1. PROGRAM CONTENT

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

1. Acid-base chemistry and buffering
2. Determinants of arterial carbon dioxide tension and carbon dioxide balance
3. Determinants of plasma bicarbonate concentration and hydrogen ion balance, including renal acidification processes and the physiology of bicarbonate reabsorption, titratable acid excretion, and ammonium excretion
4. Clinical evaluation of acid-base disorders
5. Renal tubular acidosis: pathogenesis, clinical features, causes, diagnosis, and management
6. Uremic acidosis: acid-base homeostasis in ESRD
7. Other types of metabolic acidosis: pathogenesis, clinical features, causes, diagnosis, and management
8. Metabolic alkalosis: pathogenesis, clinical features' causes, diagnosis, and management
9. Respiratory acidosis: pathogenesis, clinical features, causes, diagnosis, and management
10. Respiratory alkalosis: pathogenesis, clinical features, causes, diagnosis, and management
11. Mixed acid-base disturbances

II. PATIENT CARE EXPERIENCE

A. Trainees should be familiar with and have experience in the following areas in both the outpatient and inpatient setting:

1. Trainees must assess the accuracy of the acid-base parameters and interpret serum and urine acid-base data, including the anion gap.
2. Trainees must determine 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 is present.
3. Trainees must have experience in managing renal tubular acidosis, uremic acidosis, and acid-base

homeostasis in end-stage renal disease.

4. Trainees must have experience managing all other types of metabolic acidosis.
5. Trainees must have experience in the management of metabolic alkalosis.
6. Trainees must have experience in the management of respiratory acidosis and alkalosis.
7. Trainees must have experience in the management of mixed acid-base disorders.

Fluid and Electrolyte Disorders

1. PROGRAM CONTENT

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

1. Physiology of sodium balance, including sensors of extracellular volume, effecter systems, tubular sodium transport processes, and the regulation of renal sodium excretion
2. Hypovolemia: pathophysiology, causes, clinical features, diagnosis, and management
3. Edematous disorders: pathophysiology, causes, clinical features, diagnosis, and management
4. Clinical use and complications of diuretics
5. Physiology of water balance, including tonicity sensors, effecter systems, the countercurrent mechanism for urine concentration, the cellular physiology of collecting duct water reabsorption, and the regulation of water excretion by the kidney
6. Hyponatremia: pathophysiology, causes, clinical features, diagnosis, and management
7. Hypernatremia: pathophysiology, causes, clinical features, diagnosis, and management
8. Evaluation and management of the polyuric patient
9. Physiology of potassium balance, including the regulation of transcellular potassium movement, tubular transport processes for potassium reabsorption and secretion, and the regulation of potassium excretion by the kidney
10. Hypokalemia: pathophysiology, causes, clinical features, diagnosis, and management
11. Hyperkalemia: pathophysiology, causes, clinical features, diagnosis, and management
12. Disorders of sodium, water, and potassium balance in end-stage renal disease

II. PATIENT CARE EXPERIENCE

A. Trainees should be familiar with and have experience in the following areas in both the outpatient and inpatient setting:

1. Trainees must be able to assess the validity and relevance of serum and urine electrolyte measurements for patient management.
2. Trainees must be able to assess volume status (including the interpretation of central venous pressure and Swan-Ganz measurements) and recognize and manage hypovolemic and edematous disorders.
3. Trainees must be familiar with the use and complications of diuretic therapy.
4. Trainees must be able to evaluate and manage hyponatremia in the acute and chronic setting.
5. Trainees must be able to evaluate and manage hypernatremia in the acute and chronic setting.
6. Trainees must be able to evaluate and manage the polyureic patient.
7. Trainees must be able to evaluate and manage the patient with hypokalemia fir hyperkalemia. They must be familiar with the acute as well as the long-term management of these disorders.
8. Trainees must be able to evaluate and manage disorders of sodium, water, and potassium in patients with ESRD.

Cystic and Inherited Diseases of the Kidney

1. PROGRAM CONTENT

A. Trainees should acquire knowledge of the following areas:

1. Genetics of inherited diseases
   a. Understanding of Mendelian genetics

b. Understanding of gene linkage analysis

c. Knowledge of chromosomal localization and characteristics of the gene responsible for the more common inherited renal disorders

2. Clinical, diagnostic and epidemiologic differences between simple, acquired, and inherited cystic disorders and their potential for renal malignancies
3. Diagnosis of inherited and cystic disease
   a. Use of gene link analysis and mutational analysis in the screening
   b. Role of urinalysis, renal function testing, and radiologic testing
   c. Possibilities of prenatal diagnosis and pretest counseling
4. Approach to the symptomatic patient
   a. Familiarity with the natural history of inherited cystic and non-cystic disease
   b. Knowledge of clinical presentations
   c. Familiarity with extrarenal manifestations
5. Treatment

a. Knowledge of strategies to manage progression of renal failure, proteinuria, and hypertension in non-cystic inherited disease

b. Knowledge of management of pain, hypertension, renal stone, hematuria, infection, and progressive renal failure in patients with cystic disease

c. Familiarity with management of extrarenal manifestation of ADPKD, including mitral valve prolapse diverticular disease, intracranial aneurysm, and hepatic cystic disease

II. PATIENT CARE EXPERIENCE

A. Trainees should have experience in the diagnosis and management of various forms of cystic renal disease, with particular emphasis on autosomal dominant polycystic kidney disease (ADPKD) and its various renal and extrarenal complications.

B. Trainees should have experiences in the diagnosis and management of patients with non- cystic inherited diseases, with emphasis on Alport's syndrome and its renal and extrarenal complications.

C. Trainees should be familiar with the principles of genetic counseling of patients with inherited renal disorders.

Tubulointerstitial Disease and Urinary Tract Infections

1. PROGRAM CONTENT

A. Trainees should acquire a general understanding of:

1. Structure and function of the normal renal tubules and interstitium
2. Pathophysiological mechanisms of acute and chronic interstitial diseases
   a. Immunologically mediated interstitial nephritides
   b. Interstitial scarring as a consequence of primary
   c. Reflux nephropathy
   d. Obstructive nephropathy
3. Pathophysiology of interstitial disease
   a. Immunopathogenetic and non-immune mechanisms b. Relationship to glomerular function
   c. Association with major tubular defects, including diabetes insipidus, acidification, and potassium excretion
   d. Effects of acute and chronic urinary obstruction
4. Diagnostic procedures
   a. Assessment of tubular defects b. Evaluation of obstruction
   c. Definition of acute and chronic interstitial nephritis
5. Pathogenesis and treatment of bacterial urinary tract infections
   a. Major pathogenetic species, routes, and course of infection
   b. Appropriate antibiotic choices
   c. Appropriate workup of the patient with multiple or resistance infections

II. PATIENT CARE EXPERIENCE

A. Trainees should develop an in-depth knowledge of:

1. Clinical features, causes, course, and treatment of acute allergic interstitial nephritis
2. Clinical features, predisposing factors, complications, bacteriological profile, and treatment of acute pyelonephritis
3. Management of patients with symptomatic and asymptomatic bacteriuria, including familiarity with:
   a. Major pathogenic species, routes, and course of infection
   b. Appropriate antibiotic choices
   c. Appropriate workup and treatment of patients with recurrent or resistant infections
   d. Related syndromes, such as nonspecific urethritis, prostatitis, and hemorrhagic cystitis
4. Clinical and radiological features, course, and treatment of reflux nephropathy (chronic pyelonephritis) and analgesic nephropathy, and the differential diagnosis of papillary necrosis

B. Trainees should be familiar with:

1. Pathological features of acute and chronic interstitial nephritides
2. Clinical laboratory tests to evaluate aspects of tubular function, concentrating ability, urine acidification, potassium handling, and various resorptive functions

C. Trainees should be aware of unusual syndromes affecting the renal interstitium, such as xanthogranulomatous pyelonephritis, Lymphomatous infiltration, and various granulomatous diseases

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Disorders of Mineral and Bone Metabolism

I. PROGRAM CONTENT

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

1. Calcium and phosphorus balance in humans
2. Renal handling of calcium, magnesium, and phosphorus
3. Physiology of calciotropic hormones, specifically parathyroid hormone, vitamin D, calcitonin, and parathyroid hormone-related peptide
4. An integrated view of calcitropic hormone regulation in normal situations and in the context of acute and chronic renal failure
5. Bone physiology
6. Methods to diagnose and treat different types of renal osteodystrophy, the interpretation of bone turnover markers, bone mineral density and bone biopsies
7. Pathogenesis and treatment of calcium nephrolithiasis, urate nephrolithiasis, infected stones, and cystine stones
8. Surgical procedures necessary for the treatment of stone disease

II. PATIENT CARE EXPERIENCE

A. Trainees should also be familiar with, and preferably have experience in, the direct diagnosis and management of the following areas, in both an outpatient and inpatient setting:

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

Transplantation

1. PROGRAM CONTENT

A. Immunology/Immunogenetics

1. Normal immune response

2. Immune response to allografts
3. Inflammatory response to allografts
4. Mechanisms of tolerance
5. Immunogenetics and tissue typing, crossmatching, and surveillance for panel-reactive antibodies

B. Transplant Pharmacology

1. Basic principles of pharmacology and the mechanisms of action of immunosuppressant agents, including glucocorticoids, azathioprine, mycophenolate mofetil, cyclosporine, tacrolimus, sirolimus, and monoclonal and polyclonal antibodies

