University of Texas Southwestern Medical Center
Department of Internal Medicine
Division of Nephrology
Curriculum for Fellowship Training in Nephrology 2010-2011

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GENERAL DESCRIPTION AND EDUCATIONAL PURPOSE OF THE UNIVERSITY OF TEXAS SOUTHWESTERN MEDICAL CENTER RENAL FELLOWSHIP TRAINING PROGRAM

The goal of the Nephrology Fellowship Training Program at UT Southwestern Medical School is to train MDs and MD/PhDs in clinical nephrology and research nephrology. Fellows who enter this training program have completed an internal medicine residency. The fellows participate in clinical rotations for one to two years during which they achieve proficiency in nephrology consultation, acute and chronic dialysis and renal transplantation. This is combined with an in depth education in renal physiology and pathophysiology.

It is the goal of our program that residents completing this program should be competent nephrologists at the end of their training, able to function as a clinical nephrologist in a private hospital or in a university setting. The program provides an opportunity to pursue advanced training in clinical nephrology and to undertake training in basic science research or clinical research. The program is designed for trainees who wish to receive outstanding educational training in order to pursue a career in academic medicine (basic science, clinical research, or clinical education) or private practice.

Detailed descriptions including goals and objectives are provided for each clinical rotation in the following pages. The goals and objectives within each of these rotations are designed to meet the 6 general competencies of patient care, medical knowledge, interpersonal and communication skills, professionalism, practice based learning, and systems based practice. These goals and objectives of the Nephrology Fellowship Training Program can be globally summarized as follows:

1. The trainee will learn the clinical skills and acquire the knowledge base required to become a comprehensive and competent nephrologist.
2. The trainee will become a compassionate and ethical nephrologist. During the fellowship, the trainee will participate in safe, effective and compassionate patient care under supervision from the teaching staff.
3. The trainee will participate fully in the educational activities of the program. The trainee will also assume responsibility for teaching and supervising other residents and students who may be rotating on the various services.
4. The trainee will participate in institutional programs and activities involving the medical staff and adhere to established practices, procedures and policies of the institution.
5. The trainee will participate in institutional committees and councils as they relate to patient care activities. This may take the form of care plan meetings or quality assurance meetings that are part of individual rotations.
6. The trainee will learn the economic fundamentals of health care as it pertains to nephrology and learn effective management skills with regard to utilization of health resources and cost containment. The program will encourage the development of a well-rounded and healthy self-concept that enables one to be an effective physician without neglecting personal or family needs.

PARKLAND MEMORIAL HOSPITAL (PMH) and ZALE LIPSHY UNIVERSITY (ZLU) HOSPITAL RENAL CONSULT ROTATION

Service:

The consult service consists of an attending, 1 fellow, 1-2 medical residents, and 1-2 medical students. The fellow will assign consults to the other members of the team. The consult fellow will oversee all patients on the service, including those being followed by medicine residents and medical students. The types of consults include evaluation of acute and chronic kidney disease, glomerular diseases, and all types of fluid and electrolyte disorders. The trainee becomes skilled in the technique of renal biopsy. If a patient requires dialysis during hospital follow up the consult fellow will continue to manage the patient while receiving renal replacement therapy thus allowing for continuity of care.

Responsibilities:

The clinical fellow typically is assigned to this rotation 4-5 months during the 2 years of clinical training. The consult fellow is responsible for the initial evaluation and subsequent management of all hospitalized patients referred for consultation. The fellow will perform a history, physical examination, and review the relevant laboratory studies in each case consulted upon. The fellow will present the patient to an attending physician and, under their supervision, will formulate a diagnostic and treatment plan. The consult fellow is not responsible for admitting or discharging the patients, all patients are admitted to another service (medical or surgical) and the renal fellow acts in a consultant capacity only.

Expectations:

A. During this rotation the fellow should become familiar and develop an understanding of the disease processes listed below. In addition the fellow will be expected to learn the appropriate treatment and approach to these disorders. These expectations will be accomplished from attending required teaching conferences, daily attending rounds, renal clinic, and evaluating patients as a consultant.

-Primary and secondary glomerular disease
-Diabetic nephropathy
-Tubulointerstitial renal disease
-Fluid and electrolyte disorders
-Acid-base disorders to include metabolic and respiratory
-Management of hypertension
-Approach to patients with acute renal failure including those in the ICU
-Management of the patient with chronic renal failure
-Urinary tract infections
-Disorders of divalent cation and mineral metabolism

-Renal disease in pregnancy
-Tools used to assess renal function
-Pharmacology of drugs in renal disease

B. The fellow will become familiar with the indications for percutaneous renal biopsy. The fellow will become skilled in this procedure and be familiar with the risks and complications of the procedure

C. In addition to the Parkland Dialysis rotation, the Parkland Consult fellow will also be involved in dialysis therapy. The fellow will be expected to assess patients and determine when dialytic therapy needs to be initiated and which modality is appropriate. The fellow will be expected to become familiar with all aspects of continuous forms of renal replacement therapy as implemented in an ICU situation.

D. The fellow will coordinate the distribution of all new consults to the rotating students and fellows and will be familiar with all patients on the service

E. The fellow will be expected to provide guidance and teaching to the students and residents who rotate on the consult rotation.

F. The fellow may be contacted by outside clinics regarding scheduling patients in the renal clinic. The fellow will assist in such referrals and make recommendations for initial workup prior to the patients arriving to the clinic

General Competencies:

During this rotation, trainees are expected to acquire and master the following core competencies:

A. Patient Care:
Fellows should be able to:
1. Approach new patients and their families with respect and clearly communicate the reasons for the visit and any recommendations resulting from the consultation.
2. Demonstrate compassion and deliver appropriate and effective care with the goal of promoting health and general well being for the patients.
3. Perform a history and physical examination and review the clinical data relevant to consultation in nephrology.
4. Learn the indications for and interpretation of diagnostic tests used in nephrology including: ultrasound, urinalysis, serum chemistries, blood gas analysis and renal biopsy.
5. 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.
6. 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.
7. Implement treatment plans, such as initiating acute or chronic dialysis.

8. 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 ward patients
9. 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.

B. Medical Knowledge:
The fellow is expected to gain an expertise in general nephrology as described in detail above:
1. By demonstrating knowledge in established and evolving biomedical, clinical, epidemiological and social-behavioral sciences (as listed above).
2. By demonstrating the ability of applying this knowledge to patient care and understanding complex mechanisms of diseases.
3. By being highly resourceful in developing knowledge.

C. Practice-Based Learning:
During this rotation, fellows are expected to:
1. Analyze clinical experience and identify and review errors in management.
2. Participate in case management conferences and apply knowledge from these conferences to patient care.
3. Use information technology to obtain and manage medical information relating to the problems seen on the consultation service.
4. Apply information from large studies to improve care of patients, recognizing limitations of study design and statistical methods.
5. Use knowledge obtained from the literature and experience to teach colleagues, house staff and students.

Examples of practice-based evaluations that can be performed during this rotation include, but are not limited to:

a. The use of erythropoietin stimulating agents in hospitalized dialysis patients
b. The appropriateness of performing dialysis during late hours
c. The proper antibiotic dose adjustments in acute kidney injury and chronic kidney disease patients
d. The proper communication with outpatient dialysis facilities prior to patient discharge

D. Communication and Interpersonal Skills:
During this rotation, fellows are expected to develop and demonstrate the following skills:
1. Establish rapport with patients from different backgrounds.
2. Provide appropriate counseling to patients and their families regarding their therapeutic options.
3. Communicate effectively with supervising attending physicians; gain responsibility as experience grows.
4. Interact with physicians on other services while providing consultation, teaching and care and communicate recommendations clearly and effectively.

5. Interact with the staff of the dialysis unit, including nurses, technicians and other support staff to coordinate dialysis and to handle emergencies.
6. Provide teaching to rotating residents and medical students.

E. Professionalism:
Fellows are expected to:
1. Demonstrate a commitment to carrying out professional responsibilities.
2. Adhere to ethical principles.
3. Exhibit sensitivity to diverse patient population.
4. Demonstrate respect, compassion, integrity and honesty.
5. Consistently exhibit role model and responsible behavior.
6. Willingly acknowledge errors.
7. Consistently consider the needs of their patients, families and colleagues.
8. Provide support and advice to more junior fellows, house staff, and students.

F. Systems-Based Practice:
During this rotation, fellows are expected to:
1. Understand the resources and limitations of the dialysis unit.
2. Understand the cost-effectiveness of different modalities of dialysis for acute kidney injury (CRRT vs. IHD vs. PD)
3. Understand the role of Medicare in the provision of dialysis services.
4. Understand the resources available for the treatment of uninsured patients and the limitations in their care.
5. Understand the issues involved in the placement of patients in facilities for chronic dialysis and assist in appropriate placement decisions.
6. Assist in developing systems improvement.

PARKLAND MEMORIAL HOSPITAL (PMH) and ZALE LIPSHY UNIVERSITY (ZLU) HOSPITAL ACUTE DIALYSIS ROTATION

Service:

The acute dialysis rotation consists of one fellow and one attending. The fellow is responsible for all inpatient dialysis. The patient population consists of chronic maintenance dialysis patients who are admitted for dialysis or non-dialysis related issues, chronic peritoneal dialysis patients, and unfunded patients who do not receive regular dialysis, but who are dialyzed on an emergent basis. There are also patients admitted from the clinic for elective dialysis initiation.

The fellow learns the techniques of continuous forms of renal replacement therapy and becomes skilled in the management of ICU patients with renal failure. The fellow becomes skilled in the placement of temporary access when necessary (Quinton catheter). The fellow also becomes skilled in the various techniques of peritoneal dialysis when this procedure is indicated.

Responsibilities:

The fellow typically is assigned to this rotation 3-4 months during the 2 years of clinical training. The fellow will perform a history, physical examination, and review the relevant laboratory studies in each case consulted upon. The fellow will present the patient to an attending physician and, under their supervision, will formulate a diagnostic and treatment plan to include writing the daily dialysis orders. The fellow is not responsible for admitting or discharging the patients. All patients are admitted to another service (medical or surgical) and the fellow acts in a consultant capacity only. The fellow will coordinate outpatient placement with the help of the dialysis social worker and coordinate access placement with the help of the access nurse. The fellow will also evaluate all unfunded patients who present to the ER to determine if they require emergent HD.

Expectations:

A. During this rotation the fellow should become familiar and develop an understanding of the following disease processes and techniques. This familiarity and understanding will be obtained by attending required teaching conferences, daily attending rounds, renal clinic, and evaluating patients as a consultant.

-Acute kidney injury
-Hypertensive disorders
-Indications for initiation of renal replacement therapy, both elective and emergent
-Evaluation and selection of patients for acute dialysis or continuous renal replacement therapies (CVVHDF)
-End-state renal disease

-Evaluation of end-stage renal disease patients for various therapies and their instruction regarding treatment options
-Understanding of the indications, contraindications, and complications of placement of peritoneal catheters
-Evaluation and management of medical complications during dialysis and other extracorporeal therapies, including dialysis access, and an understanding of the pathogenesis and prevention of these complications
-An understanding of the special nutritional requirements of the hemodialysis and peritoneal dialysis patient
-Disorders of drug metabolism
-Drug dosage modification during dialysis and other extracorporeal therapies
-The pharmacology of commonly used medications and their kinetic and dosage alteration with hemodialysis and peritoneal dialysis
-Understanding of how to manage complications of vascular access, such as thrombosis
-Technical expertise: peritoneal dialysis
-Technical expertise: placement of temporary vascular access for hemodialysis and related procedures
-Technical expertise: acute hemodialysis
-Technical expertise: continuous veno-venous hemodialfiltration

B. The fellow will also be expected to do the following:

-Evaluate all patients on the service on a daily basis beginning with patients in the ICU
-Write dialysis orders on all patients prior to initiation of treatment
-Write daily progress notes tailored to renal disease management
-Review all medications and dose adjust according to renal function
-Schedule and manage dialysis access problems
-Evaluate all ESRD patients in ED upon request
-Promptly notify the attending after completing evaluation of all ED consults
-Place temporary venous access for dialysis as needed
-Contact (pager or voicemail) attending nephrologist for all ESRD patients admitted to PMH at time of admission and again at discharge
-Prescribe usual Kt/V for all maintenance ESRD whenever possible
-Update dialysis patient list in computer on a daily basis
-Coordinate inpatient and outpatient care of all ESRD patients

General Competencies:

During this rotation, trainees are expected to acquire and master the following core competencies:

A. Patient Care:
1. By demonstrating compassionate, appropriate and effective care
2. By promoting health and general well being of the patients
3. By demonstrating satisfactory clinical competence in performing medical interviews, physical examinations, review of relevant data and procedural skills

4. By making diagnostic and therapeutic decisions based on available evidence, sound judgment and patient preferences

B. Medical Knowledge:
1. By demonstrating knowledge in established and evolving biomedical, clinical, epidemiological and social-behavioral sciences (as listed above)
2. By demonstrating the ability of applying this knowledge to patient care and understanding complex mechanisms of diseases
3. By being highly resourceful in developing knowledge

C. Practice-Based Learning:
1. By showing improvement in patient care based on:
    Evaluation of one's own practice
    Incorporation of feedback information into improvement activities
    Appraisal and assimilation of scientific evidence
    Effective utilization of technology to manage information for patient care and self-improvement

Examples of practice-based evaluations that can be performed during this rotation include, but are not limited to:
    The use of erythropoietin in hospitalized ICU dialysis patients
    The appropriateness of performing dialysis during late hours
    The proper antibiotic dose adjustments in ESRD patients
    The performance of urinalysis on every patient with acute kidney injury
    Minimize the complication rate associated with placement of vascular access
    The mean time allowed for a femoral temporary vascular access for HD to remain without exchange

D. Communication and Interpersonal Skills:
1. By demonstrating effective and humanistic information exchange with patients and their families and other health professionals
2. By demonstrating excellent listening, narrative and nonverbal skills
3. By demonstrating ability to educate and counsel patients, families and colleagues

E. Professionalism:
1. By demonstrating a commitment to carrying out professional responsibilities
2. By adhering to ethical principles
3. By exhibiting sensitivity to diverse patient population
4. By demonstrating respect, compassion, integrity and honesty
5. By consistently exhibiting role model and responsible behavior
6. By willingly acknowledging errors
7. By consistently considering the needs of their patients, families and colleagues

F. Systems-Based Practice:
1. By demonstrating awareness of the larger context of health care systems.
2. By demonstrating responsiveness to health care systems
3. By effectively utilizing system resources to provide care of optimal value

4. By effectively using systematic approaches to reduce errors and improve patient care
5. By enthusiastically assisting in developing systems' improvement

The opportunity to work in 3 markedly different hospital settings provides ample exposure to the strengths and weaknesses of various health care delivery models (Parkland Memorial Hospital, a large county hospital, the Veterans Administration Hospital, a federally funded hospital system, and St. Paul University Hospital, a private tertiary referral hospital). In addition the fellows rotate through the DaVita outpatient dialysis unit which is a for profit national provider of renal replacement therapy. In each of the 3 hospital settings the fellow is responsible for prioritizing the timing of dialysis treatments for inpatients. In scheduling the patient's treatment the fellow learns to incorporate issues related to the hospital system.

Efficient evaluation of patients to determine who requires dialysis and who does not on any given day helps to minimize the likelihood of the nursing staff to add additional shifts and avoid the cost of paying overtime. Such decision making on the part of the fellow is an example of working effectively in the health care system and in this case provides for cost containment on the behalf of the hospital.

