



WRITTEN CURRICULUM

FELLOWSHIP GOALS AND OBJECTIVES

**DIVISION OF RENAL DISEASES AND HYPERTENSION
UNIVERSITY OF TEXAS –
HOUSTON MEDICAL SCHOOL**

INTRODUCTION

The mission of the Division of Renal Diseases and Hypertension is to educate and train physicians as clinically skilled Nephrologists and to generate new knowledge in the biomedical and Health Sciences. The cornerstone of this program is teaching at a level of excellence, which fosters excitement and enthusiasm for a lifetime commitment to scholarship. There is no PGY 5, 6 or 7 residents in the Nephrology program or equivalent. The described goals and objectives apply equally to all three years.

GENERAL ASPECTS OF TRAINING

The training program at the University of Texas – Houston Medical School is accredited by the ACGME (Accreditation Council for Graduate Medical Education). The Division offers a formal two or three year fellowship providing training in both clinical nephrology and clinical/basic investigation, to physicians who have already completed Internal Medicine Residency training. The educational objective of the fellowship is to teach fellows a formal Nephrology Core Curriculum, which develops expertise in the evaluation and management of patients with kidney disease. Experience is attained by clinical rotations in five different hospitals, exposure to a large population of chronic dialysis outpatients, rotations on a Renal Transplant and Renal Inpatient Unit, and a two-year continuity clinic in general nephrology and renal transplantation. Fellow's education is supplemented by numerous didactic sessions presented by full time division faculty, fellows, and visiting faculty. At the end of this training, fellows should have obtained the knowledge and technical skills necessary to be an expert consultant and/or principle care provider for patients with kidney disease. The following are considered key elements of the definition of a nephrologist:

1. An in depth knowledge of the pathophysiology, clinical manifestations and presentations, diagnosis, appropriate laboratory, imaging, and pathologic studies, and appropriate treatment and management of all conditions outlined in the Nephrology core Curriculum.
2. Knowledge and understanding of the basic science disciplines relevant to kidney diseases including anatomy, physiology, biochemistry, immunology and genetics.
3. Experience and skill to perform and/or interpret procedures necessary to the practice of nephrology:
 - a) placement of temporary vascular access for hemodialysis
 - b) percutaneous renal biopsy
 - c) urinalysis
 - d) placement of peritoneal dialysis catheters
 - e) renal nuclide scans
 - f) intravenous pyelogram (IVP)
 - g) renal arteriography
 - h) management of acute and chronic dialysis, including continuous modalities
 - i) radiology of vascular access

- j) balloon angioplasty of vascular access
 - k) therapeutic plasmapheresis
 - l) bone biopsy
 - m) ultrasonography
 - n) lithotripsy
4. Lifetime commitment to scholarship and self-directed learning to foster continued intellectual growth for application of new knowledge to patient care.
 5. Excellent communication skills, both oral and written, in order to provide the highest standard of care to patients and their families, and to effectively work with primary care providers, consultants, other health care providers (dietitians, social workers), the community, and health care agencies.
 6. High ethical and professional standards to provide the most compassionate and cost effective patient care.
 7. A strong background in evidenced based medicine utilizing the disciplines of epidemiology, biostatistics, outcomes research, and critical appraisal of the literature.

SPECIFIC PROGRAM CONTENT

Disorders of mineral metabolism including nephrolithiasis and renal osteodystrophy.
Disorders of fluid, electrolyte, and acid-base regulation.

Acute renal failure.

Chronic kidney disease and its management including nutritional management of uremia.

ESRD

Hypertensive disorders.

Renal disorders in pregnancy.

Urinary tract infections.

Tubulointerstitial disorders including inherited diseases of transport, cystic diseases, and other congenital disorders.

Glomerular and vascular diseases including the glomerulonephritides, diabetic nephropathy, and atheroembolic renal disease.

Disorders of drug metabolism and renal drug toxicity.

Genetic and inherited renal disorders.

Geriatric aspects of nephrology including disorders of the aging kidney and urinary tract.

GENERAL GUIDELINES

Order Writing

All orders pertaining to dialysis must be written on preprinted dialysis order forms. Verbal orders are acceptable at the discretion of the nursing staff, and must be cosigned by the prescribing physician within a 24-hour period. No orders may be written on the dialysis order sheets by any other physician and will not be followed by the dialysis nurse. Since the fellow

is responsible for meaningful patient care, attendings are discouraged from writing any orders. Rather, their role should be reviewing the orders with the fellow and providing educational feedback on the treatment plan.