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

C. Organ Sharing and Allocation

D. Clinical Kidney and Pancreas Transplantation

1. Historical perspective
2. Pre-transplant evaluation of the recipient
3. Pre-transplant evaluation of the living donor
4. Pre-transplant evaluation of the cadaver donor/organ procurement
5. Surgical technique and surgical management
6. Physiology of the transplanted kidney
7. Pathogenesis and pathology of allograft dysfunction
8. Post-transplant care/in-hospital care
9. Post-transplant care/outpatient care short- and long-term
10. Expected clinical outcomes/analysis of risk factors
11. Special considerations in pediatric renal transplantation
12. Special considerations for pancreas and kidney/ pancreas transplantation

E. infectious diseases in transplantation/pre- and post-transplantation

F. Pregnancy and transplantation

G. Cancer and transplantation

H. Ethics of transplantation

I. Economics of transplantation

II. PATIENT CARE EXPERIENCE

A. Pre-transplant: education. counseling, and evaluation of donor and recipient

B. Immediate postoperative management: evaluation and management of extracellular fluid volume, falling urine output, and primary nonfunction of the transplanted kidney

C. Early post-transplant management: establishment of adequate immunosuppression; diagnosis and therapy of rejection, infection. the hemolytic uremic syndrome, and urological and vascular complications; and diagnosis and management of drug interactions and toxicities

D. Long-term post-transplant management: assessment for adequacy of immunosuppression: management of complications of long-term immunosuppression, including medication-induced allograft dysfunction, recurrence of the primary disease, *de nova* post-transplant glomerulo- nephritis, post-transplant polycythemia, avascular necrosis, dyslipidemias, glucose intolerance, liver function abnormalities, Lymphoproliferative diseases, and cancers affecting the skin and other organs

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Renal Disease in Pregnancy

I. PROGRAM CONTENT

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

1. Changes in the anatomy and function of the urinary tract during pregnancy, focusing on the relevance of these changes to clinical circumstances, stressing alterations in the calyces and ureters, renal hemodynamics, and tubular function (principally potassium and glucose)
2. Changes in acid-base metabolism in pregnancy, focusing on normal pH, HCO3, and PCO2

3. An integrated view of volume homeostasis during pregnancy. This includes knowledge of the normal gestational changes in weights intravascular and extracellular volume status, renal salt handling, and the production of volume-regulating hormones.
4. Altered osmoregulation in pregnancy, focusing on changes in plasma sodium and osmolality levels, as well as on certain disorders of water metabolism peculiar to gestation
5. Course and control of blocked pressure in normal pregnancy
6. Tests of kidney function, including indications for renal biopsy during pregnancy
7. Familiarity with the clinical spectrum and management of renal disorders in gestation. This includes pathogenesis and treatment or urinary tract infections; acute renal failure (especially those primarily associated with gestation, *i.e.,* septic abortion, abruption, preeclampsia, acute fatty liver, and idiopathic postpartum renal failure); and chronic glomerular and interstitial renal diseases antedating pregnancy.
8. Recognition of the presentation of stone disease during gestation and familiarity with the effect of pregnancy on patients with nephrolithiasis
9. Familiarity with the administration of both acute and chronic renal replacement therapy in pregnant women
10. Knowledge of the effects of pregnancy on the natural history of renal allografts and of the conditions required for undertaking pregnancy in transplant recipients
11. Recognition and treatment of the hypertensive disorders of pregnancy, particularly preeclampsia and its variants such as HELLP syndrome. This includes the use in gravidas of antihypertensive drugs and the prevention and treatment of eclampsia, including the administration of magnesium sulfate.
12. Capability to perform preconception counseling pertinent for the maternal and fetal prognoses for women with chronic hypertension and/or underlying kidney disorders

II. PATIENT CARE EXPERIENCE

A. Trainees must diagnose and manage women whose pregnancies are complicated by acute or chronic renal dysfunction as well as gestations complicated by hypertension. They should have exposure to the presentation and management of gravidas experiencing acute hypertensive crises, especially those crises complicated by systemic manifestations such as liver dysfunction, thrombocytopenia, and microangiopathic hemolytic anemia.

Renal Function Testing

I. PROGRAM CONTENT

A. Trainees are encouraged to develop knowledge and expertise in the following areas, including indications, contraindications, complications, interpretation of results, cost effectiveness, and application to patient care of:

1. Urinalysis, including dipstick and sediment
2. Measurement of renal plasma flow and GFR, including interpretation of serum creatinine concentration and calculation of its clearance rate
3. Measurement of renal concentrating and diluting capacity
4. Measurement of microalbuminuria
5. Measurement of proteinuria, using semiquantitative and quantitative methods
6. Assessment of urinary acidification
7. Assessment of renal sodium and potassium handling
8. Renal radiology
   a. Urography
   b. Ultrasonography
   c. Radionuclide scans
   d. Computed tomography
   e. Magnetic resonance imaging
   f. Renal circulation imaging (angiography)

II. PATIENT CARE EXPERIENCE

A. Trainees must be given sufficient direct experience to develop expertise in their performance and interpretation of:

1. Urinalysis
2. Accurate and timed complete collection of urine for renal function testing, proteinuria, and microalbuminuria
3. Fractional excretion of electrolytes
4. Renal function clearance studies

Pharmacology of Drugs in Renal Disease

I. PROGRAM CONTENT

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

1. Principles of drug pharmacokinetics
2. Renal handling of drugs and chemicals
3. Mechanisms of drug metabolism
4. Drug prescribing in disease states and during dial
5. Relevant drug-drug interactions
6. Mechanisms of drug nephrotoxicity
7. Management of drug-induced renal diseases
8. Therapeutic drug monitoring
9. Renal transplant immunosuppression

II. PATIENT CARE EXPERIENCE

A. Trainees should also be familiar with, and preferably have experience in, the following areas, in both an outpatient and inpatient setting:

1. Trainees must diagnose and manage patients with different drug-induced renal syndromes.
2. Trainees should be able to prescribe for and adjust drug dosage in patients with renal dysfunction.
3. Trainees should understand indications of therapeutic drug monitoring.
4. Trainees should be able to access drug and poison information.
5. Trainees should be familiar with common overdoses and the need for extracorporeal therapy.
6. Trainees should prescribe and manage immunosuppression for renal transplantation.

Professionalism and Ethical Conduct

I. PROGRAM CONTENT

A. Programs are encouraged to use the resource document *Project Professionalism,* from the American Board of Internal Medicine (ABIM; Philadelphia, 1995), to assist trainees in the acquisition of knowledge and understanding of the following areas during the course of training:

1. Elements of professionalism
   a. Altruism
   b. Accountability, dependability, responsibility, and prudence
   c. Excellence, but humility; continued education: commitment
   d. Duty, justice, collegial collaboration
   e. Honor and integrity, honesty and fidelity, trustworthiness
   f. Respect for others, compassion, empathy
   g. Common sense

2. Threats to professionalism
   a. Abuse of power and position, sexual and other harassment
   b. Arrogance, prejudice, bias
   c. Greed and selfishness

d. Misrepresentation, clinical and scientific misconduct
e. Impairment, including substance abuse
f. Lack of conscientiousness
g. Conflicts of interest

B. Methods of evaluation of professionalism and ethical conduct in trainees
1. Utilizing ABIM peer evaluation professional associate rating forms from multiple evaluators
2. Maintaining a critical events file documenting positive and constructive comments
3. Expanding traditional performance evaluation forms to incorporate components of professional and ethical evaluation
4. Providing for professionalism and ethics evaluation in research performance
5. When necessary, providing a mechanism for remediation of professional and ethical deficiencies

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Research Design, Methods, and Responsible Conduct

Trainees should become familiar with the methods and problems inherent in performing and interpreting clinical and basic science research. This would be best accomplished through participation in the design, performance, and interpretation of a research project. However, it is understood that for many trainees interested in more clinical careers, such a time investment may not be worthwhile. In this case, the training program should provide a teaching program that focuses on these components of research. This is best accomplished through a weekly journal club that critically reviews clinical and basic science articles.

I. PROGRAM CONTENT

A. Trainees must acquire knowledge and understanding of the following areas during the course of their training:
1. Hypothesis development
2. Experimental design of human, animal, or other experiments
3. Elementary statistical analysis
4. If necessary, the writing of protocols that would be submitted to the institutional review board (IRB) regulating research on humans or to the institutional animal care and use committee (IACUC)
5. Preparation of data for publication
6. Acquisition, recording, and storage of data
7. Scientific integrity and the responsible conduct of research a. Protection of animal and human subjects (IRB, IACUC)
b. Integrity in the collection and recording of data c. Integrity in the interpretation of data
d. Integrity in the authorship and publication
e. the Nuremberg Code, Helsinki Declaration, and Belmont Report
8. Scientific misconduct and fraud
a. Self-deception
b. Fabrication, falsification, and plagiarism
c. Conflicts of interest
i. Scientist-scientist relationship
ii. Scientist-industry relationship

II. RESEARCH EXPERIENCE (can be acquired in various areas including, but not limited to, physiology, biochemistry, pharmacology, pathology, or clinical research)

A. Trainees working in a laboratory must develop familiarity with and a working knowledge of techniques and assays relevant to their project.

B. Trainees working on a clinical research project in a general clinical research center should admit study subjects to the center, participate in obtaining informed consent, and play an active role in the study.

C. Trainees participating in clinical outcomes studies must be familiar with the methods used to acquire data and should participate in a meaningful way in the analysis of such information.

D. Trainees should participate in the preparation of abstracts, manuscripts, or reports that originate as a result of the studies.