When a patient is initiated on dialysis the fellow takes into consideration the desires of the patient as to where to be placed on a chronic basis. Patient preferences must be incorporated into the realities of availability of space in the outpatient unit. The fellow learns to be the patient advocate but at the same time must learn to work with the social worker and the personnel in the receiving units in order to properly place the patient. This scenario is another example of the learning process of working within the local health care system.

Once a patient is placed the fellow contacts the accepting physician and must effectively communicate the patient's history and any ongoing medical problems. This ability to communicate is an integral part of the health care delivery setting. As mentioned earlier, the fellow evaluates a large number of unfunded patients who present to the ER at Parkland Hospital. The ability to properly triage these patients requires balancing the needs of the patient, the stated policy of the hospital, and the work load of the personnel in the acute dialysis unit. Proper management of these patients incorporates being the patient advocate and operating within the constraints of the health care setting.

PARKLAND MEMORIAL HOSPITAL (PMH) TRANSPLANT ROTATION

Service

The Renal Transplant Service at Parkland Memorial Hospital and UT Southwestern Medical Center is a joint effort of the divisions of Nephrology and Transplantation Surgery. The inpatient Transplant Service rounds one to two times per day with the participation of a Nephrology attending and a Transplant Surgery attending. One renal fellow and two Internal Medicine residents make up the inpatient team. Nursing staff, pharmacists, dieticians and social workers participate in rounds on a daily basis. During this rotation, the trainee is exposed to kidney and kidney-pancreas transplants.

Fellows will participate in all of the clinical and academic activities of the Renal Transplant Service. The fellow becomes familiar with the pre-transplant workup of patients. The fellow will learn the principals of selection of candidates for transplantation, donor evaluation, management of patients on the list, management of patients in the peri-operative period and long-term follow-up of kidney and kidney/pancreas transplant recipients in the outpatient clinic.

Responsibilities

The clinical fellow typically is assigned to this rotation 4 months during the 2 years of clinical training. Under direct faculty supervision, the trainee evaluates approximately 4-5 new transplant patients and 25-30 hospitalized patients with prior placement of an allograft each month while on service. The fellow will write admission notes and orders on patients assigned to them. All patients will have daily progress notes written.

The surgical team is the primary team for the initial admission in which the patient receives an allograft. During this initial admission the renal fellow acts as a consultant but is integrally involved in the decision making regarding the post-operative care of the patient. The renal fellow is the admitting physician for all subsequent admissions. As the primary physician, the fellow writes all orders for immunosuppression. The fellow is also responsible for at least being familiar with the patients assigned to the two medical residents who rotate on the service. Occasionally some renal transplant patients will be under the care of another team not described above. This will occur most commonly when patients require admission to one of the intensive care units. In this circumstance, the fellow will continue to follow these patients regularly and will directly communicate to the ICU house staff instructions regarding immunosuppression and management of transplant related issues.

Outpatient Renal Transplant Clinic

The fellow will see patients in the PMH transplant clinics on Monday, Tuesday, and Friday, as well as cover walk in patients when on-call in rotation with the medical residents. The goal of the transplant clinic is to apply principles of clinical transplantation toward actual care of patients in the outpatient setting. Each patient is

presented to the renal transplant attending who also sees every patient in clinic. A diagnostic and therapeutic plan is formulated after careful discussion.

In patients recently discharged from the hospital after having just received a transplant the objective of the clinic is to provide an educational experience in early post-transplant care. Expertise is gained in adjusting immunosuppression, evaluation of proteinuria, evaluation of renal dysfunction, management of hyperlipidemia, hypertension, follow-up evaluation and monitoring of renal function, infectious complications, management of blood pressure, and other conditions specific for this time period following placement of an allograft.

Patients who are farther removed from placement of the allograft are also evaluated. The clinic will provide the fellow an educational experience in late transplant care that includes infectious complications, metabolic abnormalities, chronic allograft dysfunction, bone disease, malignancies and other conditions specific for this time period post transplantation.

Patients being evaluated for consideration for placement on the transplant list are also seen in the outpatient setting. The objective of these encounters is to educate the fellow on subjects that include (but not limited to): identification of cardiovascular risk factors for surgery, pre-transplant patient teaching, contraindications to transplantation, HLA crossmatching, preparing recipients for transplants in situations where the living donor is ABO incompatible or where the recipient has anti-HLA antibodies to the donor (high risk pretransplant evaluation and management).

Patients already on the transplant list are periodically evaluated in the outpatient setting. The objective of these encounters is to provide the fellow with specific educational experience for patients waiting for transplantation but receiving dialysis. Complications in this group of patients may adversely affect the actual transplant procedure or the long term outcome and include issues pertaining to dialysis, vascular or peritoneal access, infections or cardiac complications.

Expectations

A. During this rotation the fellow will gain expertise in the areas listed below. This expertise will be acquired from attending required teaching conferences, daily attending rounds, and transplant clinics.

-Supervised involvement in the decision-making for patients during pre-and post-transplant care
-Evaluation and selection of transplant candidates
-Pre-operative evaluation and preparation of transplant recipients
-Immediate post-operative management of transplant recipients, including administration of immunosuppressant medications
-Clinical diagnosis of all forms of rejection, including laboratory, histopathologic, and imaging techniques
-Medical management of rejection, including use of immunosuppressant drugs and other agents
-Recognition and medical management of the surgical and nonsurgical complications of transplantations.

-Management of post-transplant complications – including rejection, chronic allograft dysfunction, post-transplant malignancies, infections, cardiovascular diseases, hypertension, and fluid/ electrolyte problems
-Technical expertise: percutaneous biopsy of allograft kidneys
-Principles of tissue typing

B. The fellow will become familiar with the indications for percutaneous renal allograft biopsy. The fellow will become skilled in this procedure at PMH and be familiar with the risks and complications of the procedure. Allograft biopsies at the St. Paul University Hospital are performed by interventional radiology.

C. The fellow will be responsible for all dialysis treatments of post-transplant patients up to 6 months after reinitiation of dialysis should the transplant fail. He/she will also manage dialysis for patients admitted specifically for pre-transplant workup.

D. The fellow will admit and cover transplant in-patients at PMH and ZLU in rotation with two medical residents.

E. The fellow will see patients in the PMH transplant clinics on Monday, Tuesday, and Friday, as well as cover walk in patients when on-call in rotation with the medical residents.

F. The fellow will see pre- and post-transplant patients in the St Paul transplant clinic.

General competencies
During this rotation, trainees are expected to acquire and master the following core competencies:

A. Patient Care:
By the end of this rotation, fellows are expected to develop and demonstrate the following skills:
1. Communicate effectively and demonstrate respectful behavior when interacting with patients referred for transplant evaluation.
2. Gather essential and accurate information about their patients
3. Make informed decisions about diagnostic and therapeutic interventions based on medical knowledge, patient preferences and judgment
4. Understand out management plans, such as treatment of rejection, adjustment of immunosuppressive medications and diagnostic procedures
5. Use information technology to educate patients about transplantation and donation
6. Perform transplant renal biopsies under supervision.
7. Provide health maintenance and preventive health care, specifically aimed at preventing complications of renal transplantation including toxicity of drugs, opportunistic infection, malignancy, cardiovascular disease
8. Work with members of the transplant team, including surgeons, other consultants, social workers, nurse practitioners, members of the organ procurement organization and UNOS

9. Demonstrate competency in performing transplant renal biopsies
10. Independently formulate a diagnostic and treatment plan for complications of renal transplantation

B. Medical Knowledge:
Fellows are expected to develop competency in transplant as described in detail above:
1. By demonstrating knowledge in established and evolving biomedical, clinical, epidemiological and social-behavioral sciences (as listed above)
2. By demonstrating the ability of applying this knowledge to patient care and understanding complex mechanisms of diseases
3. By being highly resourceful in developing knowledge

C. Practice based learning:
By the end of this rotation, first and second year fellows are expected to develop and demonstrate the following skills:
1. Understand the resources involved in procuring and allocating organs for transplantation: the role of UNOS, organ procurement organizations, donor networks, tissue typing laboratories
2. Understand the cost-effectiveness of renal transplantation (deceased donor vs. living donor) as well as the cost-effectiveness of various immunosuppressive regimens
3. Assist patients with chronic kidney disease in obtaining access to evaluation for transplantation
4. Work with members of the transplant team to improve and consolidate cost-effective health care delivery

D. Communication and interpersonal skills
By the end of this rotation, first and second year fellows are expected to develop and demonstrate the following skills:
1. Establish rapport with patients from different backgrounds
2. Provide appropriate counseling to patients and their families regarding their therapeutic options: risks and benefits of renal transplantation, both from deceased and living donors
3. Communicate effectively with all members of the transplant team
4. Interact with other physicians, nurses, and therapists caring for the patient
5. Interact with the staff of the transplant unit to promote cooperative care
6. Provide teaching to residents and medical students
7. Work with pertinent hospital personnel to arrange transplant biopsies
8. Communicate results of biopsies to nephrologists and transplant team

E. Professionalism:
By the end of this rotation, first and second year fellows are expected to develop and demonstrate the following skills:
1. Demonstrate a commitment to ethical principles particularly as pertains obtaining organs for transplantation and allocating them equitably
2. Demonstrate compassion and integrity by being responsive to patients' needs regardless of culture, age, gender, ability to pay

3. Interact professionally with other members of the health care team, colleagues and students

F. Systems-Based Practice:
By the end of this rotation, first and second year fellows are expected to develop and demonstrate the following skills:
1. Understand the resources involved in procuring and allocating organs for transplantation: the role of UNOS, organ procurement organizations, donor networks, tissue typing laboratories
2. Understand the cost-effectiveness of renal transplantation (deceased donor vs. living donor) as well as the cost-effectiveness of various immunosuppressive regimens
3. Assist patients with chronic kidney disease in obtaining access to evaluation for transplantation
4. Work with members of the transplant team to improve and consolidate cost-effective health care delivery

UNIVERSITY OF TEXAS SOUTHWESTERN DaVITA OUTPATIENT PERITONEAL DIALYSIS ROTATION

Service:

The peritoneal dialysis rotation is an outpatient rotation that is located in the DaVita outpatient dialysis facility. The service consists of one fellow and one attending is devoted exclusively to peritoneal dialysis. The clinical experience will entail supervised involvement in decision-making for patients undergoing PD. This rotation provides a comprehensive and longitudinal clinical experience in the care of patients on peritoneal dialysis. The fellow will obtain an understanding of the principles and practice of peritoneal dialysis including the indications, contraindications; complications, cost-effectiveness, and application of PD to patient care (see topics below).

Responsibilities:

The fellow is assigned to this rotation 2-3 times during the two years of clinical training. During the rotation the fellows will attend the PD Clinic scheduled two times per week and evaluate walk in patients on other weekdays. The fellow will attend the multidisciplinary care plan meeting and the CQI (continuous quality improvement) meetings that are held each month at the dialysis facility. The fellow is responsible for coordinating the care of PD patients admitted at PMH, ZLU and St. Paul University Hospital. During the rotation the fellow is expected to give a 30 minute talk on any topic related to PD to the members of the peritoneal dialysis staff.

Expectations:

A. During this rotation the fellow should become familiar and develop an understanding of the following topics related to PD:
1. Peritoneal physiology, including the concepts of small and middle molecule clearance and ultrafiltration
2. Evaluation and selection of patients for PD (CAPD, CCPD) and their instruction about treatment options
3. Assessing adequacy of peritoneal dialysis and implications of adequacy related to patient morbidity and mortality, transporter status, peritoneal equilibration tests, residual renal function, KDOQI standards; dialysis prescriptions and their modifications to achieve adequate dialysis
4. The short and long-term complications of peritoneal dialysis, including the pathogenesis and prevention of complications including but not limited to: peritonitis, catheter infections, leaks, hernias, sclerosing peritonitis, nutritional and metabolic issues, hemoperitoneum
5. Placement and maintenance of peritoneal catheters and available catheters for use and how to choose appropriate catheters; the appropriate radiologic procedures for evaluating PD catheters
6. Peritoneal dialysis solutions—composition, biocompatibility, side effects;

7. An understanding of the technology of peritoneal dialysis, including the use of automated cyclers (CCPD); principles of peritoneal biopsy
8. The pharmacology of commonly used medications and their kinetic and dosage alteration with peritoneal dialysis; drug dosage modification during peritoneal dialysis;
9. An understanding of the special nutritional requirements of patients undergoing peritoneal dialysis; urea kinetics and protein catabolic rates in PD patients; nutritional management of PD patients
10. The quality of life of patients on peritoneal dialysis; psychosocial and ethical issues in PD patients and their families
11. The function of the nephrologist in the collaborative practice of peritoneal dialysis including aspects of quality assurance in PD and the function of a Medical Director in PD programs

General competencies
During this rotation, trainees are expected to acquire and master the following core competencies:

A. Patient Care:
By the end of this rotation, fellows are expected to develop and demonstrate the following skills:
1. To select the proper candidate for Peritoneal Dialysis
2. To give a clear description of the available choices in renal replacement therapy to the patient including the pros and cons of each modality
3. To assist the patient in modality selection considering the individual patient's medical and social circumstances
4. To write a PD prescription
5. To supervise patients PD training and have the confidence in solving the unusual and unexpected problems by using your commonsense, experience, medical knowledge and by seeking advice if needed
6. To provide continuous care for the PD patients according to the KDOQI requirements and recommendations
7. To recognize the incident problems at an early stage and provide remedies for them before evolves into serious or unmanageable state
8. To diagnose and treat PD-associated infection versus surgical problems and managed common PD problems such as malnutrition and anemia
9. To demonstrate full understanding of the differences between various modalities of dialysis regarding their mechanisms, their advantage/disadvantages, clinical results of each modality, and their applicability under different circumstances
10. To analyze Dialysis Adequacy Tests, to understand the methods of optimization and the rationale behind these issues
11. To appreciate the importance of nutrition in dialysis patients survival, the basics of nutritional evaluation and correction of malnutrition in these patients

B. Medical Knowledge:
1. By the end of this rotation fellows are expected to demonstrate effective application of biomedical, clinical and social skills, and knowledge to the care of patients.

2. The fellow should demonstrate knowledge in established and evolving biomedical, clinical, epidemiological and social-behavioral sciences
3. The fellow should demonstrate the ability to apply this knowledge to patient care and understanding complex mechanisms of diseases
4. The fellow should being highly resourceful in developing knowledge

C. Practice-Based Learning:
By the end of this rotation, fellows are expected to develop and demonstrate the following skills:
1. Recognize ones limited experience in the field of PD, yet not be afraid of providing this kind of care and thus granting ESRD patients the right to choose the dialysis modality that may serve them best.
2. Recognize education of ESRD patients in the matter of modality choice on Renal Replacement therapy is a legal requirement
3. Understand and apply clinical practice guidelines to the care of the PD patient

D. Communication and Interpersonal Skills:
By the end of this rotation, fellows are expected to develop and demonstrate the following skills:
1. To gain the trust of the End Stage Renal Disease patients through expression of empathy and compassion towards them, recognizing that they are passing through a very critical state, forced to experience a lifestyle change and uncertainty about their well-being. They may have to face many losses, i.e. jobs, spouses, or social status. Each one of these distresses requires tremendous physical and psychological endurance that they may be incapable of evoking in their unstable condition. Therefore, they may be angry, depressed, or confused. Patience, clarity, and sympathy exercised by the staff helps them in alleviation of their suffering. These qualities also inspire a spirit of cooperation between patients and staff, which facilitates the delivery of medical services. This positive interaction also generates a positive feedback on the outcome of their medical care.
2. To develop a rapport with the patients as their care enters the chronic phase, when the patients have to place trust in your judgment regarding the serious issue of their life and death.