On the renal inpatient service at Memorial Hermann Hospital and all consulting services, order writing by the fellow is discouraged unless it has been discussed with the primary service for that patient. In order to foster communication between services, a treatment plan for the patient should be relayed to the consulting service in a timely manner. At that juncture, the orders pertaining to further evaluation can be written either by the primary service or if requested by them, by the renal fellow. On the renal inpatient service, orders not pertaining to the dialysis prescription should be written by the medical house staff (students, interns, and residents) assigned to the service that month.

Lines of Responsibility

As consultants, our primary role is to suggest a diagnostic evaluation and treatment plan to the primary service. In this role, all decisions related to the care of the patient are the purview of the primary service. It is expected that fellows will teach both students and residents assigned to the various renal services as well as the residents who have called consults. Timely communication with the consulting physicians will expedite work-up. The renal service is only directly responsible for care and management of issues directly related to dialysis.

Private/Non-Teaching Patients

Renal fellows are not responsible for the care or evaluation of patients of private nephrologists. When called about a renal patient, the physician calling must ascertain the name of that patient's outpatient Nephrologist. If the private Nephrologist has admitting privileges (a list is posted in the emergency room), the physician in charge of the patient's care should contact that Nephrologist. For patients whose Nephrologist does not admit to the hospital, they become teaching patients and we provide the necessary renal care.

Days Off

Fellow will as a minimum have one 24-hour period off each 7-day period. Beepers are to be turned off during this period.

Call

Fellows are expected to see and evaluate any patient when consulted on-call. After the evaluation, they should phone the appropriate attending to discuss their findings and devise a treatment plan.

Work-Hours

On average, fellows will work less than 70 hours per week. When averaged over a year, excluding vacation, fellows are provided a minimum of 48 days free of patient care duties, including home-call responsibility.

Conference Responsibilities

Fellows are expected to prepare and present in a variety of conference settings. Topics should be considered cutting-edge and prepared in power-point fashion.

Personal Conduct/Ethical Behavior

Fellows must have the welfare of their patients as their primary professional concern. Fellows must demonstrate humanistic qualities that foster empathetic, constructive, and effective patient/physician relationships. Such qualities include integrity, respect, compassion, professional responsibility, courtesy, sensitivity to patient needs for comfort and encouragement, and a professional attitude and behavior towards colleagues.

Evaluation/Promotion

The Attending Nephrologist evaluates the fellow's performance at the end of each month. The fellow's performance is discussed in person. These evaluations are in turn monitored by the Fellowship Review Committee that meets quarterly. Finally, the Program Director meets with each fellow a minimum of twice per year. Satisfactory performance is necessary for promotion and certification to sit for the Medicine Boards in Nephrology. If a fellow's performance is poor, the Program Director outlines the deficiencies and devises a course of action for improvement. Performance is then monitored on a weekly basis. If substantial improvement is not made after a reasonable time period, the fellow may not be promoted, or may be dismissed. Such fellows have the right to a grievance hearing as outlined in the UT System Medical Foundation GME Handbook distributed at the beginning of the year.

Policy for Moonlighting

Fellows are not required or encouraged to engage in moonlighting. At no time will the fellow represent the University of Texas Health Science Center while moonlighting.

The Fellow will not be allowed to moonlight in nephrology (the area in which they are currently being trained), or risk jeopardizing his/her status in the fellowship program with the University of Texas.

Moonlighting should be limited to no more than 3-4 nights per month, and only when it will not interfere with performance of one's clinical and academic duties.

Moonlighting should be very limited during rotations on the Memorial Hermann Consult Service, the MD Anderson Cancer Center Consult Service, and the LBJ Hospital Consult Service. Moonlighting is prohibited during standard work hours for a given service and when on-call.

All fellows engaged in moonlighting must be licensed for unsupervised medical practice in Texas. It is the responsibility of the institution hiring the fellow to moonlight to determine whether such licensure is in place, whether adequate liability coverage is provided (the University of Texas Health Science Center will not provide liability coverage for moonlighting activities), and whether the fellow has the appropriate training and skills to carry out assigned duties. The sponsoring institution must ensure that Dr. Kone as program director acknowledges in writing that she/he is aware that the fellow is moonlighting, and that this information is made part of the fellow's file.

According to the ACGME institutional policy, each fellow who engages in moonlighting activities must provide written notification of their intent and participation to Bruce C. Kone, M.D., Program Director for Nephrology Fellowship Program of the Division of Renal Diseases and Hypertension, and receive approval from Dr. Kone.