CURRICULUM FOR EACH ROTATION

In addition to the overall education and clinical requirements in the previous section, a description of the educational requirements for each rotation is outlined. Fellows are expected to integrate medical problems with preventive practices, cultural, socioeconomic, ethical, occupational environmental and behavioral issues in each rotation.

DIALYSIS-HEMODIALYSIS AND PERITONEAL DIALYSIS.

Course Description:

Course Directors: Site Directors at three sites; Subodh J. Saggi (SUNY Downstate), Susan Grossman (Brooklyn VA) and Mary Mallappallil (Kings County Hospital).
Locations: Acute and Chronic HD unit at the three sites.
Fellows should longitudinally manage at least 8 patients in the chronic HD unit usually at the VA.

Educational Purpose: To gain learn the principles of acute and chronic hemodialysis and peritoneal dialysis and to gain experience in the care of patients on these modalities.

Goals and Objectives of the Dialysis Rotation:

Patient Care	
Goals:	Provide patient care that is compassionate, appropriate and effective for the treatment of patients with end stage renal disease treated with hemodialysis.
Objectives:	By the end of the **first year** the fellow is expected to develop and demonstrate the following skills: • Take a relevant history regarding patient responses to hemodialysis • Be able to evaluate dialysis and ultrafiltration adequacy • Be able to manage dialysis-related hypotension • Be able to respond to fever and treat catheter-related infections • Be able to initiate hemodialysis in a new patient • Be able to appropriately assess chest pain, nausea, vomiting, hypotension, weight gain and other acute symptoms associated with the hemodialysis procedure By the end of the **second-year** fellows will be familiar with a more chronic picture provided by the continuity of care afforded by following patients for up to a year. By the end of the year, fellows are expected to develop and demonstrate the following skills: • Serve as the primary care provider for a cohort of patients receiving chronic outpatient hemodialysis • Be able to assess and treat secondary hyperparathyroidism and understand the K/DOQI guidelines • Be able to assess the function of the hemodialysis access using physical examination and radiologic studies • Be able to manage chronic hypertension in the hemodialysis patient • Be familiar with the K/DOQI guidelines and protocols for management of anemia
Medical Knowledge	

Goal:	The renal fellow must demonstrate knowledge of principles of hemodialysis including technical aspects, indications for dialysis, management of dialysis and problems related to end stage renal disease.

Objectives:	The renal fellow is expected to become knowledgeable about: □ the kinetic principles of hemodialysis □ the indications for dialysis □ the short-term and long-term complications of each mode of dialysis and their management; □ the principles of dialysis access (acute and long-term vascular and peritoneal), including indications, techniques, and complications including thrombosis and infections. □ urea kinetics and protein catabolic rate; □ dialysis modes and their relation to metabolism; □ nutritional management of dialysis patients; □ dialysis water treatment, delivery systems, and reuse of artificial kidneys; □ the artificial membranes used in hemodialysis and biocompatibility; and □ the psychosocial and ethical issues of dialysis. □ the pathophysiology of disorders of calcium and phosphorus metabolism □ contributing factors to accelerated atherosclerosis in hemodialysis patients □ reverse epidemiology of cardiovascular risk factors in hemodialysis patients
Practice-Based Learning and Improvement	
Goals:	The renal fellow must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and lifelong learning. Residents are expected to develop skills and habits to be able to achieve benchmarks established for the care of patients with end stage renal disease outlined by K/DOQI and other professional society guidelines as they relate to management of anemia, bone disease, cardiovascular risk factors, and nutrition
Objectives:	By the end of this rotation, both first- and second-year fellows are expected to develop and demonstrate the following skills: □ Identify and review one's own errors in management □ Teach about errors in management (both one's own, and those of others) with tact □ Disclose errors to patients when appropriate □ Apply scientific evidence from the literature to one's own patients and distinguish evidence-based medicine from opinion □ Become familiar with published guidelines for care of patients with ESRD and be able to critically assess the evidence base for these guidelines □ Evaluate their panel of chronic dialysis patients for the degree to which they have achieved adequate management of anemia, calcium/phosphorus metabolism and cardiovascular risk factors
Systems Based Practice	
Goal	Renal fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care for patients with end stage renal disease being treated with hemodialysis.
Objectives	By the end of this rotation, first year fellows are expected to develop and demonstrate the following skills: □ Understand how nephrologists interact with general internal medicine, cardiology, radiology, infectious disease, and anesthesiology services □ Be able to coordinate care of individual patients with other members of the

	health care team - Be able to call on system resources such as ethics consults and risk management when appropriate In addition to the above, by the end of the second month of hemodialysis rotation, first year fellows are expected to develop and demonstrate the following skills: - Be able to perform responsibilities in reporting of dialysis data (medical evidence forms, death forms) ESRD networks and CMS when required - Understand the government policies determining health care coverage for patients with ESRD - Become familiar with the systems issues related to home dialysis and nocturnal dialysis - Become familiar with the policies related to transport services for dialysis patients - Participate in a Performance Improvement (PI) project. This project will be designed in collaboration with a nephrology attending. It will be desirable for such a project to include adequate time for reassessment of results after making an intervention if indicated
Professionalism	
Goal:	The renal fellow must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. Renal fellows will be expected to understand and become comfortable with the complex psychosocial issues related to the treatment of ESRD.
Objectives:	By the end of this rotation, all fellows are expected to develop and demonstrate the following skills: - Demonstrate respect for other services, patients, and staff - Maintain a focus on excellent patient care, and the patient's needs - Model professional behavior for the service - Uphold basic ethical principles, especially as related to advanced directives, medical futility, the withdrawal/withholding of life-sustaining treatments - Respect for patient privacy and autonomy
Interpersonal and Communication Skills	
Goal:	Renal fellows must demonstrate interpersonal and communication skills that result in the effective exchange of information and teaming with patients, their families, and professional associates.
Objectives:	By the end of the second month of the dialysis rotation, first year fellows are expected to develop and demonstrate the following skills: - Be able to tell patients and family members about the initiation of the dialysis procedure - Obtain informed consent from patients for the hemodialysis procedure - Be able to interact with vascular radiology and vascular surgery in the management of the dialysis access In addition to the above, by the end of the third month of the rotation, first year fellows are expected to develop and demonstrate the following skills: - Explain to dialysis patients the important aspects of nutritional management - Discuss implications of inter-dialytic weight gain with patients - Work as part of the interdisciplinary team of nurses, nurse practitioner,

	surgeons, psychologists in caring for dialysis patients • Discuss end-of-life issues and advanced directives with patients and family members

Teaching Methods:

- Introductory (Core) Conferences given during the first 2 months of Fellowship
- Didactic Lectures during the remainder of the year
- Case-based conferences (including NephSAP)
- Multidisciplinary meetings held monthly
- Monday Case Conferences and Morbidity/Mortality meetings
- Quality improvement projects/presentations

Scope of the Rotations: During each rotation they should gain experience in the following aspects of renal replacement:

A. **Access**: Types, advantages, disadvantages, complications, and management of acute and chronic hemodialysis and PD accesses.

B. **Water Treatment**: Available water treatment and dialysis delivery machines for hemodialysis and connection and cycling systems for peritoneal dialysis

C. **Dialyzers**: Currently available hemodialyzers and their advantages and disadvantages, with emphasis on differences in membrane composition, biocompatibility, and solute and water flux

D. **Dialysis prescription**: Importance of and correct method of determining the dialysis prescription for hemodialysis and peritoneal dialysis and of monitoring the actual delivered dose of dialysis

E. **Management of Acute Complications**: Most common complications of hemodialysis, including hypotension, cramps, arrhythmias, hemolysis, and air embolism, mechanical complications of PD, peritonitis.

F. **Dialyzer Reuse**: Available techniques, advantages, and possible drawbacks

G. **Nutritional considerations** and management of ESRD patients

H. **Chronic complications**: Evaluation and management of complications of ESRD, including, dialysis amyloidosis, hypertension, hyperlipidemia, and acquired cystic disease

I. **Pharmacology**:

Appropriate use of drugs, including dose modifications for dialysis patients.
Iron deficiency: Interpretation of tests and iron prescription; monitor for reactions to IV iron Management of hypertension
Management of renal osteodystrophy

J. **Insurance & Regulatory Issues:** Role of Medicare, the Health Care Financing Administration, Networks, US Renal Data System, and voluntary organizations/societies (e.g., National Kidney Foundation, the ASN, and the Renal Physicians Association) in the delivery and financing of care for ESRD patients
Care plans (long-term and short-term) to be completed for each patient.

K. **PROCEDURES**;
Hemodialysis treatments: 10
Femoral catheters: 5
Repair tunneled catheters-no preset limit
Thrombolysis tunneled catheters: no preset limit

L. MULTIDISCIPLINARY MEETING
Patient care conference held every month
Prepare and present 1 topic every month during workday

Reading List: Handbook of Dialysis

Educational Tools: Case material, Online Source: HDCN.com, CD ROM (UpTo Date)

Reference- The American Society of Nephrology (ASN) Dialysis Advisory Group developed a comprehensive curriculum for trainees and nephrologists, the "ASN Virtual Mentor Dialysis Curriculum." This curriculum spans a substantial portion of what trainees need to understand—and what nephrologists may want to refresh—about the provision of dialysis care, from machinery to preventive health and from drug dosing to peritoneal dialysis in special populations.

You can access this on the front page of the ASN website or via http://www.asn-online.org/education_and_meetings/distancelearning/curricula/dialysis/.

TRANSPLANTATION

Course Description: Fellows work under Dr. Marina Markell and Dr. Nnaji.

Educational Purpose: To gain experience in the care of renal transplant patients. To provide consultation on renal issues on other organ transplant patients.