E. Professionalism:
By the end of this rotation, fellows are expected to develop and demonstrate the following skills:
1. Demonstrate respect for your colleagues, supervisors, patients, and staff
2. Respect other physician's opinions and not be afraid of asking for help and advice from more experienced staff members and other medical personnel involved in the case
3. Uphold ethical principles in your communications with patients
4. Understand the necessity of advanced directives and be able to handle the issues related to medical futility as well as dialysis withdrawal/withholding

F. Systems-Based Practice:

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

1. Effectively communicate with the hemodialysis unit so as to facilitate a smooth transition for those patients who require a change in treatment modality.
2. Recognize the need for surgical support for PD access management and emergency surgical events
3. Be able to advise or direct special care that the PD patients need in the Emergency Room or during a course of hospitalization
4. Manage exclusively PD-related emergencies if possible in term of space and staff
5. Facilitate referrals and accommodate the routine health maintenance with other services as Gynecology, Ophthalmology, Podiatry, gastroenterology, and Mammography

VETERANS ADMINISTRATION (VA) RENAL CONSULT ROTATION

Service:

The consult service consists of one attending, one fellow, 1-2 medical residents, and 1-2 medical students. The fellow will assign consults to the other members of the team. The consult fellow will oversee all patients on the service, including those being followed by medicine residents and medical students. The types of consults include evaluation of acute kidney injury and chronic kidney disease, glomerular diseases and all types of fluid and electrolyte disorders. The consult service follows any patients except the patients who receive chronic dialysis at the VA. If a patient requires dialysis during hospital follow up the consult fellow will continue to manage the patient while receiving renal replacement therapy thus allowing for continuity of care. Biopsies scheduled from the clinic and inpatient biopsies are performed by the consult fellow.

Responsibilities:

The clinical fellow typically is assigned to this rotation 3-4 months during the 2 years of clinical training. The consult fellow is responsible for the initial evaluation and subsequent management of all hospitalized patients referred for consultation. The fellow will perform a history, physical examination, and review the relevant laboratory studies in each case consulted upon. The fellow will present the patient to the attending physician and, under their supervision, will formulate a diagnostic and treatment plan. The consult fellow is not responsible for admitting or discharging the patients. All patients are admitted to another service (medical or surgical) and the renal fellow acts in a consultant capacity only.

Expectations:

A. During this rotation the fellow should become familiar and develop and understanding of the following disease processes. In addition the fellow will be expected to learn the appropriate treatment and approach to these disorders. These expectations will be accomplished from attending required teaching conferences, daily attending rounds, renal clinic, and evaluating patients as a consultant.

-Primary and secondary glomerular disease
-Diabetic nephropathy
-Tubulointerstitial renal disease
-Fluid and electrolyte disorders
-Acid-base disorders to include metabolic and respiratory
-Management of hypertension
-Approach to patients with acute renal failure including those in the ICU
-Management of the patient with chronic renal failure
-Urinary tract infections

-Disorders of divalent cation and mineral metabolism
-Renal disease in pregnancy (primarily through attending lectures)
-Tools used to assess renal function
-Pharmacology of drugs in renal disease

B. The fellow will become familiar with the indications for percutaneous renal biopsy. The fellow will become skilled in this procedure and be familiar with the risks and complications of the procedure

C. The fellow will also be involved in dialysis therapy. The fellow will be expected to assess patients and determine when dialytic therapy needs to be initiated and which modality is appropriate. The fellow will be expected to become familiar with all aspects of continuous forms of renal replacement therapy as implemented in an ICU situation.

D. The fellow will coordinate the distribution of all new consults to the rotating residents and students but will also be familiar with all patients on the service

E. The fellow will be expected to provide guidance and teaching to the students and residents who rotate on the consult rotation.

VA Clinics
While rotating on the VA consult service the fellow will attend the PMH continuity clinic. In addition the fellow will attend the following VA clinics.

A. Renal stone and glomerulonephritis clinic (Tuesday afternoon)

The clinic will allow the fellow to become familiar with evaluation of metabolic stone disease, learn how to prevent it, and learn radiology of stone disease. The Fellow will see patients with kidney stones and present them to the attending physician. Key literature will be reviewed as well as current guidelines for stone disease management. The case mix of renal stone disease is extensive and includes calcium oxalate and calcium phosphate stones, uric acid stones, struvite stones, renal tubular acidosis, medullary sponge kidney, primary hyperparathyroidism, enteric hyperoxaluria, urinary tract infections.

This clinic will also consist of patients with various forms of primary and secondary glomerulonephritis. Examples of the case mix include Lupus nephritis, ANCA-associated glomerulonephritis, post-streptococcal glomerulonephritis, and infectious related glomerulonephritis.

B. General renal clinic (Wednesday morning)

This clinic provides fellows with an opportunity to serve as outpatient nephrology consultants on a diverse patient population in an urban VA hospital. The clinic provides extensive exposure to a wide variety of renal diseases and hypertension as well as related diseases. The clinic provides fellows with a continuity experience while rotating at the VA. Fellows present all patients to an attending and receive direct feedback.

There is a complete range of kidney diseases represented in this clinic with the most common disorders being diabetic nephropathy, chronic kidney disease stages 3-5,

hypertension associated with CKD, and chronic tubulointerstitial diseases. Renal transplant patients are also followed in this clinic. Much time is spent helping patients choose a dialysis modality and preparing patients for dialysis. This consists of interdisciplinary discussions with social workers and nutritionists.

VA Conferences

While rotating at the VA the fellow will attend the following conferences:
A. Renal Journal Club (Tuesday at noon, once or twice a month)
B. Monday and Thursday clinical conferences which occur at UTSWMC are transmitted via the internet for the fellows rotating at the VA. This transmission allows for full interaction such as questions and answers to take place.
C. Friday afternoon case conferences (and every 4th Friday NephSAP Board Review conferences) which occur at UTSWMC are transmitted via the internet for the fellows rotating at the VA.

General Competencies:

During this rotation, trainees are expected to acquire and master the following core competencies:

A. Patient Care:
Fellows should be able to:
1. Approach new patients and their families with respect and clearly communicate the reasons for the visit and any recommendations resulting from the consultation.
2. Demonstrate compassion and deliver appropriate and effective care with the goal of promoting health and general well being for the patients.
3. Perform a history and physical examination and review of clinical data relevant to consultation in nephrology
4. Learn the indications for and interpretation of diagnostic tests used in nephrology including: ultrasound, urinalysis, serum chemistries, blood gas analysis and renal biopsy
5. 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
6. 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
7. Implement treatment plans, such as initiating acute or chronic dialysis
8. 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
9. 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

B. Medical Knowledge:

The fellow will be expected to acquire an extensive knowledge base of general nephrology described in detail above:
1. By demonstrating knowledge in established and evolving biomedical, clinical, epidemiological and social-behavioral sciences (as listed above).
2. By demonstrating the ability of applying this knowledge to patient care and understanding complex mechanisms of diseases
3. By being highly resourceful in developing knowledge

C. Practice-Based Learning:
During this rotation, fellows are expected to:
1. Analyze clinical experience and identify and review errors in management
2. Participate in case management conferences and apply knowledge from these conferences to patient care
3. Use information technology to obtain and manage medical information relating to the problems seen on the consultation service
4. Apply information from large studies to improve care of patients, recognizing limitations of study design statistical methods
5. Use knowledge obtained from the literature and experience to teach colleagues, house staff and students

Examples of practice-based evaluations that can be performed during this rotation include, but are not limited to:

a. The use of erythropoietin in hospitalized dialysis patients
b. The appropriateness of performing dialysis during late hours
c. The proper antibiotic dose adjustments in ESRD patients
d. The proper communication with outpatient dialysis facilities upon patients discharge

D. Communication and Interpersonal Skills:
During this rotation, fellows are expected to develop and demonstrate the following skills:
1. Establish rapport with patients from different backgrounds
2. Provide appropriate counseling to patients and their families regarding their therapeutic options
3. Communicate effectively with supervising attending physicians; gain responsibility as experience grows
4. Interact with physicians on other services while providing consultation, teaching and care and communicate recommendations clearly and effectively
5. Interact with the staff of the dialysis unit, including nurses, technicians and other support staff to coordinate dialysis and to handle emergencies
6. Provide teaching to fellows and medical students

E. Professionalism:
Fellows are expected to:
1. Demonstrate a commitment to carrying out professional responsibilities
2. Adhere to ethical principles

3. Exhibit sensitivity to diverse patient population
4. Demonstrate respect, compassion, integrity and honesty
5. Consistently exhibit role model and responsible behavior
6. Willingly acknowledge errors
7. Consistently consider the needs of their patients, families and colleagues
8. Provide support and advice to more junior fellows and house staff

F. Systems-Based Practice:
During this rotation, fellows are expected to:
1. Understand the resources and limitations of the dialysis unit
2. Understand the cost-effectiveness of different modalities of dialysis for acute kidney injury (CRRT vs. IHD vs. PD)
3. Understand the role of the Federal VA system in the provision of dialysis services
4. Understand the resources available for the treatment of VA patients
5. Understand the issues involved in the placement of patients in facilities for chronic dialysis and assist in appropriate placement decisions
6. Assist in developing systems improvement

VETERANS ADMINISTRATION (VA) CHRONIC OUTPATIENT DIALYSIS ROTATION

Service

The VA Dialysis rotation is designed to give the fellow an outpatient dialysis experience. The focus of the rotation includes dialysis adequacy, anemia, calcium phosphorus management, nutrition, and blood pressure/dry weights. The K/DOQI guidelines are used as a template for the care of patients. The VA outpatient unit is composed of 4 shifts with approximately 100 out patient hemodialysis patients. There are also 10-20 peritoneal dialysis patients in the Dallas VA system. All aspects of renal replacement therapy are provided including in-center hemodialysis, home hemodialysis, and peritoneal dialysis. In addition, the fellow has an opportunity to insert peritoneal dialysis catheters and a significant fraction of tunneled catheters under the direct supervision of a staff Nephrologist. The dialysis facility is a hospital based unit directly adjacent to the offices of the members of the Nephrology section. Fellows and attending physicians work together in a geographically confined environment.

Responsibilities

The fellow will manage the care of a single shift of dialysis patients (20-25 patients) while on this rotation. He/she will be responsible for all aspects of patient care under the supervision of a single attending physician. The clinical fellow typically is assigned to this rotation 3-4 months during the 2 years of clinical training. The fellow will see the dialysis patient during each hemodialysis session (except on weekends, unless the fellow is on call) and round with the attending physician weekly. The fellow will learn to place tunneled catheters and peritoneal dialysis catheters and become familiar with the technique of renal sonography. The fellow manages access problems and coordinates procedures with interventional radiology. The fellow writes medicine prescriptions as needed and writes new dialysis orders on each patient once per rotation. The fellow is expected to attend monthly care plan meetings and monthly continuous quality improvement (CQI) meetings which regularly take place in the unit.

Expectations

During this rotation the fellow is expected to acquire sufficient clinical expertise in the evaluation and management of the following disorders:

- chronic kidney disease and its management by conservative methods, including nutritional management of uremia
- evaluation of ESRD patients for various forms of therapy and their instruction regarding treatment options
- evaluation and management of medical complications in patients during and between dialysis, including an understanding of the pathogenesis and prevention and treatment of dialysis access complications

- long-term follow-up of patients undergoing chronic dialysis, including the evaluation of dialysis prescription and assessment of adequacy of dialysis
- hypertension in ESRD patients
- disorders of mineral metabolism
- disorders of vitamin D, parathyroid hormone and renal osteodystrophy
- drug dosage modification during dialysis
- understanding of the principles and practice of PD, including the establishment of peritoneal access and how to choose appropriate catheters
- understanding of the technology of PD, including the use of various cyclers
- assessment of PD efficiency using the peritoneum equilibrium test
- understanding of how to write PD prescription and how to assess PD adequacy
- pharmacology of commonly used drugs, and the kinetics and dosage alteration with PD
- understanding of the complications of PD, including peritonitis and its treatment, exit site and tunnel infections and their managements, hernias, pleural effusions, and other less common complications and their management.
- understanding of the special nutritional requirements of the HD and PD patients.
- psychosocial and ethical issues of dialysis.
- end-of-life care and pain management in the care of patients undergoing chronic dialysis.
- Occupational Safety and Health Administration regulations and universal precautions of health-care workers
- Medical informatics and decision-making skills, including critical appraisal of the literature, clinical epidemiology and biostatistics.
- Quality assessment and improvement, risk management and cost-effective medicine, including the economic impact of medical decisions on patients and society and the need to be the primary advocate for patients' needs.
- Clinical ethics, patient counseling, effective communication techniques for diverse population and end-of-life care.

In addition, trainees gain the necessary knowledge and become familiar with the following procedures, including their indications, contraindications, complications and interpretation of results, as well as their cost-effectiveness and application to patient care:

- placement of internal jugular and femoral Quinton catheter placement
- placement of tunneled catheters
-placement of peritoneal catheters

Research

The design of this rotation so that the fellow only manages one shift of patients was purposely done to allow the fellow time enough to engage in a research project (this topic is described in more detail under section: Research Curriculum for Clinical Track Nephrology Fellows). In brief, the fellow will be exposed to and participate in research that is currently ongoing with respect to veterans with CKD and ESRD at the Dallas VA, or choose to pursue a retrospective analysis of already collected data or case-series and review of the literature under guidance of a mentor. Active protocols include such areas as gadolinium exposure, tunneled catheter complication rate, hepatitis B vaccination,

cardiovascular disease in CKD, morbidity of hepatitis C and iron administration, anemia management, renal osteodystropy, and ongoing randomized controlled trials in CKD and ESRD. A database exists within the section that includes all chronic dialysis patients since 2001 and all tunneled catheter placements since 1999.

VA Clinics

While rotating at the VA the fellow will also attend the Monday PMH continuity clinic. In addition the fellow attends the following VA clinics

A. Renal stone and glomerulonephritis clinic (Tuesday afternoon)

The clinic will allow the fellow to become familiar with evaluation of metabolic stone disease, learn how to prevent it, and learn radiology of stone disease. The Fellow will see patients with kidney stones and present them to the attending physician. Key literature will be reviewed as well as current guidelines for stone disease management. The case mix of diseases is extensive and includes calcium oxalate and calcium phosphate stones, uric acid stones, struvite stones, renal tubular acidosis, medullary sponge kidney, primary hyperparathyroidism, enteric hyperoxaluria, and urinary tract infections.

This clinic will also provide exposure to patients with various forms of primary and secondary glomerulonephritis. Examples of the case mix include Lupus nephritis, ANCA-associated glomerulonephritis, focal segmental glomerulosclerosis, HCV-related membranoproliferative glomerulonephritis, and infectious related glomerulonephritis.

B. General renal clinic (Wednesday mornings for Consult Fellow and Wednesday mornings and afternoons for Dialysis Fellow)

This clinic provides fellows with an opportunity to serve as outpatient nephrology consultants on a diverse patient population in an urban VA hospital. The clinic provides extensive exposure to a wide variety of renal diseases and hypertension as well as related diseases. The clinic provides fellows with a continuity experience while rotating at the VA. Fellows present all patients to an attending and receive direct feedback.

There is a complete range of kidney diseases represented in this clinic with the most common disorders being diabetic nephropathy, chronic kidney disease stages 3-5, hypertension associated with CKD, and chronic tubulointerstitial diseases. Renal transplant patients are also seen in this clinic, as well as workup of secondary causes of hypertension and fluid and electrolytes abnormalities. Much time is spent helping patients choose a dialysis modality and preparing patients for dialysis. This consists of interdisciplinary discussions with social workers and nutritionists.