CORE COMPETENCIES

As directed by the ACGME, we have begun to implement a system to provide fellows a means to achieve competency in 6 core areas. The clinical and teaching venues where these core areas are taught and the evaluation tools that will be utilized are outlined below as well as in the specific content section of each rotation.

1. PATIENT CARE (PC)

Fellows must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health. Fellows are expected to:

- communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families
- gather essential and accurate information about their patients
- make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgment
- develop and carry out patient management plans

counsel and educate patients and their families
use information technology to support patient care decisions and patient education
perform competently all medical and invasive procedures considered essential for
the area of practice
provide health care services aimed at preventing health problems or maintaining
health
work with health care professionals, including those from other disciplines, to
provide patient-focused care

(a) Educational sites/methods

- I) Inpatient consult services
- II) Outpatient clinics
- III) Outpatient dialysis
- IV) Inpatient ward services
- V) Patient care conference (PCC) at dialysis
- VI) ESRD conference
- VII) Standardized patient

(b) Evaluation tools

- I) Direct faculty observations (DFO) using evaluation forms
- II) Standardized patient (SPF)
- III) Associate evaluation form (AEF) by nursing personnel
- IV) Oral examination (OE)
- V) Written examination (WE)
- VI) Computer simulated cases (CSC)
- VII) Patient evaluation form (PEF)

2. MEDICAL KNOWLEDGE (MK)

Fellows must demonstrate knowledge about established and evolving biomedical, clinical, and cognate (e.g. epidemiological and social-behavioral) sciences and the application of this knowledge to patient care. Fellows are expected to:

demonstrate an investigatory and analytic thinking approach to clinical situations
know and apply the basic and clinically supportive sciences which are appropriate
to their discipline

(a) Educational sites/methods

- I) Inpatient wards and consult services
- II) Outpatient clinics
- III) Outpatient dialysis
- IV) Renal Grand Rounds
- V) Renal Journal Club
- VI) Research conference
- VII) Biopsy conference
- VIII) Basic Science conference
- IX) Patient care conference (PCC) at dialysis
- X) ESRD conference

(b) Evaluation tools

- I) Direct faculty observation (DFO)

- II) Oral examination (OE)
- III) Written examination (WE)
- IV) Computer simulated cases (CSC)
- V) Literature search review (LSR)
- VI) Presentation critique form (PCF)

3. PRACTICE-BASED LEARNING AND IMPROVEMENT (PBL)

Fellows must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices. Fellows are expected to:

- analyze practice experience and perform practice-based improvement activities using a systematic methodology
- locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems
- obtain and use information about their own population of patients and the larger population from which their patients are drawn
- apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness
- use information technology to manage information, access on-line medical information; and support their own education
- facilitate the learning of students and other health care professionals

(a) Educational sites/methods

- I) Inpatient wards and consults
- II) Outpatient clinics and dialysis
- III) PCC
- IV) ESRD conference
- V) Renal Journal Club
- VI) Biopsy conference

(b) Evaluation tools

- I) Direct faculty observation (DFO)
- II) Literature search review (LSR)
- III) Presentation critique form (PCF)
- IV) Associate evaluation form (AEF)
- V) Resident/Student evaluation form (RSEF)
- VI) Oral examination (WE)

4. INTERPERSONAL AND COMMUNICATION SKILLS (ICS)

Fellows must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their patients families, and professional associates. Fellows are expected to:

- create and sustain a therapeutic and ethically sound relationship with patients

use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills
work effectively with others as a member or leader of a health care team or other professional group

a) Educational sites/methods

- I) Inpatient wards and consults
- II) Outpatient clinics and dialysis
- III) PCC
- IV) ESRD conference
- V) Standardized patient

b) Evaluation tools

- I) Direct faculty observation (DFO)
- II) Standardized patient form (SPF)
- III) Associate evaluation form (AEF)
- IV) Resident/student evaluation form (RSEF)
- V) Patient evaluation form (PEF)

5. PROFESSIONALISM (P)

Fellows must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population.