Patient Care	
Goals:	Renal Fellows must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of renal transplant donors and recipients.
Objectives:	By the end of the rotation the renal fellow is expected to develop and demonstrate the following skills: - Communicate effectively and demonstrate respectful behavior when interacting with patients referred for transplant evaluation. - Gather essential and accurate information about their patients - Make informed decisions about diagnostic and therapeutic interventions based on medical knowledge, patient preferences and judgment - Understand management plans, such as treatment of rejection, adjustment of immunosuppressive medications and diagnostic procedures - Formulate and execute a plan to diagnose allograft dysfunction in the immediate post-transplant period - Interpret diagnostic tests including urinalysis, renal ultrasound, renal CT scan, renal biopsy - Use information technology to educate patients about transplantation and donation - Perform transplant renal biopsies under supervision. - Provide health maintenance and preventive health care, specifically aimed at preventing complications of renal transplantation including toxicity of drugs, opportunistic infection, malignancy, cardiovascular disease - Work with members of the transplant team, including surgeons, other consultants, social workers, nurse practitioners, members of the organ procurement organization and UNOS - Demonstrate competency in performing transplant renal biopsies - Independently formulate a diagnostic and treatment plan for complications of renal transplantation - Diagnose and treat complications of pancreas transplantation
Medical Knowledge	
Goal:	The renal fellow must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences related to renal and pancreas transplantation

Objectives:	By the end of the rotation the renal fellow is expected to acquire knowledge of: - Indications for renal transplantation, criteria for selection of donors and recipients, understanding of the risks and benefits of marginal donors - Post-operative management of transplant recipients: design of immunosuppressive regimen, fluid management, recognition of technical complications and delayed graft function, use of radiologic studies - Clinical and laboratory diagnosis of cellular and antibody mediated rejection, use of renal biopsy and immunohistochemistry

	• Causes, evaluation and treatment of delayed graft function • Causes, evaluation and treatment of elevated creatinine at any time post-transplant • Infectious complications of transplantation; prophylaxis, diagnosis and management • Mechanism of and use of common immunosuppressive drugs, • Long-term follow-up of transplant patients: management of hypertension, bone disease, dyslipidemias, screening for malignancy, infectious diseases • Long –term follow-up of renal function: chronic allograft nephropathy, calcineurin effects, recurrent and de novo diseases • Preoperative evaluation of kidney donors and recipients • Medical management of rejection: use of plasmapheresis, immune modulating treatment • Principles of tissue typing and management of living donor transplants with a positive crossmatch • Epidemiology, screening strategies and treatment of post-transplant malignancy including PTLD • Diagnosis and management of BK nephropathy •
Practice-Based Learning and Improvement	
Goals:	The renal fellow must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence and to continuously improve patient care based on constant self-evaluation and lifelong learning.
Objectives:	By the end of this rotation, first and second year fellows are expected to develop and demonstrate the following skills: • Analyze clinical experience and identify and review errors in management • Participate in Transplant case management conferences and apply knowledge from these conferences to patient care • Use information technology to obtain and manage medical information relating to the problems seen on the transplant service • Apply information from large studies to improve care of patients, recognizing limitations of study design statistical methods • Assess adherence to guidelines for transplant recipient's management of cardiovascular risk prevention, prevention of infections and malignancy • Use knowledge obtained from the literature and experience to teach colleagues, house staff and students

Systems Based Practice	
Goal	Renal Fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care as well as the ability to call effectively on other resources in the system to provide optimal health care.
Objectives	By the end of this rotation, first and second year fellows are expected to develop and demonstrate the following skills: - Understand the resources involved in procuring and allocating organs for transplantation: the role of UNOS, organ procurement organizations, donor networks, tissue typing laboratories - Understand the cost-effectiveness of renal transplantation (deceased donor vs. living donor) as well as the cost-effectiveness of various immunosuppressive regimens - Assist patients with chronic kidney disease in obtaining access to evaluation for transplantation - Work with members of the transplant team to improve and consolidate cost-effective health care delivery
Professionalism	
Goal:	The renal fellow must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles.
Objectives:	By the end of this rotation, first and second year fellows are expected to develop and demonstrate the following skills: - Demonstrate a commitment to ethical principles particularly as pertains obtaining organs for transplantation and allocating them equitably - Demonstrate compassion and integrity by being responsive to patients' needs regardless of culture, age, gender, ability to pay - Interact professionally with other members of the health care team, colleagues and students
Interpersonal and Communication Skills	
Goal:	Renal fellows must demonstrate interpersonal and communications skills that result in the effective exchange of information and teaming with patients, their families and professional associates.
Objectives:	By the end of this rotation, first year fellows are expected to develop and demonstrate the following skills: - Establish rapport with patients from different backgrounds - Provide appropriate counseling to patients and their families regarding their therapeutic options: risks and benefits of renal transplantation, both from deceased and living donors - Communicate effectively with all members of the transplant team - Interact with other physicians, nurses, and therapists caring for the patient - Interact with the staff of the transplant unit to promote cooperative care - Provide teaching to residents and medical students - Work with nurse practitioners to arrange transplant biopsies - Communicate results of biopsies to nephrologists and transplant team

Teaching Methods: Attending rounds, multidisciplinary conference, immunobiology conference, Q&A conferences, M&M conferences, transplant clinic.

Disease Mix: Medical problems in pre transplant patients, peri-transplant period, post-transplant ambulatory care, donors. The total experience gained by the fellow should encompass the following aspects of renal transplantation:

A. Immunology/Immunogenetics
Visit the tissue typing laboratory to gain an insight into practical aspects of transplant immunology.

B. Transplant Pharmacology
Learn basic principles of pharmacology and the mechanisms of action of immunosuppressant agents, including glucocorticoids, azathioprine, mycophenolate mofetil, cyclosporine, tacrolimus, sirolimus, sirolimus and monoclonal and polyclonal antibodies. Learn principles of pharmacology of nonimmunosuppressive medications used in transplant for the prophylaxis of infection and the treatment of concurrent illnesses, with an emphasis on anticipating and managing drug interactions

C. Organ Sharing and Allocation: Experience provided at NYU rotation.

D. Clinical Kidney Transplantation
Conduct at least 5 pre-transplant evaluations of potential recipients
Conduct at least 3 Pre-transplant evaluation of living donors Follow
5 cadaveric transplant recipients
Observe 1 complete donor and recipient surgery (For
living donor surgery experience NYU rotation).
Treat 5 cases of acute rejection
Perform 2 transplant renal biopsies

E. Renal dysfunction in other organ transplants
Evaluate renal dysfunction in heart, lung and liver transplants, kidney Pancreas at NYU.

Assessment Method (Fellow):
Fellows are evaluated by the Transplant Attending of the Month at the end of each month of rotation; the evaluation is entered on the new innovation system. In addition, the monthly Transplant Attending gives the fellow verbal feedback at the end of the month.

Assessment Method (Program Evaluation):
The Transplant Rotation is discussed routinely at monthly Quality Improvement Meeting with the Program Director and the Fellows, and at the periodic meetings with the Faculty and fellows.
The rotation is also evaluated in the written yearly evaluation of the program by the fellows.

Level of Supervision:
The renal fellow is directly supervised by the Nephrology Transplant Attending assigned to the Transplant service during the rotation. The fellow reports directly to the attending, makes rounds daily with the attending, and attends outpatient Transplant Clinic with the Attending. The Transplant Surgeon may also supervise the fellow during this rotation during the morning rounds, and on a case-by-case basis.

Reading List: Handbook or renal transplantation.
Educational Tools: Case material, Online Source: HDCN.com, Up To Date, Immunobiology conference.

CONSULT SERVICES (GENERAL NEPHROLOGY AND NEPHROLOGY-CARDIAC):
Course Description: Required number of months: 6 in 2-year program but on average 3 months at each site each year. The renal fellow will be contacted by other services to provide in-hospital consultation on inpatients who have renal problems. The consult team will comprise of the fellow, the attending, between 1 and 2 fellows, a PA and between 1 or 2 resident or medical students. Rounds will be held daily on new consults and relevant follow up patients. The fellow will be responsible for each site consultations at each rotating site Hospital.

Educational Purpose: To gain clinical experience in the care of patients with a variety of renal diagnoses that are called in as consults. To teach fellows and medical students.