VA Conferences

While rotating at the VA the fellow will attend the following conferences:
Monday and Thursday: Renal Grand Rounds (UTSW lectures via video)
Tuesday: Once a month, VA Journal Club
Friday: Case Conference or Board Review (UTSW lectures via video)

General competencies
During this rotation, trainees are expected to acquire and master the following core competencies:

Patient Care:
By the end of this rotation, the fellow is expected to develop and demonstrate the following skills:
A. Take a relevant history regarding patient responses to hemodialysis
B. Be able to evaluate dialysis and ultrafiltration adequacy
C. Be able to manage dialysis-related hypotension
D. Be able to respond to fever and treat catheter-related infections
E. Be able to initiate hemodialysis in a new patient
E. Serve as the primary care provider for a cohort of patients receiving chronic outpatient hemodialysis
F. Be able to assess and treat secondary hyperparathyroidism and understand the K/DOQI guidelines
G. Be able to assess the function of the hemodialysis access using physical examination and radiologic studies
H. Be able to manage chronic hypertension in the hemodialysis patient
I. Be familiar with the K/DOQI guidelines and protocols for management of anemia

Medical Knowledge:
The fellow is expected to acquire and master the core competency of medical knowledge:
A. By demonstrating knowledge in established and evolving biomedical, clinical, epidemiological and social-behavioral sciences (as listed above)
B. By demonstrating the ability of applying this knowledge to patient care and understanding complex mechanisms of diseases
C. By being highly resourceful in developing knowledge

Practice-Based Learning:
By the end of this rotation, the fellow is expected to develop and demonstrate the following skills:
A. Identify and review one's own errors in management
B. Teach about errors in management (both one's own, and those of others) with tact
C. Disclose errors to patients when appropriate
D. Apply scientific evidence from the literature to one's own patients and distinguish evidence-based medicine from opinion

Examples of practice-based evaluations that can be performed during this rotation include, but are not limited to the proper adjustment of erythropoietin dosing in dialysis patients, proper adjustment of vitamin D dosing in dialysis patients, participation at the CQI meetings

Communications and Interpersonal Skills:
By the end of this rotation, the fellow is expected to develop and demonstrate the following skills:

A. Be able to tell patients and family members about the initiation of the dialysis procedure
B. Obtain informed consent from patients for the hemodialysis procedure
C. Be able to interact with vascular radiology and vascular surgery in the management of the dialysis access
D. Explain to dialysis patients the important aspects of nutritional management
E. Discuss implications of interdialytic weight gain with patients
F. Work as part of the interdisciplinary team of nurses, nurse practitioner, surgeons, psychologists in caring for dialysis patients
G. Discuss end-of-life issues and advanced directives with patients and family members
H. Serve as a resource for first year fellows, providing them with appropriate advice regarding the management of hemodialysis patients

Professionalism:
By the end of this rotation, all fellows are expected to develop and demonstrate the following skills:
A. Demonstrate respect for other services, patients, and staff
B. Maintain a focus on excellent patient care, and the patient's needs
C. Model professional behavior for the service
D. Uphold basic ethical principles, especially as related to advanced directives, medical futility, the withdrawal/withholding of life-sustaining treatments

Systems-Based Practice:
By the end of this rotation, the fellow is expected to develop and demonstrate the following skills:
A. Understand how nephrologists interact with general internal medicine, cardiology, radiology, infectious disease, and anesthesiology services
B. Be able to coordinate care of individual patients with other members of the health care team
C. Be able to call on system resources such as ethics consults and risk management when appropriate
D. Acquire the ability to report dialysis data (medical evidence forms, death forms) to VA Central Office, ESRD networks and CMS when required
E. Participate in the development of performance improvement project.

ST. PAUL UNIVERSITY HOSPITAL TRANSPLANT ROTATION

Service

The Renal Transplant Service at St. Paul University Hospital is a joint effort of the divisions of Nephrology and Transplantation Surgery. The transplant team rounds one to two times per day. These rounds include participation of a nephrology attending and a transplant surgery attending. One renal fellow and one or more surgical residents make up the transplant inpatient team. Nursing staff, pharmacists, dieticians and social workers participate in rounds on a daily basis. During this rotation, the trainee is exposed to kidney, kidney-pancreas, and liver kidney transplants. Fellows will participate in all of the clinical and academic activities of the renal transplant service. The fellow becomes familiar with pre-transplant workup of patients. The fellow will learn the principals of selection of candidates for transplantation, donor evaluation, management of patients on the list, management of patients in the perioperative period and long-term follow-up of kidney, kidney/pancreas, and liver/kidney transplant recipients in the outpatient clinic.

Responsibilities

The clinical fellow typically is assigned to this rotation 3-4 months during the 2 years of clinical training. Under direct faculty supervision, the trainee evaluates approximately 4-5 new transplant patients each month and 25-30 hospitalized patients with prior placement of an allograft each month while on service. As currently structured the service is not a primary care service but a consult service. Patients are either admitted to a surgical service or a hospitalist service. The fellow will write an initial consult note and daily follow up notes. The fellow will also write orders on patients in conjunction with other members of the team. The fellow will continue to consult on these patients in the situation where the patient requires an ICU setting. In this circumstance the fellow will follow these patients regularly and will directly communicate to the ICU house staff instructions regarding immunosuppression and management of transplant related issues.

Outpatient Renal Transplant Clinic

The fellow will see patients at the St. Paul University Transplant Outpatient Center on a daily basis. The patients who attend this clinic are scheduled but walk in patients are evaluated as well. The goal of the transplant clinic is to apply principles of clinical transplantation toward actual care of patients in the outpatient setting. Each patient is presented to the renal transplant attending who also sees every patient in clinic. A diagnostic and therapeutic plan is formulated after careful discussion. In patients recently discharged from the hospital after having just received a transplant the objective of the clinic is to provide an educational experience in early post-transplant care. Expertise is gained in adjusting immunosuppression, evaluation of proteinuria, evaluation of renal dysfunction, management of hyperlipidemia, hypertension, follow-up for evaluating renal function, infectious complications, management of blood pressure, and other conditions specific for this time period following placement of an allograft.

Patients who are farther removed from placement of the allograft are also evaluated. The clinic will provide the fellow an educational experience in late transplant

care that includes infectious complications, metabolic abnormalities, chronic allograft dysfunction, bone disease, malignancies and other conditions specific for this time period post transplantation.

Patients being evaluated for consideration for placement on the transplant list are also seen in the outpatient setting. The objective of these encounters is to educate the fellow on subjects that include (but not limited to): identification of cardiovascular risk factors for surgery, pre-transplant patient teaching, contraindications to transplantation, HLA crossmatching, preparing recipients for transplants in situations where the living donor is ABO incompatible or where the recipient has anti-HLA antibodies to the donor (high risk pretransplant evaluation and management).

Patients already on the transplant list are periodically evaluated in the outpatient setting. The objective of these encounters is to provide the fellow with specific educational experience for patients waiting for transplantation but receiving dialysis. Special complications are seen in this group of patients that relate to dialysis, vascular or peritoneal access, infections or cardiac problems that may have influence on transplantation and/or outcomes.

Expectations

A. During this rotation the fellow will gain expertise in the areas listed below. This expertise will be acquired from attending required teaching conferences, daily attending rounds, and transplant clinics.
-Supervised involvement in the decision-making for patients during pre-and post-transplant care
-Evaluation and selection of transplant candidates
-Pre-operative evaluation and preparation of transplant recipients
-Immediate post-operative management of transplant recipients, including administration of immunosuppressant medications
-Clinical diagnosis of all forms of rejection, including laboratory, histopathologic, and imaging techniques
-Medical management of rejection, including use of immunosuppressant drugs and other agents
-Recognition and medical management of the surgical and nonsurgical complications of transplantations.
-Management of post-transplant complications – including rejection, chronic allograft dysfunction, post-transplant malignancies, infections, cardiovascular diseases, hypertension, and fluid/ electrolyte problems
-Technical expertise: percutaneous biopsy of allograft kidneys
-Principles of tissue typing

B. The fellow will become familiar with the indications for percutaneous renal allograft biopsy. The fellow will also become familiar with the risks and complications of the procedure. Allograft biopsies at the St. Paul University Hospital are performed by interventional radiology.

C. The fellow will be responsible for all dialysis treatments of post-transplant patients up to 6 months after reinitiation of dialysis should the transplant fail. He/she will also manage dialysis for patients admitted specifically for pre-transplant workup.

D. The fellow will see patients in the University transplant clinic daily. These clinics consist of scheduled patients as well as walk in transplant patients.

General competencies

During this rotation, trainees are expected to acquire and master the following core competencies:
A. Patient Care:
By the end of this rotation, fellows are expected to develop and demonstrate the following skills:
1. Communicate effectively and demonstrate respectful behavior when interacting with patients referred for transplant evaluation.
2. Gather essential and accurate information about their patients
3. Make informed decisions about diagnostic and therapeutic interventions based on medical knowledge, patient preferences and judgment
4. Understand out management plans, such as treatment of rejection, adjustment of immunosuppressive medications and diagnostic procedures
5. Use information technology to educate patients about transplantation and donation
6. Perform transplant renal biopsies under supervision.
7. Provide health maintenance and preventive health care, specifically aimed at preventing complications of renal transplantation including toxicity of drugs, opportunistic infection, malignancy, cardiovascular disease
8. Work with members of the transplant team, including surgeons, other consultants, social workers, nurse practitioners, members of the organ procurement organization and UNOS
9. Demonstrate competency in performing transplant renal biopsies
10. Independently formulate a diagnostic and treatment plan for complications of renal transplantation

B. Medical Knowledge:
Fellows are expected to develop competency in transplant as described in detail above:
1. By demonstrating knowledge in established and evolving biomedical, clinical, epidemiological and social-behavioral sciences (as listed above)
2. By demonstrating the ability of applying this knowledge to patient care and understanding complex mechanisms of diseases
3. By being highly resourceful in developing knowledge

C. Practice based learning:
By the end of this rotation, first and second year fellows are expected to develop and demonstrate the following skills:

1. Understand the resources involved in procuring and allocating organs for transplantation: the role of UNOS, organ procurement organizations, donor networks, tissue typing laboratories
2. Understand the cost-effectiveness of renal transplantation (deceased donor vs. living donor) as well as the cost-effectiveness of various immunosuppressive regimens
3. Assist patients with chronic kidney disease in obtaining access to evaluation for transplantation
4. Work with members of the transplant team to improve and consolidate cost-effective health care delivery

D. Communication and interpersonal skills
By the end of this rotation, first year fellows are expected to develop and demonstrate the following skills:
1. Establish rapport with patients from different backgrounds
2. Provide appropriate counseling to patients and their families regarding their therapeutic options: risks and benefits of renal transplantation, both from deceased and living donors
3. Communicate effectively with all members of the transplant team
4. Interact with other physicians, nurses, and therapists caring for the patient
5. Interact with the staff of the transplant unit to promote cooperative care
6. Provide teaching to residents and medical students
7. Work with pertinent hospital personnel to arrange transplant biopsies
8. Communicate results of biopsies to nephrologists and transplant team

E. Professionalism:
By the end of this rotation, first and second year fellows are expected to develop and demonstrate the following skills:
1. Demonstrate a commitment to ethical principles particularly as pertains obtaining organs for transplantation and allocating them equitably
2. Demonstrate compassion and integrity by being responsive to patients' needs regardless of culture, age, gender, ability to pay
3. Interact professionally with other members of the health care team, colleagues and students

F. Systems-Based Practice:
By the end of this rotation, first and second year fellows are expected to develop and demonstrate the following skills:
1. Understand the resources involved in procuring and allocating organs for transplantation: the role of UNOS, organ procurement organizations, donor networks, tissue typing laboratories
2. Understand the cost-effectiveness of renal transplantation (deceased donor vs. living donor) as well as the cost-effectiveness of various immunosuppressive regimens
3. Assist patients with chronic kidney disease in obtaining access to evaluation for transplantation
4. Work with members of the transplant team to improve and consolidate cost-effective health care delivery

ST. PAUL UNIVERSITY HOSPITAL RENAL CONSULT and ACUTE DIALYSIS ROTATION

Service:

The St. Paul rotation consists of general nephrology consults and inpatient dialysis. The service consists of one attending and one fellow. The trainee is exposed to all renal consults that are encountered in the hospital. These consults include evaluation of chronic kidney disease and acute kidney injury and all types of fluid and electrolyte disorders. The fellow manages dialysis treatments for all patients to include those with acute kidney injury and those who require maintenance dialysis. Both hemodialysis and peritoneal dialysis are included in this group. The fellow also manages the continuous forms of dialysis required of patients in the ICU setting. Renal and allograft biopsies at St. Paul are performed by interventional radiology. The clinical experience on this rotation and the expertise gained during this rotation are similar to what has been described on the Parkland Memorial Hospital consult and acute dialysis rotations.

Responsibilities:

The clinical fellow typically is assigned to this rotation 3-4 months during the 2 years of clinical training. The Nephrology consult fellow is responsible for the initial evaluation and subsequent management of all hospitalized patients referred for consultation. The fellow will perform a history, physical examination, and review the relevant laboratory studies in each case consulted upon. The fellow will present the patient to an attending physician and, under their supervision, will formulate a diagnostic and treatment plan. This plan will also involve the implementation and management of renal replacement therapy (hemodialysis and peritoneal dialysis) when indicated. The fellow is not responsible for admitting or discharging the patient. These patients are admitted to other services (medical or surgical) and the renal fellow acts in a consultant capacity only.

Expectations:

A. During this rotation the fellow should become familiar and develop and understanding of the following disease processes. In addition the fellow will be expected to learn the appropriate treatment and approach to these disorders. These issues will be accomplished from attending required teaching conferences, daily attending rounds, renal clinic, and evaluating patients as a consultant.