Fellows are expected to:

demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society that supercedes self-interest; accountability to patients, society, and the profession; and a commitment to excellence and on-going professional development

demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices

demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities

Educational sites/methods

- I) Inpatient wards and consults
- II) Outpatient clinics and dialysis
- III) PCC
- IV) ESRD conference
- V) Standardized patient

Evaluation Tools

- I) Direct faculty observation (DFO)
- II) Standardized patient form (SPF)
- III) Associate evaluation form (AEF)
- Resident/student form (RSEF)
- Patient evaluation form (PEF)

6. SYSTEMS-BASED PRACTICE (SBP)

Fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value. Fellows are expected to:

- understand how their patient care and other professional practices affect other health care professionals, the health care organizations, and the larger society and how these elements of the system affect their own practice
- know how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources
- practice cost-effective health care and resource allocation that does not compromise quality of care
- advocate for quality patient care and assist patients in dealing with system complexities
- know how to partner with health care managers and health care providers to assess, coordinate, and improve health care and know how these activities can affect system performance

Educational sites/methods

- I) Inpatient wards and consults
- II) Outpatient clinics and dialysis
- III) PCC
- IV) ESRD conference
- V) Renal Grand Rounds

Evaluation Tools

- I) Direct faculty observation (DFO)
- II) Oral examination (EO)
- III) Written examination (WE)
- IV) Associate evaluation form (AEF)

EVALUATION TOOLS FOR CORE COMPETENCIES

The following is a guide to the evaluation tools to assess adequacy in the core competencies.

1. Direct Faculty Observation Form: Traditional American Board of Internal Medicine (ABIM) form graded on a 1 through 9 scale on several key areas. Observation takes place during the month long consult and inpatient ward assignments. The faculty, based on performance in outpatient clinics and dialysis, also fill out this form.
2. Oral Examinations: Semi-annually, over a ½ day period, fellows will review 3-5 written patient simulated cases, then discuss with a faculty member the differential diagnosis and proposed treatment plans. Faculty will be provided with a script to appraise the fellows' medical knowledge, synthesis skills, knowledge of current literature, and ability to think on their feet.
3. Written Examination: Annually fellows will take a board-style multiple-choice examination to assess their medical knowledge.

4. Associate Evaluation Form: Will be filled out by the nursing staff on the inpatient ward, inpatient and outpatient dialysis units, and the outpatient clinics. It is an attempt to give feedback on others' perceptions of the fellows' interpersonal skills, professionalism, and medical knowledge.
5. Resident/Student Evaluation Form: Will be filled out by students and residents with whom the fellow works. Its purpose is to provide feedback on teaching skills, interpersonal skills with ancillary staff, patients, and their families.
6. Standardized Patient Forms: Will be filled out annually by faculty who will observe the fellow complete a history and physical on a patient not known to the fellow. Its purpose is to provide feedback on interpersonal skills and professionalism.
7. Patient Evaluation Form: To be filled out by clinic and dialysis patients assigned to the fellow. Its purpose is to provide feedback on interpersonal skills, compassion, and professionalism as perceived by the patients.
8. Computer Simulated Cases: Semi-annually, fellows will review cases on CD-ROM that requires interpretation of renal biopsy slides of urinalyses. The purpose is to ensure the ability to interpret correctly these diagnostic studies, assess medical knowledge, and verify familiarity with the medical literature.
9. Literature Search Review: Each fellow will provide a copy of the methods used to search the medical literature when preparing for Renal Grand Rounds, Renal Biopsy Conference, and Research Conference. The results of the search will be discussed with the fellow by a member of the division with expertise in evidence based medicine and literature searching. The purpose is to continually improve the skill of the fellow in the use of the medical literature and evidence based medicine.
10. Presentation Critique Form: All attendees at any conference given by the fellow will fill out the form. Its purpose is to provide feedback on presentation skills, teaching skills, medical knowledge, and familiarity with the medical literature.
11. Portfolio: The aforementioned evaluation tools, along with procedure logs placed in the fellows' permanent file constitutes the portfolio. It is expected that the synthesis of these varied data will better define the individual strengths of the fellow and suggest areas for further improvement.

Abbreviations for Specific Content

Core competencies to obtain

Patient Care = PC

Medical Knowledge = MK

Practice-Based Learning and Improvement = PBL

Interpersonal and Communication Skills = ICS

Professionalism = P

Systems-Based Practice = SBP

Evaluation Tools

Direct Faculty Observation = DFO

Oral Examination = OE

Written Examination = WE
Associate Evaluation Form = AEF
Resident/Student Evaluation = RSEF
Standardized Patient Form = SPF
Patient Evaluation Form = PEF
Computer Simulated Cases = CSC
Literature Search Review = LSR
Presentation Critique Form = PCF

SPECIFIC CONTENT

MEMORIAL-HERMANN HOSPITAL CONSULT SERVICE

I. Educational Purpose: The purpose of this rotation is to develop expertise in the evaluation and management of nephrologic disorders in a large primary and tertiary care center. This rotation also stresses effective communication skills and cost containment.