Patient Care	
Goals:	The overall educational goal is to provide the necessary training and experience for the renal fellow to function as a Nephrology consultant and impart the skills necessary for providing consultation services on inpatient services including communicating with referring physicians and other members of the health-care team and ensuring support for continuous renal care by the patient's primary physician. The renal fellow must be able to evaluate inpatients with acute or chronic renal dysfunction in association with additional cardiac, medical, surgical and obstetric problems. The renal fellow must be able to manage complicated fluid and electrolyte disturbances in hospitalized patients. The renal fellow must be able to distinguish prerenal azotemia from acute renal failure. The renal fellow must be able to diagnose urinary tract obstruction.
Objectives:	The first year fellow should be able to: • Approach new patients and their families with respect and clearly communicate the reasons for the visit and any recommendations resulting from the consultation • Perform a history and physical examination and review of clinical data relevant to consultation in nephrology • Learn the indications for and interpretation of diagnostic tests used in nephrology including: ultrasound, CT scan, MRI, MRA, urinalysis, serum chemistries, blood gas analysis and renal biopsy • Make decisions regarding diagnosis and treatment plans, including modality of dialysis and renal biopsy, based on review of current literature, consultation with attending physicians and counseling of the patient • Counsel and educate patients and their families regarding their options, specifically when choosing a modality for the treatment of end stage renal disease using interactive patient education material • Implement treatment plans, such as initiating acute or chronic dialysis • Gain proficiency in procedures including: urinalysis, renal biopsy, placement of vascular access for hemodialysis, prescriptions for acute dialysis and continuous renal replacement therapy, prescriptions for peritoneal dialysis in the ICU and in inpatients • Understand the different causes and treatment approaches for acute renal failure in the routine post operative patient, the post cardiothoracic surgery patient, the burn unit patient, the neurologic intensive care unit patient, and the obstetric patient. • Work with other members of the health care team, including referring physicians from other specialties, nurses, social workers and technicians to implement a treatment plan The second year fellow should be able to perform these activities with greater independence and with less guidance from the Nephrology Attending. The second year fellow should be able to perform a nephrology consultation in less time than a first year fellow and demonstrate a greater appreciation of the differences in acute renal failure in various hospital settings (cardiothoracic surgery, burn unit, trauma, obstetric). Second year fellows on the renal consultation service should be able to independently write dialysis and CRRT orders and adjust orders daily based on clinical assessment
Medical Knowledge	
Goal:	At the end of the rotation the renal fellow is expected to become familiar with the causes and treatments of fluid and electrolyte disturbances in hospitalized patients,

	and acute and chronic renal failure in hospitalized patients.
Objectives:	The fellow is expected to demonstrate knowledge of: • The differential diagnosis and management of acute renal failure in a variety of settings including: post-operative, traumatic, in critically ill patients and in the elderly • Evaluation of patients with acute renal failure for renal replacement therapy: role and cost effectiveness of hemodialysis, continuous renal replacement therapy, peritoneal dialysis, indications for temporary access placement and their complications • Indications for and interpretation of different radiologic techniques for evaluating renal dysfunction including renal ultrasound, renal CT scan, MRI, MRA, renal angiography • Indications for and complications of renal angioplasty • Drug dosage modification during renal replacement therapy • Nutritional management of patients with acute renal failure and hospitalized patients with end-stage renal disease • Diagnosis and management of glomerular and vascular disease including: glomerulonephritis, diabetic nephropathy, atheroembolic disease • Diagnosis and treatment of tubulointerstitial disease, including acute interstitial nephritis, cystic diseases and nephrolithiasis • Analysis of acid-base and electrolyte disorders • Diagnosis and management of hypertensive emergencies • Diagnosis and management of renal disorders occurring in pregnancy, including preeclampsia and exacerbation of underlying renal dysfunction and acute renal failure • Management of intoxications and the role for extracorporeal treatment Second year fellows should demonstrate knowledge in: • Utility of CRRT in patients with multiorgan failure • Specific use of immunosuppressive medications in autoimmune diseases • Workup of patients with renal dysfunction in the setting of heart failure
Practice-Based Learning and Improvement	
Goals:	The fellow should demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and lifelong learning.
Objectives:	The renal fellow is expected to: • Analyze clinical experience and identify and review errors in management • Participate in case management conferences (Weekly Inpatient Renal Consultation Conference) and apply knowledge from these conferences to patient care • Use information technology to obtain and manage medical information relating to the problems seen on the consultation service • Apply information from large studies to improve care of patients, recognizing limitations of study design statistical methods Second year fellows should also: • Use knowledge obtained from the literature and experience to teach colleagues, house staff and students
Systems Based Practice	
Goal	The renal fellow is expected to demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on

	other resources in the system to provide optimal health care.
Objectives	During this rotation the renal fellow is expected to: • Understand the resources and limitations of the dialysis unit • Understand the cost-effectiveness of different modalities of dialysis for acute renal failure (CRRT vs. IHD vs. PD) • Understand the role of Medicare in the provision of dialysis services • Understand the resources available for the treatment of uninsured patients and the limitations in their care • Understand the issues involved in the placement of patients in facilities for chronic dialysis and assist in appropriate placement decisions
Professionalism	
Goal:	The renal fellow must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles.
Objectives:	Fellows are expected to: • Demonstrate a commitment to ethical principles, including respect for patients' wishes with regard to withholding or withdrawing care • Demonstrate compassion and integrity by being responsive to patients' needs regardless of culture, age, gender, ability to pay • Interact professionally with other members of the health care team, colleagues and students, including providing services in a timely manner In addition, second year fellows should act independently to address end of life and ethical issues with patients, their families and other physicians
Interpersonal and Communication Skills	
Goal:	The fellow must demonstrate interpersonal and communication skills that result in the effective exchange of information and teaming with patients, their families, and professional associates.
Objectives:	During this rotation fellows are expected to develop and demonstrate the following: • Establish rapport with patients from different backgrounds • Provide appropriate counseling to patients and their families regarding their therapeutic options • Communicate effectively with supervising attending physicians; gain responsibility as experience grows • Interact with physicians on other services while providing consultation, teaching and care and communicate recommendations clearly and effectively • Interact with the staff of the dialysis unit, including nurses, technicians and other support staff to coordinate dialysis and to handle emergencies • Provide teaching to fellows and medical students • Provide support and advice to more junior fellows and house staff

Teaching Methods: Attending rounds, present cases during Clinical Conference (Mondays 7 AM to 8 AM, Tuesdays 7 AM to 8 AM and Fridays from 7 AM to 8 AM). Review Topics for discussion, literature search on topics pertinent to the care of patients.

Disease Mix: Fellows should gain a broad exposure to in-patient nephrology problems including Acute renal failure, hypertensive crises, glomerular diseases, end-stage renal failure and initiating renal replacement, fluid and electrolyte disorders, management of intoxications, renal issues in pregnancy, UTI.

Reading List: Primer of Kidney Diseases, (NKF), Brenner BM: The Kidney.

Assessment Methods:

Formative evaluations of the fellow at the end of each month are completed by the Nephrology Attending. Verbal feedback is also given to the fellow by the Nephrology Attending.

Level of Supervision:

A Nephrology Attending is assigned to the Consultation Rotation each month and directly supervises the fellow. The Nephrology Attending makes rounds with the renal fellow each day, reviews and visits all new consults and reads and co-signs all fellows' hospital notes.

Educational Tools: Attending Teaching, Online Sources. Review of literature.

Procedures: Urinalyses should be done as frequently as possible.
Native Renal biopsy = 3, Transplant Renal biopsy= 2 CRRT=10 Acute PD catheters: No defined number but 1 laparoscopic and one Interventional placed catheter.

RENAL PATHOLOGY

Course Directors: Fellows are to contact Dr. Saggi and Pathologists from Cornell University to set up dates and times for biopsy slides assessments. Fellows present in biopsy conferences depending on their assignments.

Educational Purpose: To understand the principles of renal pathology, to apply the utility of renal biopsies in the overall care of the patient.

Teaching Methods: Review cases followed by examination of histologic slides (LM,IF, EM). Discuss interpretation of findings.

Disease Mix: A variety of glomerular, tubular, microvascular and interstitial disease (as outlined in the curriculum). In renal transplant biopsies, an understanding of acute rejection, chronic allograft nephropathy, drug toxicity, infections and thrombotic microangiopathy.

Reading List: Primer of Kidney Diseases, Renal Biopsy: Striker L and D'agati V. (Books available in the renal pathology laboratory).

Educational Tools: Teaching files, UpToDate, Online Sources (HDCN.com). Biweekly clinico-pathologic conferences. Annual renal biopsy conference.

Research Project: Fellows are encouraged, but not required to do a research project in conjunction with the renal pathologists.

AMBULATORY CARE

Course description: Fellows will be assigned to the Renal-Hypertension Clinic. These clinics are held every Monday and Friday from 1 PM to 5 PM at SUNY Downstate, every Monday and Wednesday from 1 to 5 PM at Kings County at a frequency determined by the VA.
Required number: ½ day each week for the duration of the program (except vacations). During the transplant rotation, fellows will spend an extra ½ day in the renal transplant clinic between pre and post-transplant clinics.
Fellows will be assigned between 3-5 new cases and 10-12 follow up patients. Each fellow will be assigned a fully equipped examination room. There may be medical fellows and students assigned to a fellow. A fellow should not exceed seeing 15-16 cases in clinic. Fellows need to document their cases as case logs in new innovations as their continuity clinic cases.

Goals:

To gain experience in the evaluation, diagnosis and management of various nephrological problems in an out-patient setting including chronic kidney disease (CKD), end stage renal

disease (ESRD), hypertension, renal transplantation, renal stone disease, metabolic disorders.

Objectives:

The fellow will be expected to learn how to become: An excellent consultant
Demonstrate proficiency in history taking, physical examination in the outpatient setting.
Demonstrate knowledge in ordering radiologic tests, blood tests, biopsy
Demonstrate ability to synthesize information into a diagnosis and treatment plan
(patient care, medical knowledge, practice-based learning)
Demonstrate how to identify rapid progression of CKD.