-Primary and secondary glomerular disease
-Diabetic nephropathy
-Tubulointerstitial renal disease
-Fluid and electrolyte disorders
-Acid-base disorders to include metabolic and respiratory
-Management of hypertension
-Approach to patients with acute kidney injury including those in the ICU
-Management of the patient with chronic kidney disease

-Urinary tract infections
-Disorders of divalent cation and mineral metabolism
-Renal disease in pregnancy
-Tools used to assess renal function

During this rotation the fellow should also become familiar and develop and understanding of the following disease processes as it relates to the delivery of renal replacement therapy:

-Acute kidney injury
-Hypertensive disorders
-Indications for initiation of renal replacement therapy, both elective and emergent
-Evaluation and selection of patients for acute dialysis or continuous renal replacement therapies (CVVHDF)
-End-state renal disease
-Evaluation of end-stage renal disease patients for various therapies and their instruction regarding treatment options
-Understanding of the indications, contraindications, and complications of placement of peritoneal catheters
-Evaluation and management of medical complications in patients during and between dialysis and other extracorporeal therapies, including dialysis access, and an understanding of their pathogenesis and prevention
-An understanding of the special nutritional requirements of the hemodialysis and peritoneal dialysis patient
-Disorders of drug metabolism
-Drug dosage modification during dialysis and other extracorporeal therapies
-The pharmacology of commonly used medications and their kinetic and dosage alteration with peritoneal dialysis
-Understanding of how to manage complications of chronic and temporary vascular access
-Technical expertise: peritoneal dialysis
-Technical expertise: placement of temporary vascular access for hemodialysis and related procedures
-Technical expertise: acute hemodialysis
-Technical expertise: continuous veno-venous hemodialfiltration

B. Additional expectations are those previously described for the PMH consult and acute dialysis rotations.

General Competencies:

During this rotation, trainees are expected to acquire and master the core competencies that have been delineated in the PMH consult and acute dialysis rotations discussed elsewhere, but can be summarized as follows:

A. Patient Care:

1. By demonstrating a compassionate, appropriate and effective care
2. By promoting health and general well being of the patients
3. By demonstrating satisfactory clinical competence in performing medical interviews, physical examinations, review of relevant data and procedural skills
4. By making diagnostic and therapeutic decisions based on available evidence, sound judgment and patient preferences

B. Medical Knowledge:
1. By demonstrating knowledge in established and evolving biomedical, clinical, epidemiological and social-behavioral sciences (as listed above)
2. By demonstrating the ability of applying this knowledge to patient care and understanding complex mechanisms of diseases
3. By being highly resourceful in developing knowledge

C. Practice-Based Learning:
1. By demonstrating improvement in patient care based on: evaluation of one's own practice, incorporation of feedback information into improvement activities, and appraisal and assimilation of scientific evidence
2. By demonstrating effective utilization of technology to manage information for patient care and self-improvement

Examples of practice-based evaluations that can be performed during this rotation include, but are not limited to:

a. The use of erythropoietin stimulating agents in hospitalized dialysis patients
b. The appropriateness of performing dialysis during late hours
c. The proper antibiotic dose adjustments in acute kidney injury and chronic kidney disease patients
d. The proper communication with outpatient dialysis facilities upon patients discharge

D. Communication and Interpersonal Skills:
1. By demonstrating effective and humanistic information exchange with patients and their families and other health professionals
2. By demonstrating excellent listening, narrative and nonverbal skills
3. By demonstrating ability to educate and counsel patients, families and colleagues

E. Professionalism:
1. By demonstrating a commitment to carrying out professional responsibilities
2. By adhering to ethical principles
3. By exhibiting sensitivity to diverse patient population
4. By demonstrating respect, compassion, integrity and honesty
5. By consistently exhibiting role model and responsible behavior
6. By willingly acknowledging errors
7. By consistently considering the needs of their patients, families and colleagues

F. Systems-Based Practice:

1. By demonstrating awareness of the larger context of health care systems.
2. By demonstrating responsiveness to health care systems
3. By effectively utilizing system resources to provide care of optimal value
4. By effectively using systematic approaches to reduce errors and improve patient care
5. By enthusiastically assisting in developing systems' improvement

UNIVERSITY OF TEXAS SOUTHWESTERN MEDICAL CENTER CONTINUITY CLINIC LOCATED AT PARKLAND MEMORIAL HOSPITAL (PMH)

Fellows will spend one-half day per week in their continuity clinic for two consecutive years. In this setting, fellows will evaluate new out-patient consultations, formulate diagnostic and treatment plans and coordinate care with the referring physician. In this setting fellows will also have longitudinal care of patients with nephrological problems. Fellows are directly supervised by a faculty member and each patient encounter is used as a teaching opportunity. In general, fellows will see 4-5 new patients and 4-5 established patients per session. Fellows and the attending work closely to provide a strong teaching experience that emphasizes the core of out-patient Nephrology practice. KDOQI guidelines are emphasized in the outpatient management of patients

Goals and Objectives:

The out-patient setting will be a site where fellows are expected to learn the following core subjects: the pathogenesis, complications, and management of:

- chronic kidney disease and its management, including dietary interventions
- diagnosis and management of hypertensive disorders
- the workup of the abnormal urinalysis and the microscopic examination of the urine
- the workup and management of renal dysfunction
- renal involvement in systemic diseases (i.e., SLE and vasculitis)
- glomerulonephritis
- the nephrotic syndrome
- diabetic nephropathy
- tubular interstitial renal diseases
- inherited cystic and congenital renal diseases
- drug metabolism in renal diseases
- evaluation of ESRD patients for various forms of therapy and their instruction regarding treatment options.
- understanding the immunological aspects of some renal diseases
- geriatric aspects of nephrology, including disorders of the aging kidney and urinary tract
- tubular interstitial renal diseases, including inherited transport diseases, cystic diseases and congenital disorders
- other genetic and inherited renal disorders
- psychosocial and ethical issues of CKD and ESRD patients.
- end-of-life care and pain management in the care of patients CKD and ESRD patients

General competencies

In the continuity clinic the fellow is expected to acquire and master the following core competencies:

Patient Care:
The fellow is expected to develop and demonstrate the following skills:

A. Be aware of advantages and disadvantages of peritoneal and hemodialysis.
B. Educate patients regarding all aspects of CKD especially diet, medications, anemia and blood pressure control
C. Evaluate CKD in consultation and offer differential diagnoses of decreased GFR, proteinuria, and hypertension
D. Prepare patients to choose a dialysis modality
E. Complete transplant evaluations and counsel patients regarding risks and benefits of transplantation

Medical Knowledge:
The fellow is expected to develop and demonstrate the following skills:
A. Offer differential diagnosis of CKD
B. Understand indications for renal biopsy
C. Initiate appropriate renoprotective strategies
D. Be familiar with the full set of K/DOQI guidelines for outpatient management of chronic kidney disease
E. Be prepared to assume care for patients with all types of renal disease in the outpatient setting

Practice-Based Learning:
The fellow is expected to develop and demonstrate the following skills:
A. Be able to track kidney function of CKD patients to evaluate success of renoprotective strategies
B. Use information technology to manage data for long term patient care
C. Understand and apply practice guidelines for the care of CKD patients

Communication and Interpersonal Skills:
The fellow is expected to develop and demonstrate the following skills:
A. Establish highly effective humanistic and therapeutic relationships with patients and families
B. Discuss implications of long-term dialysis care and different modalities with patients and family
C. Work with interdisciplinary team to initiate social work and dietician consultations for CKD patients
D. Work with the transplant center in the management of patients awaiting renal transplantation
E. Be comfortable discussing end-of-life decisions, palliative care options, and disposition issues with patients and family members and social workers

Professionalism:
The fellow is expected to develop and demonstrate the following skills:
A. Demonstrate relationships with CKD patients and be familiar with their problems
B. Be able to act as a role model and teach medical students and residents regarding respect, compassion, integrity, and honesty
C. Demonstrate responsible behavior and total commitment to self-assessment
D. Be willing to acknowledge errors

Systems-Based Practice:
The fellow is expected to develop and demonstrate the following skills:
A. Be familiar with coordinating long-term care of patients with CKD and understand resources available to dialysis patients
B. Understand CMS and insurance issues of dialysis
C. Be able to refer patients to a transplant center and undertake the pre-transplant evaluation
D. Be able to coordinate vascular access surgery, assess access and help decide when to initiate dialysis therapy.
E. Assist a patient in the transition to dialysis and direct an interdisciplinary team to coordinate nutritional services, financial assistance, home care and other benefits.

OTHER CLINICS

The following clinics have been described in detail in the descriptions of the rotations and will only be listed here. These clinics are not continuity clinics in the sense that the fellows only attend the clinic while on specific rotations.

A. PMH Outpatient Renal Transplant Clinic
This PMH transplant fellow attends this clinic on Monday, Tuesday, and Friday while on the PMH transplant rotation. The PMH consult fellow attends this clinic on Tuesdays one time during the week.

B. VA Renal Stone and Glomerulonephritis clinic (Tuesday afternoon)
The VA consult and dialysis fellow attend this clinic while on rotations at the VA

C. VA General Nephrology Renal Clinic (Wednesday morning)
The VA consult fellow attends this clinic on Wednesday morning while the VA dialysis fellow attend this clinic Wednesday morning and afternoon while on rotations at the VA

D. St. Paul University Hospital Transplant Clinic
The St. Paul Fellow attends this clinic on a daily basis. In addition to transplant patients the fellow evaluates dialysis patients referred for transplantation and evaluates dialysis patients who already are on the waiting list.

TEACHING CONFERENCES

In addition to clinics and fellow rotations, the division offers an intensive didactic lecture series for the trainees. These lectures are discussed in more detail below. The weekly conference schedule includes a core lecture series (Monday and Thursday 1200-1300) and a clinical conference (Friday 1600-1700). A formal research conference is conducted on average two times per month. The Friday afternoon clinical conference is divided into a journal club, presentations of selected cases, and review of pathology specimens with the renal pathologist. An additional Journal club is scheduled during the last Thursday of each month during the core lecture time slot. The fellows must sign a sheet at the time of the conference. Attendance is monitored by the program director.

I. Summer Basics of Nephrology Lecture Series

During July and August, each Monday and Thursday lecture (1200-1300) is of an introductory nature and designed to provide fellows with a basic grounding in the science, clinical presentation, and treatment of a wide range of nephrologic diseases. In addition the basics of renal replacement therapy are covered. These are topics that the fellow needs to be formally introduced to early in their training.

During the remainder of the academic year, lectures, discussions and case reviews (as described in detail below) will be conducted to provide the fellows with instruction in basic sciences relevant to nephrology including: physiology, anatomy, biochemistry; to review concepts central to the understanding of nephrology including: epidemiology, immunology, pathophysiology, pharmacology; to provide a forum for case discussions, review of management decisions and preparation for board examinations.

II. Renal Core Lecture Series (Monday 1200-1300 and Thursday 1200-1300)
In the clinical lecture series, the trainee will be given lectures covering all areas of clinical nephrology and renal basic sciences. The lectures are organized to first introduce the normal physiology and basic science of the kidney followed by a detailed discussion of the clinical disorders. Topics covered include:

A. Nephrolithiasis
B. Alterations in mineral metabolism in renal disease and renal osteodystrophy
C. Disorders of fluid, electrolyte, and acid-base regulation
D. Acute kidney injury and chronic kidney disease
E. End-state renal disease
F. Renal disorders of pregnancy
G. Tubulointerstitial renal diseases, including inherited disease of transport, cystic diseases, and other congenital disorders
H. Glomerular and vascular diseases, including the glomerulonephritis, diabetic nephropathy, and atheroembolic renal disease
I. Effects of drugs on renal structure and function
J. The pharmacology of commonly used medications and their kinetic and dosage alteration with renal failure, hemodialysis, and peritoneal dialysis

K. An understanding of the special nutritional requirements of the hemodialysis and peritoneal dialysis patient
L. Renal pathology
M. Pathogenesis, natural history, and management of congenital and acquired diseases of the kidney and urinary tract and renal diseases, associated with systemic disorders such as diabetes, collagen-vascular diseases, and pregnancy
N. The pathogenesis and management of urinary tract infections
O. The pathogenesis and management of acute renal failure
P. The clinical implications and technique of lithotripsy
Q. Indications for and interpretations of radiologic tests of the kidney and urinary tract
R. Immunology to include basic principles; immunologic mechanisms of renal disease; and fundamental aspects of diagnostic laboratory immunology relevant to renal disease.
S. Transplantation to include biology, diagnosis, and management of transplantation rejection; immunosuppressive agents; indications for and contraindications to renal transplantation; principles of transplant recipient evaluation and selection; principles of evaluation of transplant donors, both live and deceased, including histocompatibility testing; principles of organ harvesting, preservation, and sharing; and psychosocial aspects of organ donation and transplantation.
T. Dialysis to include the kinetic principles of hemodialysis and peritoneal dialysis; the indication for each mode of dialysis; the short-term and long-term complications of each mode of dialysis and their management; the principles of dialysis access (acute and chronic vascular and peritoneal) including indications, techniques, and complications; 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 membrane used in hemodialysis and biocompatibility; and the psychosocial and ethical issues of dialysis.
U. Formal lectures on renal pathology by the renal pathologist are provided
V. The fellow will gain expertise in renal anatomy and physiology, normal and abnormal blood pressure regulation, mineral metabolism, and disorders of fluid, electrolyte, and acid-base regulation. Topics on molecular biology are provided as it pertains to the kidney.
W. Uses and indications for the use of plasmapheresis and plasma exchange

III. Clinical Conference (Friday 1600-1700)

There are three alternating formats to this conference

A. Case presentation: On a rotating schedule the fellow presents an interesting case from one of the clinical services. The case is then discussed among the fellows, attending physicians, and the differential diagnosis is generated or expanded upon. The fellow then presents a review of the literature focused on a specific aspect of the case. This conference provides the fellow with the opportunity to improve skills in case presentation and improve diagnostic and therapeutic reasoning. The fellow provides a scholarly and in depth analysis of the case and approach to diagnosis.

B. Journal Club: The fellows select an article from top-tier journals that is approved by a member of the faculty. The article is circulated to the division at least two weeks in advance of the presentation date. Each fellow presents 2-4 times per year on average to include an equal number of basic science and clinical topics. Fellows are encouraged to state the hypothesis of the paper and determine whether the paper is the result of hypothesis-driven research or descriptive. The fellow goes through each figure or table in the order they were presented in the paper and discusses the methods used to generate the data, the statistical methods used to analyze the data, and the conclusions that may be drawn. The fellow then discusses whether the hypothesis is supported by the data and analyzes the strengths and weaknesses of the paper.

The conference provides fellows with an in-depth exposure to current basic science and clinical literature relating to the discipline of nephrology and medicine, including epidemiology of disease. In addition the conference allows fellows to develop 1) the analytic tools to critically evaluate the design and interpretation of research studies and 2) the presentation techniques to effectively communicate this evaluation.

As mentioned above an additional journal club is conducted during the last Thursday of each month during the Renal Core Lecture Series time slot.

C. Pathology Conference

The renal pathologist using a multi-head microscope reviews pathologic specimens obtained at various time from the last 1-2 months. During the conference the cases are presented by the fellow and a discussion of differential diagnosis with the pathologist is performed. This conference teaches the fellow the indications for performing a kidney biopsy and allows the fellow to learn how the kidney biopsy impacts diagnosis, therapy, and prognosis. The fellow learns how to read and interpret kidney biopsies and gains an understanding of the various histological methods that are used in this process.

IV. Research conference (Conducted on average twice per month)

During this conference research in progress is presented by our own faculty or a visiting professor. The fellow learns recent advances in nephrology and cell biology. Research fellows also present their data during this conference. In this forum they gain the knowledge and expertise to present research findings in a formal lecture setting.

V. The fellow is encouraged to attend the Department of Internal Medicine lecture series to include:
A. Internal Medicine Grand Rounds (Fridays 0800-0900)
B. Clinical-Pathologic Conference (CPC) (Fridays 1200-1300)
C. Case presentations currently on the wards “Popourri” (Tuesday 1200-1300)
Of note, the Chairman of the Department of Internal Medicine has identified Internal Medicine Grand Rounds and the Clinical-Pathologic conference as required conferences for members of the Department of Internal Medicine

VI. Interdisciplinary topics covered in other venues

A. Risk management (on line at UTSWMC): All new fellows must complete 15 hours of risk management education at the beginning of their appointment. After successful completion of the risk management program, the fellow has 2-3 years in which to complete an additional 15 hour course. The initial course consists of 10 core hours and 5 elective hours.
B. Mandatory training (PMH) is also given in the areas of patient abuse and neglect, pain management, patient rights and responsibilities and infection control, advance medical directives. Training also covers the Parkland Memorial Hospital mission and guiding principles and hazardous material safety. There is training that covers legibility, corrections, and appropriate use of abbreviations in medical records.
B. Medical ethics: several lectures are given through the year on this topic
C. Issues of physician fatigue: this topic is covered yearly in the Internal Medicine Grand rounds or CPC time slot and is required for of all members of the Internal Medicine Housestaff. Additional information on this subject is available to the fellow on the home page of New Innovations.
D. Business of Medicine and Medical Finance: On the home page of New Innovations lecture material is available for the fellow that covers areas such as opening and managing a private practice, personal risk management, topics of health care finance, and Medicare and Medicaid analysis.