II. Principle Teaching Method: The principle teaching method on this rotation is daily teaching rounds with the Attending nephrologist. Rounds are made every day where bedside teaching takes place.

III. Educational Content:

A. Memorial-Hermann Hospital is a private general hospital adjacent to the medical school in the Texas Medical Center with 665 beds. It is a primary and tertiary care center, as well as a trauma hospital, and exposes trainees to a wide variety of patients and a broad mix of diseases. Consults are derived from all services at the hospital, including general Medicine, Surgery and its subspecialty services, and OB/GYN. All major medical services, an emergency room, trauma center, and intensive care units are present, and it offers state of the art clinical laboratories and imaging facilities: renal pathology with electron microscopy and immunofluorescence, a diagnostic radio nuclide laboratory, biochemistry and serologic laboratories, nutritional support services, social services, CT/spiral CT scans, MRI/MRA, PET scanning, gamma knife, and an active Interventional Radiology department.

Fellows are assigned on a monthly basis two to three times per year, and are supervised by a full time faculty attending. The consulting team is supplemented by rotating internal medicine residents and medical students. The monthly Attending nephrologist meets with the team daily to evaluate and discuss new patients and to see all follow up patients. Fellows, no more than every fourth night, take call from home for any night or weekend consults/emergencies, always under supervision of an Attending nephrologist. Patients who require follow-up after discharge are referred to the continuity clinic of the consulting fellow.

Patients are of varied ethnicity and include self-pay, managed care and private insurance. The patients may be under the care of faculty or private physicians. By its founding charter, Memorial-Hermann Hospital has a strong commitment to indigent care in the greater Houston area.

Specific educational content on this rotation includes:

- 1) Evaluation and management of Acute Renal Failure (ARF)
- 2) Management of Intermittent Hemodialysis for ARF, poisonings and intoxications.
- 3) Evaluation and treatment of proteinuria and hematuria
- 4) Evaluation and management of glomerular diseases including immune complex diseases (e.g. SLE) and vasculitis
- 5) Evaluation and treatment of diabetic nephropathy
- 6) Evaluation and management of primary and secondary hypertension
- 7) Evaluation and management of renal diseases in pregnancy
- 8) Evaluation and management of acid base disturbances
- 9) Evaluation and management of fluid and electrolyte disorders
- 10) Evaluation and management of vascular diseases of the kidney
- 11) Understand the social and ethical issues of patient encounters and learn from the faculty how to address these for the patient's best interests.

D. Core competencies obtained: PC, MK, PBL, ICS, P, SBP

IV. Procedures: On this rotation trainees will learn the indications, contraindications, and performance of:

Intravenous access for temporary dialysis (internal jugular, subclavian and femoral veins)

Urinalysis

Percutaneous renal biopsy

Peritoneal dialysis

Hemodialysis

Continuous dialysis

Fellows are required to maintain a record of all procedures performed, which is verified by the Attending nephrologist.

V. Ancillary Education: Trainees are provided with a supplemental reading list. Trainees are expected to attend The Division's weekly educational conferences at the Medical School, as well as attend weekly Internal Medicine Grand Rounds.

VI. Methods of Evaluation:

At the start of the rotation, the fellow is provided a list of educational objectives, expected to be met by the end of the rotation. The fellow and faculty at the rotation's conclusion will sign off this list.

At the end of the rotation, the Attending Nephrologist on standardized forms, which are submitted to the program committee, which meets quarterly,

evaluates trainees. On at least a semi-annual basis, the program director or associate director meets with each trainee and discusses his or her performance. Trainees also complete forms at the end of the rotation identifying the strengths and weaknesses of the Attending nephrologist as well as the sponsoring institution. These forms are reviewed by the program director.

MEMORIAL-HERMANN HOSPITAL
ICU SERVICE

I. Educational Purpose: The purpose of this rotation is to develop expertise in the evaluation and management critically ill patients in a large primary and tertiary care center. This rotation also stresses effective communication skills.

II. Principle Teaching Method: The principle teaching method on this rotation is daily teaching rounds with the Attending nephrologist. Rounds are made once per day where bedside teaching takes place.