A personable, compassionate and caring physician
Demonstrate ability to communicate with patients regarding difficult issues: diagnosis of kidney disease, need for biopsy, need for renal replacement.
Demonstrate responsiveness to patient's needs for support.
(Interpersonal skills, professionalism, systems-based practice)

An instructor to other health care providers
Work with nursing, social work and nutrition to coordinate care
(Interpersonal skills, professionalism, systems based practice)

A skilled general internist who provides the majority of primary care to his or her patients.
Demonstrate ability to manage other medical issues including diabetes, cardiovascular disease, infectious disease, G.I. problems. Demonstrate ability to appropriately refer to consultants.
(All competencies: patient care, medical knowledge, interpersonal skills, practice-based learning, professionalism, systems based practice)

The specific areas that will be covered during the outpatient rotation include:

Glomerular disease/ Proteinuria/Hematuria: The fellow will be able to develop competency in the diagnosis and evaluation of proteinuria, hematuria, elevated creatinine, in isolation and as part of systemic illness. The fellow will develop skills in planning and evaluating diagnostic tests, an understanding of serologic evaluation, radiologic evaluation, and the need for renal biopsy in the outpatient setting. The fellow will become competent in the treatment of various glomerular diseases (primary and secondary) including IgA nephropathy, FSGS, membranous nephropathy, membranoproliferative nephropathy, lupus nephritis and diabetic nephropathy. The fellow will become competent in strategies to prevent the progression of glomerular disease and the appropriate use of antiproteinuric therapies (e.g. ACE inhibitors, angiotensin receptor blockers, aldosterone antagonists, immunosuppressives, fish oil).

Management of CKD: The fellow will become competent in all aspects of management of patients with CKD including dietary and other lifestyle recommendations, use of antihypertensive therapy, glycemic control for patients with diabetes, volume and electrolyte abnormalities, management of anemia and use of recombinant erythropoietin, preparation for renal replacement therapy (either dialysis or transplantation). Identify rapid progressors and interventions in them Discuss options and refer for education for options of RRT. Arrange preemptively access evaluation and Home dialysis evaluation.

End stage renal disease and renal replacement therapy: The fellow will become competent managing chronic medical and renal problems of dialysis patients including those related to access, infection, cardiovascular risk reduction, diet, bone disease, calcium and phosphate regulation, and psychosocial issues.
The fellow will interact with other services (nursing, social work, surgery, nutrition) to provide full care to ESRD patients.

Transplantation: The fellow will become competent managing recipients of renal transplants including long term regulation of immunosuppressive drugs, screening for and treating infections

and malignancy, prevention and treatment of bone disease, managing cardiovascular risk.

Cystic and inherited diseases of the kidney: The fellow will become competent in evaluation and management of all cystic diseases and inherited diseases

Nephrolithiasis and obstructive disease: The fellow will become competent in the evaluation and management of nephrolithiasis and renal obstructive disease

Hypertension: The fellow will become competent in the management of blood pressure in patients with all forms of renal disease. This will be supplemented by additional experience in year two in the Hypertension Clinic.

During the outpatient rotation the emphasis of the training will be on development of skills relating to diagnosis (especially use of renal biopsy, urine studies, serologic studies and renal imaging), management of chronic problems common to patients with renal disease (cardiovascular, metabolic, access), patient communication especially with respect to prognosis and need for renal replacement, interaction with consultants and other disciplines.

Disease Mix and Patient Characteristics:

Patients include all referrals from Brooklyn ambulatory practices of physicians on the faculty at SUNY DMC and KCHC and nephrology and renal transplant clinics. Most patients will have known or suspected renal, acid-base or electrolyte disorders, or complications of chronic renal disease.

Types of Clinical Encounters:

Outpatient medical care of patients, most of whom have chronic illnesses.

Fellows Responsibilities: The fellow will have one half-day per week of clinic and will be assigned to one supervising attending nephrologist for the duration of the fellowship. Patients will be scheduled by the administrative personnel. On average there will be 3-5 new consultations per session and 10-15 revisits. The fellow will conduct the visit alone and then present the case to the attending who will review the findings and plan with the fellow, as well as briefly see the patient. The fellows' notes will be reviewed by the attending staff.

Competencies addressed: Patient care, medical knowledge, interpersonal and communication skills, systems-based practice, practice-based learning and improvement.

Educational Resources:

- Medical Literature via library at Downstate Health Sciences University on-line, Fellows have access to up to Date as well.
- Renal biopsies and urine analyses will be reviewed as when they are done.
- Renal biopsy conference (Every other Tuesday)
- Journal Club (Each other Tuesday)
- Nephrology Grand rounds conference (Each Tuesdays)
- Immunology and Transplantation, Basic and Clinical (Each Thursday)
- In-patient review (Every day on rounds with Attending)
- Renal Attending on site to provide one-on-one supervision
- Medical Literature with Attending on service and mentors assigned.
- ESRD Grand Rounds every month Last Tuesday of the month.

Lines of Responsibility:

- The renal fellow is to see assigned patients under supervision of renal attending physician.
- Document all care provided
- Follow-up on the care plan.
- The renal fellow will update the clinic staff on their availability to see patients.
- The educational experience and clinical experience under the overall supervision of Program Director of the Renal Fellowship Program.

Methods of Evaluation:

- The supervisory physician submits an evaluation into new innovations to the program office and is expected to give verbal feedback to the fellow every rotation and with program director every six months. The evaluations will be reviewed at least twice yearly by the fellow during meetings with the Program Director. Unfavorable or marginal evaluations will be reviewed with the Program Director as they come to the Program Director's attention.
- Evaluations of Supervisory Physicians are performed by the fellow at the close of each rotation and at the semi-annual meetings with the Program Director during milestones evaluation. These may be anonymous or signed depending on the wishes of the individual house officer.
- ACGME Milestones.
- Fellows are encouraged to seek out additional feedback.

Research Experience

Educational Purpose: Each fellow participates in research during his or her training. The goals of this research experience are two-fold: 1) expose fellows to a clinical and research experience that may reinforce a desire to pursue an academic career; and 2) complement clinical training by providing basic and clinical science knowledge not readily obtained in the clinical setting. The fellow commits 1 month to a clinical research project in the first and second year of the fellowship. Basic science research is available via SUNY Medical School The school of Public Health offers sessions in clinical trial designs and Biostatistics as well

Fellows interested in basic research can choose among basic science laboratories within the Downstate Health Sciences University Medical Center. Fellows interested in clinical research are expected to identify one of the ongoing projects that are currently being performed in the division and are of interest to them. Fellows are expected to discuss their plans for research with the Program Director and the Division Chief by the end of the first year of fellowship to review the fellow's proposed choice of research area and mentor. At the end of the research period, fellows will present the results of their research to the division in a short mini- lecture format. Fellows are encouraged to publish their research in peer-reviewed journals and to present their research at the local and national level like American Society of Nephrology or NKF.

Teaching Methods: With the guidance of the mentor, fellows are expected to formulate and then outline and perform studies that will enable them to test their hypotheses. Fellows will attend seminars in areas that overlap with their research interests. Since basic research may involve the use of human specimens such as cells or tissue specimens, fellows performing either basic science or clinical investigation will complete all IRB and HIPAA learning modules required for research on human subjects.

Reading Lists: Fellows choosing to pursue a clinical project will become familiar with all aspects

of running a clinical study including writing and obtaining IRB approval and informed consent, study design (primer text: *Designing Clinical Research: An Epidemiologic Approach* by Stephen B. Hulley), and statistical analysis through courses provided by the Statistics Department.

Evaluation of Resident Performance: Fellows work closely with their mentors and are evaluated and guided during research meetings and presentations. During their research time, fellows are required to attend and participate in all divisional activities.

Goals and Objectives of Research Rotation

Patient Care: Not applicable

Medical Knowledge:
By the end of this rotation, fellows are expected to develop and demonstrate the following skills:

- Understanding of the relationship between their research project and human disease
- Understand the risks and benefits of participating as a subject in a clinical research study
- Understand the pathophysiology of the disease which they are studying (clinical research)
- Understand the use of informed consent
- Understand the application of statistics and data analysis to results

Interpersonal Skills and Communication Skills:
By the end of this rotation, fellows are expected to develop and demonstrate the following skills:

- Work effectively with other members of the laboratory
- Communicate results with mentors
- Participate in collaboration with other researchers
- Maintain records that are legible and accurate

Systems-Based Practice:
By the end of this rotation, fellows are expected to develop and demonstrate the following skills:

- Understand the mechanisms by which research is funded by the government and private sources
- Understand the role of peer review in publication of articles in academic journals
- Understand the role of the IRB in approving research protocols

Practice-Based Learning:
By the end of this rotation, fellows are expected to develop and demonstrate the following skills:

- Critically evaluate the scientific literature
- Ability to respond to criticism and questions about the research project appropriately
- Apply the results of previous studies in the literature to study design and interpretation.

Professionalism:

By the end of this rotation, fellows are expected to develop and demonstrate the following skills:

- Scientific integrity
- Adhere to principles of informed consent
- Understand the ethics of research

DIDACTICS AND CORE CONFERENCES

Goals and Objectives

The core conferences take place approximately every week. This series of lectures covers the core curriculum and is repeated annually. Topics covering both research and clinical practice are covered throughout the year. Nephrology Faculty as well as allied specialties and sub- specialties are invited to present.

Specific Objectives of Core Conference:

• Expand clinically applicable knowledge base of the basic and clinical sciences underlying the care of medical inpatients

• Access and critically evaluate medical literature, and be able to apply knowledge to clinical practice

• Demonstrate awareness and applications of newly emerging pathophysiology and therapeutics concepts

• Promote appropriate, evidenced-based, and cost-effective use of diagnostic and therapeutic interventions.

• Teach basic approaches to the analysis of problems and decision making

Other Departmental conferences:

Renal Rounds: Every day - Clinical and Physiologic discussions of case material relevant to active patients presented by the consultation service

Renal Journal Club: Every other Tuesday 3.00 PM to 4 PM presentation and discussion of important recent articles on various aspects of the mechanism of renal disease.

Renal Biopsy Conference: Every other Tuesdays 3.00 PM -4 PM- Case presentation of recent patients biopsied with clinicopathological discussions run by the Renal Pathology Division.