VII. Educational Assignments and Fellow Portfolio Development
As described in detail above the fellow is expected to prepare and make presentations at the Clinical Conference and Journal Club. In addition, a formal didactic lecture of their choosing involving some aspect of Nephrology is given by the 2nd year clinical fellow and delivered in the spring during the Thursday Noon lecture time slot. The lecture topic is approved by a faculty member. Fellows Trainees also participate actively in the research conference by presenting their data or presenting topics related to their research projects. The various lecture presentations can be included in the fellow's portfolio of educational accomplishments

UNIVERSITY OF TEXAS SOUTHWESTERN MEDICAL CENTER RENAL FELLOWSHIP CALL SCHEDULE

The most recent ACGME guidelines state that one day in 7 averaged over a four week period need to be free of patient care responsibilities. Our current call schedule meets this requirement. The ACGME states that residents must not be scheduled for more than 80 hours per week averaged over a four week period. Our fellows are well below this cut off in hours worked, including the occasional time they are called in when taking at home call.

On all rotations there is no in hospital call. All call is taken from home. On those services where at home call is taken, the number of times fellows are actually called into the hospital is quite low. This occurs rarely at the VA and perhaps 25% of the time at the St. Paul Hospital and Parkland rotations. This is monitored by the program director.

Listed below are the current types of call and number of days off per month for each rotation:

A. VA Consult and Hemodialysis Rotation: During both of these rotations, call is taken from home every other day with weekends alternated. The two fellows assigned to the VA alternate weekends so that two weekends or four days are completely free of patient care responsibilities.

B. DaVita Peritoneal Dialysis Rotation: There is no call – weekends are off, for a total of 8 days free of clinical responsibilities.

C. Parkland Consult and Hemodialysis, St. Paul Consult and transplant Rotations: There is shared at home call between these three rotations. The rotation schedule is designed so that each fellow has no less than 4 days/month free of patient responsibility.

MOONLIGHTING POLICY

I. Professional and patient care activities that are external to the educational program are called moonlighting. Moonlighting activities, whether internal or external, may be inconsistent with sufficient time for rest and restoration to promote the fellows educational experience and safe patient care. Moonlighting will count toward the 80-hour week and fellows must assure the fellowship coordinator is made aware of any hours spent on moonlighting. All moonlighting will be approved prospectively and in writing by the program director. The letter of approval will be made part of the fellow's file.

II. Fellows are not required to engage in moonlighting

III. All moonlighting will be approved prospectively and in writing by the program director. The letter of approval will be made part of the fellow's file.

IV. Moonlighting activities must not interfere with the normal workload of the renal fellowship. If adverse effects are discovered related to moonlighting, permission will be withdrawn.

IV. The program director will monitor each resident for signs of fatigue and interference with educational objectives.

V. Moonlighting will comply with ACGME Institution Requirements and will not violate any written policies of the GME office.

VI. Without compromising the goals of Fellowship training and education, the program director may allow a fellow to moonlight if all of the following conditions are met:

- The fellow is in good standing in the program.
- The fellow is licensed for unsupervised, independent medical practice in the state where the moonlighting will occur.
- The fellow has obtained professional liability (including "tail" insurance), and workers' compensation coverage from an outside employer. Professional liability insurance is provided by the U.T. System Medical Liability Self-Insurance Plan only for those activities that are an approved component of the training program. There is NO coverage for professional activities outside of the scope of the residency program.
- The responsibilities in the moonlighting activities are delineated clearly in writing and are **prospectively approved** in writing by the program director
- Written documentation of the moonlighting activity is filed with the fellows record and is available for GME Committee monitoring
- The fellows performance in the training program is monitored for the effect of these activities, and adverse effects may lead to withdrawal of permission to engage in moonlighting.

RESEARCH CURRICULUM FOR CLINICAL TRACK (2 or 3 years) NEPHROLOGY FELLOWS

The Research Curriculum for two year Clinical Nephrology Fellows at UT Southwestern is designed to provide trainees with a meaningful experience in clinical research. The curriculum consists of: 1) individual mentoring by clinical faculty actively involved in clinical research; 2) formal didactic training in patient-oriented research techniques; 3) clinical research projects tailored to interests and aptitude of the trainee; 3) Institutional (NIH-sponsored K30 Clinical Research Curriculum Award (Dr. Robert Toto) and General Clinical Research Center; Divisional (2000 square ft dedicated clinic lab and office space) and Faculty (NIH-sponsored K24 Mentoring Research Award - Dr. Toto) infrastructural support for a broad spectrum of clinical research activities; 4) integration into the clinical training program. The goal is for each trainee to participate in design, conduct, presentation and ultimately publication of a completed clinical research project by the conclusion of their fellowship.

I. Mentoring

A. General

We strongly believe that mentoring trainees in clinic research is essential. Trainees will be assigned mentors for clinical research at the beginning of their fellowship. Mentors will meet with the fellows early in their fellowship training to discuss key aspects of the curriculum including design, objectives, goals and expectations. A calendar for the development and execution of a research project will be outlined during this initial meeting and completed during the first quarter of the Fellowship. Fellows will meet with mentors periodically (e.g., quarterly) thereafter to review progress, trouble shoot problems and analyze data. Mentors, together with the trainee, will complete a progress report that will be copied to the Director for review.

B. Role of Mentors

Mentors will provide leadership to fellows including intellectual and scholarly guidance for the conduct of human research. Each mentor will be responsible for assisting trainees throughout their training. The responsibilities include project assignment and development, tracking progress, assigning literature review, approaches to critical review of the literature and assistance in oral presentations and written presentations of their work. Mentors may carry up to 2 clinical fellows per year.

C. Current Faculty

Nephrology faculty actively involved in clinical research include: Dr. Robert Toto-Director of Patient-Oriented Research in Nephrology; Dr. Susan Hedayati (VAMC), Dr. Robert Reilly (VAMC), Dr. Miguel Vasquez, Dr. Devasmita Dev (VAMC), Dr. Ramesh Saxena, and Dr. Khashayar Sakhaee.

II. Didactic

Lectures on Key Areas in Clinical Research: Trainees will attend lectures in clinical research methodology during their years of training. These lectures are designed to

provide trainees with a background in clinical research methodologies including ethics in human research, role of the General Clinical Research Center, IRB and Federal regulations, clinical research design, informed consent, clinical epidemiology and public health, basic biostatistics and scholarly and professional writing. The didactic curriculum is intended to be taken in conjunction with clinical training, therefore accessible to trainees who also have clinical responsibilities. This is accomplished by scheduling attendance during regular noon conferences.

II. Projects

A. Assignment of projects
Trainees will be assigned projects by mentors. However, project assignments will be decided on an individual basis and effort will be made to accommodate specific interests of the trainee. Mentors will provide appropriate guidance and direction to insure maximum likelihood of each fellow achieving a meaningful experience in clinical research. Project assignments will be reviewed by the Director of patient-oriented research for each trainee.

B. Available Resources
1. Patient: Patient material for clinical research is abundant. Our clinic population includes more than 13,000 patients with progressing (pre-ESRD) chronic renal disease. Our ESRD population exceeds 2,500 hemodialysis and 300 peritoneal dialysis patients and more than 1500 renal transplant patients. In addition, we have access to more than 500 patients with renal stone disease. These patient populations are in accessible computerized databases on and off campus. Also, the inpatient consult, dialysis and transplant services at Parkland Hospital, VA Medical Center, and Methodist Hospital are active with census ranging from 15-50 per hospital at any given time. Each hospital has an acute hemodialysis unit supporting several intensive care units.

2. Infrastructure: The Nephrology Division has 2000 square feet of space dedicated to clinical research on the UTSW campus. Also, the Nephrology Division has several active protocols ongoing in our Clinical and Translational Research Center (CTRC). The center has 12 inpatient beds and 3000 square feet of outpatient clinic and office space as well as biostatistical support. . Computer terminals are available for literature search, data analysis and manuscript development.

3. Funding: Funding for specific projects will be the responsibility of the mentor. Trainees are not expected to write research grants to obtain funding for projects. Nevertheless, with guidance trainees may submit such grants.

C. Scope of Research
Areas of clinical research suitable for our curriculum include those already ongoing in our Division: 1) mechanisms of renal diseases (e.g., conducted in the CTRC; 2) case-control studies; 3) health services research; 4) retrospective studies (e.g., risk factors for progression of renal diseases); 5) epidemiologic and statistical analyses; 6) literature reviews and meta-analyses, 7) clinical trials; 8) case series; and 9) case reports.

III. Presentations

A. Oral
Trainees will be encouraged to present the results of their research during the last 6 months of their fellowship to the Nephrology Division trainees and faculty members. Trainees who are selected to present abstracts at scientific meetings will receive travel stipends for such activities.

B. Written
Trainees will be expected to produce a manuscript or abstract from their research project. Manuscripts will be submitted for publication to appropriate journals and abstracts will be submitted to appropriate national meetings for presentation. Mentors will assist in this process.

IV. Quality Control

A clinical research committee consisting of the clinical faculty mentors meets on a regular basis to identify appropriate research projects, review progress of trainees, and make recommendations for improvements and modifications in the program.

V. Integration

It is recognized that time and manpower constraints for those fellows doing only a 2-year clinical fellowship do not allow in-depth training in clinical research. For these reasons we have structured our program with mentors for each trainee to tailor the research experience in order to provide the trainee with a meaningful experience in clinical research within our 2-year curriculum. "Protected time" to conduct clinical research projects is limited; nevertheless, supervision by faculty ensures feasibility of completion of projects during the 2-year training period.

VI. Implementation and Specifics
A. Clinically meaningful research can range from writing a case-report or review article to cross-sectional analysis of already collected clinical data, written up as an ASN abstract or original research manuscript. The outcome should be an abstract or manuscript that is submitted for publication. Given that there is limited protected time for those fellows only doing a 2-year clinical fellowship, the following types of projects are suggested in order to accomplish the goal of meaningful research experience:

1) Cross-sectional or secondary analysis of already collected data: If the fellow is interested in a particular area of clinical research, he or she should identify a clinical question and a mentor in the Division of Nephrology by the end of your first 6 mo of fellowship and decide on a project. The project should be completed in a year in order to leave another 6 month time-period for preparation and submission of an abstract or manuscript. In this regard the project has to be approved to assure it is feasible.

2) Case-Report or Review Article: During the first year of clinical training the fellow should identify an unusual clinical case that can be written up into a case-report, or identify a subject to write a review article. The fellow needs to identify a mentor to be the senior author on the paper such as the attending who staffed the case in question or someone who is doing research or has written on the subject of interest.

B. To ensure implementation of a research project, first year clinical fellows meet with Dr. Susan Hedayati to review possible subject matter and potential mentors. After a project is chosen written documentation of the project and name of the mentor is sent to Dr. Hedayati. This information should be sent no later than the end of the first year of fellowship training. Cross-sectional or retrospective clinical research projects are communicated to Dr. Hedayati by the end of the first 6 months of fellowship training. The goal is to complete the chosen project by the end of the second year of training for those fellows doing a 2-year clinical fellowship.

Clinical Nephrology Fellow Requirement for Research Activity

Name of fellow: _____
Email address: _____
Pager: _____

Date of fellowship training: __ __/__ __/__ __ to __ __/__ __/__ __

I plan to do: □ 1. Cross-sectional or secondary analysis of already collected data

□ 2. Case-Report

□ 3. Review Article

Name of Mentor: _____

Brief description of project:
_____
_____
_____
_____
_____
_____
_____

□ I have not identified a subject or a mentor

Please fill out by the end of your first clinical year and email or fax it to me. If you are planning to do the first option, please email or fax by first 6 mo.

susan.hedayati@med.va.gov
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Bp 214-759-1015

RESEARCH TRACT

The Nephrology program at UT Southwestern offers a research tract for those applicants who desire intensive training in clinical or basic science research. In fact, the division has been the recipient of an NIH training grant to fund those individuals who are interested in this type of training. This training grant was again renewed in 2007. The aim of this tract is to encourage and provide support for the fellow who desires to pursue an academic career in either basic or clinical research.

Following the successful completion of the clinical year (as determined by the program director based on satisfactory evaluations during the clinical year) the applicant enters the research program under a specific mentor. On a full time bases the fellow is assigned either a clinical or basic science research project. The fellow continues to attend the renal continuity clinic during the first research year so as to ensure there has been two continuous years of the renal continuity clinic. The performance of the fellow during this second year of attendance in the continuity clinic is evaluated directly by the program director (Dr. Biff F. Palmer) who attends in the renal clinic three weeks each month throughout the year as well as other attending who rotate in the clinic. During the research years the fellow continues to attend all conferences to include basic science and clinical conferences. The fellow will present their research in conferences at various times of the year and present articles at journal clubs.

The total number of years spent on a research project varies but fellows who are on the training grant typically spend a minimum of three years on their project after the clinical year is completed. If the fellow decides to enter clinical practice, a letter is sent by the mentor to the program director verifying the trainee has performed in a satisfactory manner during the research years. The program director will then verify the fellow is competent to enter practice without direct supervision.

CRITERIA FOR ADVANCEMENT FROM 1st TO 2nd YEAR CLINICAL FELLOW

Patient Care

- Prioritizes a patient's problems
- Prioritizes a day of work
- Monitors and follow up patients appropriately
- Demonstrates caring and respectful behavior with patient's and families
- Gathers essential and accurate information through interviews and physical exams and reviews other data.
- Knows indications, contraindications & risks of various forms of renal replacement therapy
- Knows indications, contraindications & risks of renal biopsy
- Knows indications, contraindications and risks of femoral, subclavian, and internal jugular vein catheterization
- Works with all health care professionals to provide patient-focused care
- Understands and weighs alternatives for diagnosis and treatment
- Uses diagnostic procedures and therapies appropriately
- Elicits subtle findings on physical examination
- Obtains a precise, logical and efficient history
- Interprets results of laboratory tests and procedures to include renal biopsy properly
- Is able to manage multiple problems at once
- Makes informed decisions about diagnosis and therapy analyzing clinical data.
- Develops and carries out management plans.
- Considers patient preferences when making medical decisions
- Reasons well in ambiguous situations
- Spends time appropriate to the complexity of the problem

Medical Knowledge

- Uses written and electronic reference and literature sources to learn about patients' diseases
- Demonstrates knowledge of basic and clinical sciences
- Applies knowledge to therapy
- Is aware of indications, contraindications and risks of procedures and commonly used medications
- Demonstrates knowledge of epidemiologic and social-behavioral sciences
- Applies the basic, clinical, epidemiologic and social behavioral science knowledge to the care of the patient
- Demonstrates an investigatory and analytic approach to clinical situations

Practice-Based Learning Improvement

- Understands his or her limitations of knowledge
- Asks for help when needed
- Is self motivated to acquire knowledge
- Uses computerized sources of results and information to enhance patient care
- Accepts feedback and develops self-improvement plans.

Undertakes self-evaluation with insight and initiative
Facilitates the learning of students and other health care professionals
Analyzes personal practice patterns systematically, and looks to improve.
Compares personal practice patterns to larger populations
Locates, appraises and assimilates scientific literature appropriate to nephrology
Applies knowledge of study design and statistics

Interpersonal and Communication Skills

Writes pertinent and organized notes
Composes timely and legible medical records
Uses effective listening, narrative and non-verbal skills to elicit and provide information.
Works effectively as a leader of the health care team
Creates and sustains therapeutic and ethically sound relationships with patients and families.
Provides education and counseling to patients, families and colleagues
Is able to discuss end of life care with patient/families

Professionalism

Establishes trust with patients and staff
Does not refuse to treat patients
Is honest, reliable, cooperative and accepts responsibility
Shows regard for opinions and skills of colleagues
Is free from substance abuse or satisfactorily undergoing rehabilitation
Demonstrates respect, compassion and integrity
Is responsive to the needs of patients and society, which supersedes self-interest
Displays initiative and leadership
Is able to delegate responsibility to others
Demonstrates commitment to on-going professional development
Demonstrates commitment to ethical principles pertaining to the provision or withholding of care, patient confidentiality, informed consent and business practices
Demonstrates sensitivity to patient culture, gender, age, preferences and disabilities
Acknowledges errors and works to minimize them
Is effective as a consultant

Systems-Based Practice

Is a patient advocate
Has constructive skepticism
Advocates for high quality patient care and assists patients in dealing with system complexity.
Applies knowledge of how to partner with other health care providers to assess, coordinate and improve patient care
Uses systematic approaches to reduce errors

Participates in developing ways to improve systems of practice and health management
Demonstrates ability to adapt to change
Provides cost effective care
Understands how individual practices affect other health care professionals, organizations, and society
Demonstrates knowledge of types of medical practice and delivery systems
Practices effective allocation of health care resources that does not compromise the quality of care

CRITERIA FOR SUCCESSFUL COMPLETION OF 2ND YEAR CLINICAL FELLOW

The second year of training is designed to further prepare the fellow for a career in academic nephrology or private practice by developing more extensive experience in outpatient and inpatient nephrology, to develop independence as a clinical nephrologist, and by engaging in nephrology research and scholarly activity. Second year nephrology fellows through their rotations continue to provide care of hemodialysis, peritoneal dialysis, and renal transplant patients with supervising teaching faculty members throughout the year. The fellows continue in the continuity clinic to gain additional longitudinal experience with outpatients. It is anticipated that trainees in their 2nd year will assume a greater role in decision making and will offer supervision to 1st year trainees.

The specific educational goals for the second year of training are similar to and build upon the goals of the first year of training. However, second year trainees are expected to take a more independent role in clinical decision making and to focus more of their attention on teaching first year fellows, residents and students. The curriculum topics listed for each rotation and others covered in the lecture setting, are the same for second year fellows.

Specific competency-based goals for the second year of training in Nephrology (by rotation subtype)

1. Continuity Clinics/Outpatient Rotations/Dialysis Rotations

a. Patient care: Fellows will continue to evaluate a mix of patients, both for their initial visit as well as in follow-up (see patient mix above). We expect all history and physical examinations to be complete and accurate in terms of the entire renal evaluation by the completion of this year. Similarly, we expect that the second year trainee will be able to establish appropriate diagnostic and therapeutic care plans and present those concepts to the faculty.

b. Medical knowledge: Fellows are expected to continue to read widely regarding their patient encounters. At the completion of the year, second year trainees should be able to site relevant literature and provide a scientific basis for their decisions.

c. Practice-based learning and improvement: All fellows will gain experience in the analysis of practice patterns and decision making both through critique in the clinic and discussions in conference. We expect second year trainees to be able to recognize areas in which practice decisions may not be clear-cut and to identify proper practice through their reasoning skills and re-evaluation of clinical experience.

d. Interpersonal skills and communication skills: We fully expect second year trainees to interact in a respectful and productive way with all patients. Similarly, a year 2 trainee will be able to discuss in a collegial and concise fashion patient care with referring physicians. All communications, either written or verbal, will be at the level of a faculty member by the completion of the second year of training.

e. Professionalism: Similar to interpersonal skills, we expect that our fellows, from the initial time of their training, will maintain a highly professional attitude with patients, medical staff, peers and faculty.

f. Systems-based practice: Year 2 trainees will be familiar with the full spectrum of diagnostic studies employed at the University of Texas Southwestern Medical Center and be able to integrate those capabilities into their discussions with physicians from outside of the university. Similarly, second year trainees will recognize the regulations/requirements of our regional healthcare insurers and thereby be facile in selecting appropriate medical care for most situations.

2. In patient consultative service/Transplantation Service

a. Patient care: Fellows will provide the initial evaluation for all patients, both for their initial evaluation as well as in follow-up during their hospital stay. For the second year trainee, we expect all history and physical examinations to be complete and accurate in terms of the renal diagnosis and all related issues. Fellows will convey all medical decisions to the consulting service and serve as the liaison to the renal clinic for follow-up after discharge. By the completion of the second year we expect fellows to recognize renal emergencies, direct appropriate renal care and provide patients with needed medical support as well as to document proper follow-up.
b. Medical knowledge: As in the outpatient setting, fellows are expected to read widely regarding their patient encounters. By the completion of their second year, we expect fellows to have the knowledge to independently formulate a complete differential diagnosis, outline required studies needed to identify causative conditions and recognize the appropriate care plan for each individual. Presentations to faculty will be thorough, thoughtful and contain predictions as to patient outcomes/performance. Year 2 trainees will be able to provide decisions regarding diagnostic or care plans on an independent basis before review of the case by the faculty member.
c. Practice-based learning and improvement: fellows will continue to gain experience in the analysis of practice patterns and decision making both through critique in the clinic and discussions in conference. Through discussion of the medical literature, we expect second year trainees to be able to refine their skills such that analysis of patient care and outcomes is an integral part to their decision-making abilities.
d. Interpersonal skills and communication skills: We fully expect second year trainees to interact in a respectful and productive way with all patients. Similarly, all communications with other physicians, either via written work (dictations) or direct verbal contact is appropriate and effective.
e. Professionalism: Similar to interpersonal skills, we expect that our fellows, from the initial time of their training, will maintain a highly professional attitude with patients, medical staff, peers and faculty. Year 2 trainees are expected to have mastered the need for clear and concise transmission of information to those also participating in any patient's care.
f. Systems-based practice: Year 2 trainees will be familiar with the full spectrum of diagnostic studies employed at the various teaching hospitals and be able to integrate those capabilities into their discussions with physicians from outside of the training program.

EVALUATION PROCESS

I. Tools Used to Evaluate Fellows In The Six General Competencies.

To ensure that trainees possess the knowledge, skills and attitudes essential for the provision of excellent care, the faculty members formally and regularly evaluate them. At the end of the rotation, and based on a close observation of the trainee, faculty members fill out an evaluation form that specifically addresses the following characteristics: patient care, medical knowledge, practice-based learning, interpersonal and communication skills, professionalism, and systems-based practice. The monthly evaluations are written by using the New Innovations Residency Management suite. The attending will meet with the fellow prior to each rotation to discuss expectations for the rotation. The attending also meets with the fellow mid-rotation in order to discuss the performance and identify any deficiencies that may be present.

In addition to the written evaluation, the performance of the fellows is verbally discussed during a monthly faculty meeting in which minutes are recorded. Any problems identified are addressed with specific plans as to how the fellows training can be altered in order to correct the underlying problem. We have found that having an open discussion oftentimes brings issues to bear that were not mentioned in a written evaluation. In this manner, a more complete evaluation of the fellow's performance can be obtained.

The fellowship program director meets with the fellows on a one-on-one basis and goes over the written evaluations. This is done at least two times per year. In addition, any time a fellow receives an unsatisfactory evaluation, that fellow also meets with the program director immediately in order to address the current concern and to devise an action plan as to how to correct the underlying problem. In the event that a fellow persistently performs in an unacceptable level, the training program follows the policies and procedures of the University of Texas Southwestern Medical Center described in the next section.

II. 360 Degree Evaluations

The training program in nephrology requires its fellows to obtain competence in the six competencies as defined by the ACGME and as stated above. As part of the performance improvement process to improve competency in professionalism, systems based practice and communication skills, we have started the process of 360 degree evaluations of fellows. We have initiated the evaluation of fellows by the charge nurse in the PMH acute dialysis rotation and the charge nurse on the PMH transplant rotation. Over time we will expand this process.

II. Evaluations of Attending Physicians

The fellow is asked to fill out an anonymous faculty evaluation form for each rotation. The New Innovations Residency Management suite is utilized for this purpose. The members of the faculty are evaluated with regard to their availability, teaching skills and abilities, faculty/fellow rapport and quality of patient care. The division chief

counsels faculty who consistently perform poorly on their evaluation and formulates a remediation plan. If no improvement is observed in their overall teaching skills, they will be removed from their teaching responsibilities.

III. Evaluation of the Nephrology Fellowship Program

We have mechanisms in place, by which the fellow can evaluate the overall quality and content of the Nephrology Fellowship Program. Two times per year, the fellows meet with the fellowship program director in order to evaluate each rotation and give input into the content of the rotations. This also includes the content of the didactic lectures. In addition, the fellowship program director meets one-on-one with the fellows in order to gain their input as to suggestions for the nephrology fellowship. At the end of the year the fellows and faculty fill out an anonymous survey in which all aspects of the training program are evaluated.

IV. Problem remediation policy

The program director is responsible for implementing fair policies, grievance procedures, and due process as established by the University of Texas Southwestern Medical Center. In the event of an unsatisfactory evaluation, the fellow is warned both verbally and in writing. Corrective action is instituted and documented. The warning includes evidence of deficiency such as letters of complaint, attendance records or other documentation of unsatisfactory performance. Specific plans for remediation are documented, which may include repeat of rotations, additional supervision or referral for counseling. The goals of remediation, designation of responsible faculty members, and description of the outcome are described. Fellows may appeal decisions to suspend, place on probation, deny credit or dismiss from the program. Fellows are advised and given written documentation of these policies during orientation at the beginning of each year.

PURPOSE

The Accreditation Council of Graduate Medical Education (ACGME) requires the "establishment and implementation of fair institutional policies and procedures for academic or other disciplinary actions taken against residents" and the "establishment and implementation of fair institutional policies and procedures for adjudication of resident complaints and grievances related to actions which could result in dismissal, non-renewal of a resident's contract or other actions that could significantly threaten a resident's intended career development."

PROCEDURE

I. RESIDENT DISCIPLINE

A. Corrective Action

1. Conduct Subject to Corrective Action. Residents may be subject to corrective action as a result of unsatisfactory academic performance and/or misconduct, including but not limited to issues involving knowledge, skills, scholarship, unethical conduct, illegal conduct, excessive tardiness and/or absenteeism, unprofessional conduct, job abandonment, or violation of applicable policies or procedures (collectively "job performance").
2. Counseling Prior to Corrective Action. Where the Program Director determines that an adverse evaluation or evaluations indicate(s) unsatisfactory job performance in the program, the resident may be requested to attend a conference with a program representative for purposes of discussion and counseling regarding the Program Director's concerns prior to the imposition of any corrective action or disciplinary measures. The counseling conference serves as an opportunity to promote a mutual discussion regarding the specific issues or areas of concern, as well as to encourage mutual communications. The Program Director or the Committee shall designate a representative from the program to conduct the counseling conference with the resident. During the conference, the program representative shall inform the resident of the basis for the unsatisfactory performance assessment and may advise the resident regarding any corrective action that is being considered. The resident shall have an opportunity to respond to the issues raised and may offer any explanation and/or additional information regarding the facts and/or circumstances surrounding the resident's job performance. The resident may elect to submit a written statement in response to the conference to the program representative. The program representative shall document the

events of the counseling conference and any required action by the resident in a written summary, a copy of which shall be retained in the resident's file. Counseling is not a prerequisite to the imposition of corrective action.

3. Referral for Investigation. The Program Director, the Committee, or the Department Chairperson shall refer allegations of (i) sexual harassment or unlawful discrimination made against a resident for investigation by the Equal Opportunity Director of UT Southwestern in accordance with UT Southwestern's Handbook of Operating Procedures, and (ii) substance abuse or other impairment of a resident for investigation and handling by the Committee on Physician Peer Review and Assistance at Parkland Memorial Hospital.
4. Imposition of Corrective Action. "Corrective action" may include, but not be limited to, probation, suspension, non-renewal of contract, or dismissal from the program. In the event the Program Director determines at any time that corrective action is warranted with regard to a resident, the Program Director shall provide written notice to the resident which states: (i) the specific corrective action to be taken, (ii) the reasons for the corrective action, (iii) notice of the resident's right to an appeal of the corrective action, (iv) the time period within which the resident must initiate the appeal, and (v) that failure to request a hearing constitutes waiver of all rights to appeal . In the event that the Program Director determines that the resident's job performance presents a threat to patient safety or welfare, the resident may be immediately removed from the patient care environment pending a corrective action determination. In addition, the following supplemental requirements shall apply for each of the following corrective action measures:
    a. *Probation or Suspension*. Probation is where the resident is formally notified that there are identified areas of unsatisfactory job performance, which will require remediation and/or improvement if the resident is to continue in the program. Suspension is where the resident is temporarily not permitted to perform his or her job duties due to unsatisfactory job performance, which will require remediation and/or improvement if the resident is to continue in the program. The notice to the resident of either probation or suspension shall set a commencement date and duration period for the probation or suspension status and shall set forth the specific remedial action or improvement that is required during this time period. The Program Director shall re-evaluate the resident at the end of the probation or suspension period and make a determination to (i) continue the probation or suspension period, (ii) remove

the resident from probation or suspension status, or (iii) impose another corrective action measure. The Program Director's decision shall be documented in the file and communicated in writing to the resident and the Committee chairperson.

b. *Non-renewal of Contracts*. In the event the Program Director, the Committee, and/or the Department Chairperson elects not to renew a resident's contract for the next year, the Program Director shall provide the resident with written notice of this decision. Notice must be provided to the resident at least four (4) months prior to the expiration date of the current contract, unless the primary reason for the non-renewal occurs within the four (4) months prior to the expiration date, in which case the Program Director must provide the resident with as much written notice of the non-renewal prior to the expiration date as the circumstances will reasonably allow.

c. *Dismissal*. Notice of dismissal of a resident from the program shall set forth the effective date of the dismissal.

B. Appeal of Corrective Action

A resident shall have the right to appeal any measure of corrective action imposed. The procedures governing the process for resident appeals of corrective action determinations are set forth in the Appeal Procedures, a copy of which is attached hereto as Appendix A.

II. RESIDENT GRIEVANCES

A. General Grievances

If a resident has a complaint or grievance related to matters other than job performance, corrective action, discrimination or sexual harassment, the resident should first attempt to resolve it by consulting with the Chief Resident(s) or the Program Director. If the resident is unable to resolve it at that level, the resident should then present the grievance to the Department Chairperson. If the resident is unsatisfied with the Department Chairperson's decision, recommendation or other handling of the complaint, the resident may present the grievance in written form to the Associate Dean Medical Education (ME) who shall provide a written response to the resident within ten (10) business days of receipt of the written complaint. The decision of the Associate Dean of ME shall be final and binding.

B. Sexual Harassment and Discrimination

If a resident has a complaint or grievance related to discrimination or sexual harassment, the resident shall have the right to address said complaint in accordance with the policies and procedures set forth in UT Southwestern's Handbook of Operating Procedures.

Appendix A

Appeal Procedures

1. FIRST APPEAL – CLINICAL COMPETENCE COMMITTEE.

a. Exercise of Right. A resident shall first have a right of appeal of a decision to impose corrective action to the department's Clinical Competence Committee. The resident may exercise this right by notifying the chairperson of the committee, in writing, of the resident's intent to appeal within twenty (20) days of the resident's receipt of the notice of corrective action.

b. Appeal Conference. The chairperson shall arrange for an appeal conference to be held among the members of the Clinical Competence Committee and the resident. The appeal conference shall be held within ten (10) business days of the date the chairperson's receipt of the resident's notice of appeal. At the conference, the resident shall have an opportunity to make a statement, to present any written documentation relevant to the issues and to bring any new or additional information to the attention of the committee. The committee chairperson shall within ten (10) days after the date of the appeal conference notify the resident in writing of the decision of the Clinical Competence Committee and the resident's right to appeal the decision.