Weekly Renal Grand Rounds: Tuesdays from 4 PM to 5 PM – In depth review of important topics on various aspects of Nephrology. World renowned Speakers and experts are invited to speak on topics

There are in addition conferences related to clinical care in which the clinical fellow participates. These include:

- **Monthly QAPI Dialysis Conference and ESRD Grand Rounds:** Last Tuesday of the month from 8.30 AM to 11.30 AM - Joint session with dialysis staff, nutrition services, social service, nursing re-active dialysis patients.

Weekly Transplant Patient Conference: Thursdays 1 PM to 5 PM. Joint session with surgeon's social service, and nursing services to review active transplant patient care problems. This is followed by a weekly meeting with surgery, urology, and pediatrics to evaluate new transplant candidates, and present topics of interest to the renal transplant team. Tuesdays between 1 PM and 5 PM pre-evaluation candidates' discussion.

Training in the Protection of Human Participants (GCP) for Patient-Oriented Clinical Investigators (TC0005) - This a web-based training module in the protection of human participants in biomedical and behavioral research.

Health Insurance Portability & Accountability Act (HIPAA) Training Course (TC0019) – This is a web-based training module in the privacy protection of human participants in biomedical and behavioral research.

Recommended reading/informational sources:

1. The Kidney. Brenner BM, Rector FC. WB Saunders.
2. Clinical Physiology of Acid-Base and Electrolyte Disorders. Fourth Edition. Rose BD. McGraw-Hill.
3. Primer on Kidney Diseases. Second Edition. Greenberg A. (National Kidney Foundation). Academic Press.
4. Handbook of Dialysis. Second Edition. Daugirdas J.T.. Little, Brown and Co.
5. Renal biopsy, Striker G, Striker L, D'Agati V. Third edition.
6. UpToDate in medicine: Available on library resources

EVALUATION PROCESS

A. The Fellow Evaluations

Accurate, timely, and meaningful evaluation of fellow performance is an important component of house staff education and a necessary procedure for medical licensure. In addition, house staff evaluation of attending performance and rotational merit helps ensure continued programmatic improvement.

The following modalities ensure that a comprehensive evaluation process occurs, and that it can be utilized in a constructive fashion to help promote both education and improved patient care.

a) Rotation Evaluation- Each house officer receives an on-line evaluation by the teaching attending at the conclusion of every rotation. These evaluations are based on the Accreditation Council for Graduate Medical Education's Core Competencies. An example of an evaluation form can be found in the appendix. Fellows may review their performance online and a copy is available in their files in the Program Director's office.

Teaching attendings are expected to provide oral evaluations to fellows throughout the course of the rotation as well as formal oral feedback at the end of each rotation. b) Program Director's Review Session- Each fellow meets twice a year with the Program Director during milestones evaluation to review his or her performance. Rotational evaluations, elective plans, and career counseling are covered in detail as well as any number of topics identified by the house officer as important. A written summary of the meeting is both entered each fellow's permanent file. Any substantive issues warranting further attention are discussed immediately with the Key Faculty.

c) Annual ABIM Tracking Evaluation - The Program Directors complete the yearly tracking evaluation by the American Board of Internal Medicine required for eventual certification of successful residency training. Eligibility status for sitting for the ABIM exam requires adequate performance in a broad range of areas.

d) The Clinical Competence Committee- key faculty members meet on a yearly basis to discuss fellow evaluations, monitor their training progress.

e) Program Evaluation Committee See below.

B. The Program Evaluations

a) Fellows' complete evaluations of faculty members at the conclusion of each rotation. Evaluations may be kept anonymous by checking an appropriate box, in which case the results are known only to the Program Director. All evaluations are entered into the Attending's permanent teaching file, and any significant problems are addressed promptly, maintaining strict confidentiality if requested by the house officer. Evaluations are an important consideration in all faculty promotions.

b) The overall training experience is evaluated yearly by the fellows, in the form of a comprehensive anonymous survey. In addition, an Internal Review Committee, comprised of both faculty and fellows, evaluates the overall training experience and compliance with ACGME policies on an every-other-year basis.

c) At the bi-annual key faculty meeting, feedback, and constructive suggestions on practical and educational content of the program is actively elicited. The opportunity for the fellow to participate actively in systemic changes is present in this setting as well as ad-hoc meetings set up by the Program Director.

DIVISIONAL POLICIES

A. Nephrology Fellowship: Job and Procedures Descriptions

1) The Nephrology Fellowship consists of Fellows at each of two levels of training, first year fellows (PGY 4 or PGY 1 equivalent for non-US residency trained candidates) and second year fellows (PGY 5 or PGY 2 for non-US resident trained candidates). All Nephrology Fellows should have completed training in an ACGME approved Internal Medicine program prior to commencing training in the Fellowship ideally but this is not true for non-US residency candidates.

2) The ultimate responsibility for care rendered by the Nephrology Fellow is via a Nephrology Attending.

3) Supervision can be provided by an Attending Physician through general, direct, or personal observation of the Fellow performing the procedure.

4) All Nephrology fellows are permitted to perform routine care procedures such as histories and physical examinations, order writing, and documentation of same, without direct observation by a supervisory person.

5) Each fellow will gain progressive experience with several procedural skills essential to the practice of nephrology throughout the two years of training. The American Board of Internal Medicine (ABIM) also requires documentation of competency for the essential procedures listed below as a requirement for ABIM certification. In addition, opportunity exists to gain experience in several advanced and specialized skills through careful utilization of elective time. The table below lists the skills considered "essential" for nephrology fellowship training and elective procedures. It is expected that all fellows will be fully competent to perform "essential" skills by the conclusion of their training under General Supervision.
The acquisition of competency in procedural skills requires a careful initial introduction and supervision of the specific procedure. For essential skills this occurs under the Personal Supervision of a physician who has been credentialed as competent to perform that specific procedure. Successful, and technically competent, completion of a specific procedure the listed number of times under Personal Supervision, with appropriate documentation, is necessary if a fellow is to be considered credentialed in a procedure.
Documentation requires listing the procedure, supervisor, patient unit number, indication, and any complication in new innovations. It is essential that fellows enter data into new innovations of procedures, case logs for continuity clinic timely. such records are required to be rigorously maintained; both for the advancement in the fellowship program, eligibility to sit for the ABIM exam, and all future hospital appointments, require such documentation.

Essential Procedures:

Percutaneous renal biopsy: At least 3 preferably 5, All renal biopsy procedures are performed under personal supervision of an Attending Physician.

- Native kidney under ultrasound guidance at SUNY Downstate
- Transplant kidney under ultrasound guidance at NYU or at SUNY DMC.
- ABIM finally determines based on National polls what adequate number is sufficient.

Placement of temporary vascular access for hemodialysis and related procedures: Placement of vascular access lines is performed by the Fellow on the Clinical Service. The first 3 lines are placed under personal supervision by an Attending physician after this, lines are placed under direct supervision. Fellows also practice in simulation labs before going to humans.

Inpatient acute peritoneal dialysis: Orders for acute peritoneal dialysis are written by the Fellow on the Clinical service if a patient on PD gets admitted to the hospital. These orders are written under direct supervision of an Attending physician for the Fellow's first 3 procedures. Most of outpatient PD training will be at the Mount Sinai rotation and some AT SUNY Parkside Ambulatory Dialysis. There is no current Acute Start PD Program at Health Sciences University but we hope to have this in future.

Acute hemodialysis: Orders for acute hemodialysis are written by the Fellow on the Clinical Service. These orders are written under direct supervision of an Attending physician for the Fellow's first 5 procedures. Then the fellows place the hemodialysis orders and prescription changes the prescription as needed which is patient specific. PA's or allied health care professionals also work in this area and interact with the

fellows to train them in this skill set. This skill set has also to be learnt by the fellow over time. Attendings audit, the orders to know that the fellow has become competent.

Continuous renal replacement therapy: Orders for continuous renal replacement therapies are written by the Fellow on the Clinical service. These orders are written under direct supervision of an Attending physician for the Fellow's first 5 procedures. Fellows need to learn when and how to modify CRRT prescription and how to trouble shoot if CRRT process is having technical issues.

Elective Procedures (No minimum requirement)

Thrombolysis of permanent AV grafts and fistulae at Av access care center
Placement of permanent catheters, removal of permanent catheters, vein mapping.
Placement of acute peritoneal dialysis catheter under Laparoscopy and IR.

Ultrasound guided biopsy:

To perform ultrasound-guided biopsies independently attending physicians should complete the POCUS training for Nephrology as well.

"Academic Due Process and Grievance Policy

This policy adheres to and extends the Institutional Grievance Policy of the Downstate Health Sciences University institutional polices and that of Graduate Medical Education. An aggrieved fellow should notify the Program Director, in writing, of the grievance if from another faculty member. If the fellow's grievance is with the Program Director, the fellow should submit his/her grievance to the ombudsperson or the Division chief, or to the Office of GME in anonymous ways. All fellows are educated on this process at orientation and repeatedly over many morning reports. Fellows also attend resident GME meeting where complaints are voiced and escalated to DIO every month. Program Director cannot attend those meetings where resident's forum discusses problems with the program and complaints. In rare circumstances a task force can be created to address the problems and further escalation to Ombudsperson for GME program. Anonymous notification includes all pertinent information and evidence which supports the grievance. The Program Director or the Chair of his/her designee will set a mutually convenient time with the fellow to meet to discuss the complaint and to attempt to reach a satisfactory solution. When the complaint involves negative evaluations or questions of clinical competence, it will be referred to the Clinical Competence Committee. If the complaint involves an unsatisfactory rating for Overall Clinical Competence, Patient Care, or Professionalism, or involves an action of probation, suspension, or dismissal, the is submitted to GME to conduct an ad hoc subcommittee to examine the complaint. The fellow will be provided with the opportunity to present his/her complaint formally to the Committee or its subcommittee. Thereafter, additional meetings between key personnel may be scheduled to resolve the grievance. The aggrieved fellow and the Program Director or the Vice-Chair or his/her designee should make a good faith effort to resolve the grievance at this level. The process for this grievance procedure is complete when the Program Director (or Vice-Chair) or his/her designee informs the aggrieved fellow, in writing, of the final decision. A copy of this final decision will be sent to the Department Chair and the Vice-Chair for Medical Service Operations and Education. Upon receiving the communication on the outcome of the departmental process, the aggrieved fellow may choose to appeal the decision to the DIO for the Institution. To review the Downstate Health Sciences University Institutional Grievance Policy, one may refer to Policies and Procedures of the Downstate Health Sciences University Hospital Graduate Medical Education Office, available online.