2. SECOND APPEAL –APPEAL COMMITTEE.

a. Exercise of Right
A resident shall have a right of appeal of the decision of the Clinical Competence Committee and a right to a hearing before an ad hoc appeal committee to be appointed by the Program Director. The resident may exercise this right by delivering a written notice of his or her decision to appeal to the Program Director within twenty (20) days after the date of receipt of the decision of the Clinical Competence Committee. The notice of appeal shall state whether or not the resident will have legal counsel in attendance at the hearing and, if so, the name, address and telephone number of legal counsel in writing. Failure of the resident to provide written notice of appeal within said twenty (20) days shall be deemed acceptance of the corrective action and waiver of appeal.

b. Appointment of Appeal Committee; Notice of Hearing.
   i. Upon receipt of a written notice of appeal of the decision of the Clinical Competence Committee from a resident, the Program Director shall appoint a committee to hear the appeal (the "Appeal Committee"). The Appeal Committee shall be comprised of no less

than three (3) members of the applicable department's faculty. The Appeal Committee shall appoint a presiding chairperson.

ii. The Appeal Committee shall provide the resident with at least fifteen (15) days written notice of the date, time and place for the appeal hearing and the names of the members of the Appeal Committee. The notice will include a written statement of the deficiencies of the resident and a summary statement of the evidence supporting such deficiencies. The notice shall be delivered in person or by regular or certified mail to the resident at the last known address on file for the resident.

iii. The resident may challenge the fairness and impartiality of any member(s) of the Appeal Committee by stating in writing to the Associate Dean of ME the factual basis for the challenge. This challenge must be received by the Associate Dean of ME no less than ten (10) days prior to the hearing date. The Associate Dean of ME shall communicate the challenge to the member and it shall be up to the member challenged to determine whether he or she can serve with fairness and impartiality. If a challenged member determines that he or she cannot be fair and impartial in the consideration of the appeal, a replacement shall be appointed in the same manner as the original member was appointed.

c. <u>Witnesses and Documents.</u>

i. Each party shall provide to the Associate Dean of ME a complete list of all witnesses, a brief summary of the testimony to be given by each, and a copy of each document, record and exhibit to be introduced at the hearing.

ii. The Associate Dean of ME shall set deadlines for submission of the above information and shall provide copies to the other party prior to the hearing.

d. <u>Hearing.</u>

i. The Appeal Committee chairperson shall preside at the hearing, ensure order of presentation and make determinations on the relevancy of testimony and documentary evidence. The Appeal Committee may ask questions of the parties and their witnesses. The chairperson may request consultation with legal counsel during the hearing.

ii. Each party shall have the right to appear and present evidence in person. The resident will have the right to have legal counsel present in the hearing room. The legal counsel may serve only in an advisory capacity to the resident and may not participate in the hearing. UT Southwestern shall have the right to have a representative from the Office of the Associate Vice President for Legal Affairs in attendance.

iii. UT Southwestern shall designate an institutional representative to present evidence on behalf of UT Southwestern. UT Southwestern shall have the burden of proving the allegations by a

preponderance of credible evidence that good cause exists for the corrective action. The resident shall have the opportunity, but shall not be required, to address the committee and present evidence. Both parties shall have the right to introduce witnesses and documentary evidence. The parties shall have the opportunity to cross-examine witnesses.

iv. If the resident elects to have counsel present during the hearing, the hearing will be recorded by a court reporter furnished by UT Southwestern. Both parties will be allowed to purchase a copy of the transcript from the court reporter. If the resident does not have counsel present, the hearing will be recorded by audio equipment, which shall be furnished by UT Southwestern. UT Southwestern shall make a copy of the audiotape available to the resident upon request.

e. Appeal Committee Decision.

i. The Appeal Committee shall deliberate and prepare, and forward written findings and recommendations to the resident, the Program Director, and the Department Chairperson within five (5) business days after the close of the hearing.

ii. If the resident disputes the findings and recommendations of the Appeal Committee, the resident may within ten (10) days of receipt of the written findings and recommendations submit a written request for review of the matter to the Department Chairperson. The resident's submission should include only the record of the hearing proceedings, documentary evidence submitted at the hearing, and a written argument setting forth the reasons why the decision was in error. The Department Chairman may, in his or her discretion, elect to have a meeting with the resident and an institutional representative to discuss his or her review of the record. The Department Chairperson shall mail a written decision to the resident within twenty (20) days of receipt of the resident's request and said decision shall be final and binding.

f. Due Process Challenges

If the resident believes at any stage of the appeal that procedural due process has not been followed, he or she should notify the Associate Dean of ME of the substance of the alleged deficiency. If the Associate Dean of ME finds a material deficiency in the procedural due process afforded the resident he or she shall institute appropriate remedial action.

UNIVERSITY OF TEXAS SOUTHWESTERN MEDICAL CENTER AT DALLAS
LINES OF RESPONSIBILITIES

The lines of responsibility for fellows are identical at all teaching hospitals and clinics:

1. Parkland Health and Hospital Systems (PHHS)
2. Veterans Affairs North Texas Health Care System (VANTHC)
3. Zale Lipshy University Hospital (ZLUH)
4. St. Paul University Hospital
5. University of Texas DaVita Dialysis Unit

I. Legal Responsibilities

A. The ultimate legal responsibility for the training program is vested in (a) the Chief of Nephrology and (b) the Program Director.

B. On each rotation, the fellow is under the direction and reports to the attending Physician assigned to that rotation. The Attending Physician is responsible for all medical care and teaching. The Fellow is directly responsible to the Attending Physician, whose decisions on medical care are final.

C. In outpatient clinics, the Fellow is responsible to and directed by the Attending Physician.

D. The Fellows, teaching faculty, and Program Director interact with the hospital CEO and administration of each teaching hospital according to the bylaws of that hospital. At PHHS, this interaction occurs through the Medical Advisory Council. At VANTHC and ZLUH, these interactions occur through the Executive Committee of the medical staff. The administrations of the teaching hospitals have no authority over the teaching programs.

II. Clinical Responsibilities

A. Inpatient Services

1. The Fellow is responsible for the care of all patients assigned by the Attending Physician. The Fellow is expected to demonstrate independent thought in devising a clinical plan and writing orders, but he/she should discuss these with the Attending Physician.
2. The Fellow must know in detail and follow all patients on the service. She/he must guide the residents and students who may be on the service as well as teach both theory and practice. Organization of work on teaching rounds is the responsibility of the Fellow, who reports directly to the Attending Physician. The fellow should write daily notes, which are then reviewed by the Attending.

B. Outpatient Services

In the outpatient clinics, especially continuity clinics, the Fellow will manage her/his patients independently. Prior to the patient's discharge from the clinic, a brief summary should be presented to the Attending Physician(s). With more complicated patients, or those with whom questions arise regarding further workup and management, the Attending Physician should be involved earlier.

III. Chief Fellow

Scheduling of clinical rotations and the call schedule is done by the Chief Fellow, under the direction of the Program Director. All Fellows are expected to follow these assignments. The Chief Fellow also assigns vacations, education leaves and absences required because of emergencies, such as family illness or death, with final approval by the Program Director.

IV. Program Director/Attendings

A. The day to day operation of the Fellowship Program is vested in the office of the Program Director. The Program Director executes the policies of the Department of Internal Medicine and the Division of Nephrology and is responsible for conformity to the bylaws of the teaching hospitals.

B. The Attending is the first source of counseling should a Fellow have difficulty or if disputes arise during a rotation. If problems cannot be solved by the Attending, they may be referred to Dr. Biff F. Palmer (Program Director).

V. Interactions with House Staff in Internal Medicine and with Consultants for Other Departments

House Staff and other consultants should be treated with dignity and respect, and their recommendations should be carefully considered.

VII. The lines of responsibility are now described in more detail.

The program director coordinates all aspects of the nephrology fellows education and training, including their supervision by faculty members. Fellows are provided with responsibilities consistent with their level of training. Every patient examined, and every procedure or test performed is either done under the direct supervision of a faculty member or is reviewed with a faculty member. Faculty members are directly responsible for ensuring that resident procedures are performed to the high standards set by the Program and that appropriate documentation is completed (including documentation for resident credentialing). Appropriate faculty supervision is provided during all educational experiences. The specific mechanisms for proper supervision of residents are as follows:

A. Clinical Training

Nephrology fellows round and present clinical cases in teaching rounds, Nephrology Continuity experience, and Outpatient Dialysis Ambulatory experience and receive one-on-one instruction and feedback in history taking, physical examination and in-patient and outpatient management of nephrology patients. These case presentations may include review of clinical data, urinalysis, review of pathologic specimens, and imaging data. Nephrology teaching faculty members interview, examine and discuss assessment and plans with the nephrology fellows for all inpatient consultations, nephrology continuity clinic outpatients, and outpatient dialysis ambulatory patients. All inpatient consultations and follow up care, Nephrology Outpatient Clinic visits, and Outpatient Dialysis patients are discussed and supervised by Nephrology teaching faculty members. All outpatient supervision, whether in the Nephrology Outpatient clinic or for Outpatient Dialysis Ambulatory experience is directly supervised with the attending present. During the Nephrology Consultation rotations, the Nephrology fellow directs a team of residents, and medical students. The nephrology fellow is responsible for organization of rounds, assisting the attending physician with the education of the Internal Medicine residents and medical students, and supervising the Internal Medicine residents and medical students.

B. Procedural Supervision

Procedures such as renal biopsy, urinalysis, placement of the temporary vascular access catheters, and hemodialysis and peritoneal dialysis procedures are directly supervised by attending physicians. The placement of vascular access catheters is supervised in all cases. Fellows' advancement to independent performance of procedures is based upon successful completion of procedures as well as review with attending physicians who must certify residents based upon clinical and procedural competency. At times hemodialysis and peritoneal dialysis treatments may not be directly supervised. For example, an attending may not be present on site after hours. However in all cases, prior to the initiation of any procedure, the case, indications, risk and benefit for the procedure are fully discussed. At any time during the two year training period, attending physicians will be available to come in to the hospital to directly supervise any procedure. Fellows receive formal feedback to procedural competence as part of each post rotational evaluation. An on-line log of procedures using the New Innovations web site is maintained by the fellow. This data base of procedures is used for future credentialing documentation.

C. Research

Throughout the course of any research project, Nephrology fellows meet regularly with their faculty research mentor to report their progress and discuss the design and content of their projects. Every Nephrology fellow research project is supervised by a faculty mentor who is available to discuss any issues that may arise. Fellows also discuss their progress with other trainees and other interested attending faculty at various research conference and clinical conferences.

ORDER WRITING POLICY

1. The order writing policy described herein is reflective of all the teaching hospitals in which the renal fellows participate. The policy is also reflective of the University of Texas Southwestern Medical Center Internal Medicine Training Program.

2. Routinely, the medical house staff enters all orders for the patients for whom they are caring.

3. This is done to facilitate teaching and instruction and to centralize the medical ordering as a precautionary measure.

4. Nephrology fellows enter orders for procedures and treatments that require subspecialty expertise and that are beyond the scope of internal medicine training. These include: acute and chronic hemodialysis, peritoneal dialysis, continuous renal replacement therapy, and the monitoring of a patient undergoing renal biopsy.

5. Nephrology fellows on the PMH transplant service enters all orders for patients whom there are caring. The St. Paul Transplant fellow writes orders in conjunction with other members of the transplant team.

5. Attending physicians enter orders on teaching patients in the unusual circumstance when the fellow is unavailable and patient care could be compromised by any delay. Attending physicians are expected to discuss these orders with the fellow and house staff caring for the patient.

FATIGUE DURING RENAL FELLOWSHIP TRAINING

Fatigue should be considered an impairment like alcohol or drugs
Drowsiness, sleepiness, and fatigue cannot be eliminated during fellowship training, but can be managed
Recognition of sleepiness and fatigue and use of alertness management strategies are simple ways to help combat sleepiness during post-graduate training.
When sleepiness interferes with your performance or health, talk to the Renal Fellowship Program Director.

1. Signs of Fatigue

Falling asleep in conferences or on rounds
Feeling restless and irritable with staff, colleagues, family, and friends
Having to check your work repeatedly
Having difficulty focusing on the care of your patients
Feeling like you really just don't care

2. Signs of drowsiness during driving

Trouble focusing on the road
Difficulty keeping your eyes open
Nodding
Yawning repeatedly
Drifting from your lane, missing signs or exits
Not remembering driving the last few miles
Closing your eyes at stoplights

Fellows and faculty should review the presentation entitled Resident Duty Hours and Fatigue Part I and II. These presentations are located on the Home Page of New Innovations.

STRESS AND OR EMOTIONAL OR MENTAL CONDITIONS INHIBITING PERFORMANCE OR LEARNING AND DRUG-0R-ALCOHOL RELATED DYSFUNCTION

During the training program the program director will monitor fellows for signs of stress or emotional issues that may be contributing to impaired performance or learning. Similarly the program director will monitor trainees for signs of drug and or alcohol related problems. These types of issues are very sensitive and will always be handled in the strictness of privacy. The University of Texas Southwestern Medical Center has resources and support services available for trainees who develop these types of issues. The renal fellowship program director maintains an open door policy and is always accessible for discussion should any areas of concern arise. The fellow should be assured that such sensitive issues will be handled in such a way that the privacy of the trainee will be preserved.

EVALUATION BY THE GRADUATES

The effectiveness of our training program is assessed by the following measures:

a. The success of nephrology graduates in their clinical practices
b. The ability of nephrology graduates who are interested in academia to secure an appointment in an academic center and to move up the ranks
c. The pass rate on the ABIM certification examination in nephrology
d. The performance of fellows on the In-Service examination

The program director maintains a close professional relationship with the nephrology graduates and remains informed of their current positions and satisfaction in their jobs. In addition, we have recently designed a survey that assists us in evaluating the status of our graduates many years after graduation. The purpose of the survey is to obtain feedback on demographic and practice profiles, licensure and board certification, the graduates' perceptions of the relevancy of training to practice or other career pathways, suggestions for improving the training, and ideas for new areas of curriculum. The results of this survey will be analyzed and program modifications will be implemented if deemed necessary. We plan to mail the survey every 5 years.

Suggested Reading List

Comprehensive Clinical Nephrology 4th edition. Johnson RJ, Feehally J, Floege J (eds.) Philadelphia: Elsevier Inc. 2010.

The Principles And Practice of Dialysis. WL Henrich, (ed.),. 4th Edition, Philadelphia: Lippincott Williams and Wilkins, 2009

Handbook of Dialysis 4th edition. J Daugirdas, P Blake, and T Ing (eds.),. Philadelphia, Lippincott Williams and Wilkes, 2007

The Kidney: Physiology and Pathophysiology, 4th Edition. Alpern RJ and Hebert SC (eds.),. San Diego Elsevier, 2008

The Kidney, 8th Edition. BM Brenner (Ed.), Philadelphia, Saunders, 2008

Diseases of the Kidney, 8th Edition. R Schrier (ed), Lippincott Williams and Wilkins, 2007

Renal and Electrolyte Disorders 7th edition. Schrier RW (ed.). Philadelphia: Lippincott Williams & Wilkins 2010

UpToDate, Available with free of charge access at all teaching hospitals and UTSW Medical Center Campus Library