B. Fellow Supervision Policy

Supervision of the renal fellows in both inpatient and outpatient settings seek to balance the

need for appropriate attending physician supervision with the progressive responsibility and autonomy fellows must demonstrate by the conclusion of their training experience. Supervision of activities on the medical service falls under three broad categories depending upon the complexity of the clinical situation and/or training experience. For the purpose of defining the overall supervision policy, and based on HCFA and NYSDOH guidelines, supervision is defined as follows:

1) **General Supervision**: Supervision is furnished under the attending physician's overall direction and control, but the attending physician's presence is not required during the procedure or patient encounter.

-Outpatient and Inpatient Patient encounters not needing a procedure

-Research Supervision. Fellows meet periodically with their mentor. Specific goals are set and meetings are held periodically to monitor the fellow's progress.

2) **Direct Supervision:** Supervision is by an attending physician whose direct physical presence is either in the office suite or immediately available to furnish assistance and direction throughout the performance of a procedure or during a patient encounter. It does not mean that the attending physician must be present in the room when the procedure or encounter is taking place.

-After being credentialed, the following procedures may be done under direct supervision: hemodialysis, hemofiltration, peritoneal dialysis, femoral catheter placement, renal biopsies.

3) **Personal Supervision:** (also called Visual Supervision) Supervision by an attending physician who is in attendance in the room while the procedure or encounter is taking place.

-Renal biopsy

-Placement of temporary Hemodialysis catheter.

C. Fellow Moonlighting Policy

Nephrology Fellows at the Downstate Health Sciences University Nephrology Fellowship Program cannot engage in professional activities outside the educational program (moonlighting).

D. Recruitment and Applications:

The Section of Nephrology accepts Fellowship applications only from candidates who are presently in or have graduated from an American, university based, and 3-year accredited Internal Medicine residency program. We do consider based on eligibility criteria set by ACGME exceptionally qualified International medical graduates who have not done residency in the US but done so for 36 months in their foreign country after a vetting procedure by IOC and GME committee vote. Our application process follows the current ACGME matching program (ERAS).

E. Promotion:

First year Fellows are promoted to the second year after satisfactory completion of the first year.

Non-renewal of a Fellow's contract for the second year can only occur in accordance with the steps required by the DHSU GME policies and agreement (contract) and must include failure to improve during a probationary period set by GME and HR and labor relations for GME. Fellows that will not be offered contract renewal for the second year must be given notice based on GME, HR and Labor relations polices, before the expiration of present contract.

F. Work Environment:

The Fellowship complies with the RRC's "*Common Requirements for all Core and Subspecialty Programs*" for resident duty hours and the working environment. Fellows have their rooms rest

and sleep areas and shower rooms and for women lactation rooms at all three sites.

G. Meetings/Conferences:

First year Fellows may attend one of the following:

- ASN National Nephrology meetings.
- National Kidney Foundation Spring Clinical Meeting

The second year Fellows may attend:

- American Society of Nephrology (ASN) meeting
- Other optional courses:

-Peritoneal Dialysis University or similar meetings held on Home therapies in NYC.

The Section will cover expenses for Fellows attending meetings under the standard guidelines established by Downstate Health Sciences University:

1. Expenses will only be covered during the time period of the meeting.
2. No expense will be reimbursed without proper receipt and documentation.
3. The lowest cost direct flight will be selected.
4. Same gender Fellows should room together unless otherwise approved.
5. Hotel expenses covered are room rate and applicable taxes at the DHSU re-imbursement rate.
6. Transportation costs covered are transportation to and from airport from home and hotel, and to meeting events.
7. Breakfast, lunch and dinner allowances are covered at the DHSU re-imbursement rates.
8. Meeting registration is covered. Pre-meeting Courses should be approved with the Fellowship Director.
9. Many courses include travel grants for fellows; applications should be sent in early.

I. Duty Hours and On-call:

The Fellowship complies with the RRC's "*Common Requirements for all Core and Subspecialty Programs*" for resident duty hours and the working environment. Details are in hand book.

Duty Hours

a. Duty hours are defined as all clinical and academic activities related to the residency program, i.e., patient care (both inpatient and out-patient), administrative duties related to patient care, the provision for transfer of patient care, time spent in-house during call activities, and scheduled academic activities such as conferences. Duty hours do not include reading and preparation time spent away from the duty site.

b. Duty hours must be limited to 80 hours per week, averaged over a four-week period, inclusive of all in-house call activities.

c. Residents must be provided with 1 day in 7 free from all educational and clinical responsibilities, averaged over a four-week period, inclusive of call. One day is defined as one continuous 24- hour period free from all clinical, educational, and administrative activities.

d. A-10-hour time period for rest and personal activities is provided between all daily duty periods, and after in-house call. If an on-call dialysis needs to be performed between the hours of 10pm and 8am, the attending nephrologist on call will come into the hospital (unless some prior arrangement has been made which will provide 10 hours of rest during the latter part of the day).

On-Call Activities

The objective of on-call activities is to provide residents with continuity of patient care experiences throughout a 24-hour period. In-house call is defined as those duty hours beyond the normal workday when residents are required to be immediately available in the assigned institution.

a. In-house call must occur no more frequently than every third night, averaged over a four-week period.

b. Continuous on-site duty, including in-house call, must not exceed 24 consecutive hours. Residents may remain on duty for up to 6 additional hours to participate in didactic activities, maintain continuity of medical and surgical care, transfer care of patients, or conduct out-patient continuity clinics.

c. No new patients may be accepted after 24 hours of continuous duty except in outpatient continuity clinics. A new patient is defined as any patient for whom the resident has not previously provided care.

d. At-home call (pager call) is defined as call taken from outside the assigned institution.

The frequency of at-home call is not subject to every third night limitation. However, at-home call must not be so frequent as to preclude rest and reasonable personal time for each resident.

Residents taking at-home call must be provided with 1 day in 7 completely free from all educational and clinical responsibilities, averaged over a 4-week period.

When residents are called into the hospital from home, the hours residents spend in-house are counted toward the 80-hour limit.

The program director and the faculty monitor the demands of at-home call in their programs and make scheduling adjustments as necessary to mitigate excessive service demands and/or fatigue.

J. Absence/Coverage:

Fellows need to arrange coverage if they are gone or unavailable during the time they are on active rotations. Any pre- arranged Fellow absences should be cleared with the appropriate Attending. A memo or email with the dates and covering Fellow must be circulated. The Fellow needs to make sure that the designated person is available and on-site. The Fellow covering the unavailable Fellow should let the Administration know that they are covering and available.

K. Evaluations:

After each monthly "service" rotation, the Fellow is evaluated by the Attending by filling out a form based on the standardized ABIM evaluation form entitled "Evaluation of Subspecialty Trainees on new innovations. This should be done in a timely manner following the rotation. Fellows are evaluated by the Program Director every 6 months in milestones. A written report of this evaluation is made, which is provided to and discussed with the Fellow. All evaluations are maintained in the Fellow's file and are made available to the Fellow by request.

Evaluations of the Attendings by the Fellows are done frequently by GME and ACGME. The goal is to maintain as much anonymity as possible, so that the Fellow feels comfortable and will be frank with the process.

The Fellows evaluate the program yearly through GME and ACGME.

The Program Director meets with the Fellows frequently to review and evaluate the entire program and curriculum. Prior to this meeting, the Senior Fellow will have met with the other Fellows to discuss and therefore represent their opinions on the curriculum.

The Program Director then meets with the Attending Staff to discuss potential curriculum changes.

L. Gifts to Physicians from Industry

Not accepted.

Fellowship Benefits

- **Financial Support:** The Nephrology Fellowship is a two-year program. Details of each year salary and benefits will be negotiated by Albany and determined GME.
- **Vacations:** A vacation period of four weeks split into two weeks period as determined by the office of GME and Department of Human Resource.
- **Professional leave:** Up to 3 working days per year may be utilized for conferences, board examinations, and courses with the exception of meetings held virtually which could be attended remotely on site. Additional days are at the discretion of the Program Director. Fellows are expected to arrange coverage during their absence.
- **Professional liability insurance:** The Renal Division provides Liability insurance.
- **Health insurance:** Downstate Health Sciences University will provide health coverage (Empire Insurance) for the fellow. If the fellow chooses to purchase his/her own insurance, or if he/she needs health insurance for a spouse and/or child, he/she must pay the difference.

- **Disability insurance:** Not provided.
- **Life insurance:** Not provided.
- **Uniforms:** 4 hospital coats will be issued at the beginning of the fellowship.
- **Pagers:** A long-range pager will be provided during the period of fellowship.