III. Educational Content:

- A. Memorial-Hermann Hospital is a private general hospital adjacent to the medical school in the Texas Medical Center with 150 ICU beds. It is a primary and tertiary care center, as well as a trauma hospital, and exposes trainees to a wide variety of patients and a broad mix of diseases. Consults are derived from all services at the hospital, including Cardiology, Pulmonary-Critical Care, Cardiovascular Surgery, General Surgery and its subspecialty services, OB/GYN, and Neurology.
- B. Fellows are assigned on a monthly basis two to three times per year, and are supervised by a full time faculty attending. The monthly Attending nephrologist meets with the team daily to evaluate and discuss new patients and to see all follow up patients. Patients on continuous renal replacement therapies are seen twice daily by the team. Fellows, no more than every fourth night, take call from home for any night or weekend consults/emergencies, always under supervision of an Attending nephrologist.
- C. Specific educational content on this rotation includes:
 - Define the role of the primary care provider and multidisciplinary care team in the management of the renal patient
 - Discuss the role of the care team members with the care providers in society to help define and outline a team approach that optimizes patient care while controlling cost of care
 - Review and understand Medicare and Medicaid rules and regulations in the area of renal related diseases to optimize the delivery of medical care while containing cost of care
 - Operate as patient advocates in the area of quality care in helping patients deal with system complexities
 - Operate as a partner with health care manager, social workers, and other health care providers to assess, coordinate, and improve health care

- Evaluation and management of acute renal failure (ARF), including nutritional management
- Management of intermittent hemodialysis for ARF, poisonings and intoxications.
- Evaluation and management of acid base disturbances
- Evaluation and management of fluid and electrolyte disorders
- Management of drug clearance and dosing in the renal patient and in the dialyzed renal patient
- Understand the social and ethical issues of patient encounters and learn from the faculty how to address these for the patient's best interests
- Intravenous access for temporary dialysis (internal jugular, subclavian and femoral veins)
- Interpretation of urinalysis
- Hemodialysis
- Management of continuous renal replacement therapies (CAVHD/F and CVVHD/F)
- Understand role of dialysis adequacy in ARF
- Understand independent role of ARF in mortality of critically ill patients
- Learn interventions related to critical illness that affect renal function

Core competencies obtained: PC, MK, PBL, ICS, P, SBP

IV. Procedures: On this rotation trainees will learn the indications, contraindications, and performance of:

Intravenous access for temporary dialysis (internal jugular, subclavian and femoral veins)

Urinalysis

Percutaneous renal biopsy

Peritoneal dialysis

Hemodialysis

Continuous dialysis

Fellows are required to maintain a record of all procedures performed, which is verified by the Attending nephrologist.

V. Ancillary Education: Trainees are provided with a supplemental reading list. Trainees are expected to attend The Division's weekly educational conferences at the Medical School, as well as attend weekly Internal Medicine Grand Rounds.

VI. Methods of Evaluation:

At the start of the rotation, the fellow is provided a list of educational objectives, expected to be met by the end of the rotation. The fellow and faculty at the rotation's conclusion will sign off this list.

At the end of the rotation, the Attending Nephrologist on standardized forms, which are submitted to the program committee, which meets quarterly, evaluates trainees. On at least a semi-annual basis, the program director or associate director meets with each

trainee and discusses his or her performance. Trainees also complete forms at the end of the rotation identifying the strengths and weaknesses of the Attending nephrologist as well as the sponsoring institution. These forms are reviewed by the program director.

M.D. ANDERSON CANCER CENTER
CONSULT SERVICE

I. Educational Purpose: The purpose of this rotation is to develop expertise in the evaluation and management of nephrologic disorders in a rather unique patient population, namely patients receiving treatment for various malignancies.

II. Principle Teaching Method: The principle teaching method on this rotation is daily teaching rounds with the full time faculty Attending nephrologist, where bedside instruction is stressed.

III. Educational Content:

A. The University of Texas M.D. Anderson Cancer Center (MDACC), located within the Texas Medical Center, is a 418-bed facility that provides care to patients with cancer. It provides care to all Texans regardless of the ability to pay, and as an internationally recognized center of excellence, it has many patients from out of state and foreign countries. Therefore, the mix of diseases ranges from simple toxin mediated renal disease to rare, or previously unrecognized, paraneoplastic renal syndromes. MDACC has a busy emergency room, multiple outpatient clinics, medical and surgical intensive care units, and active medical and surgical services from which consultations are derived. The hospital offers a full array of clinical laboratory biochemistry and serologic laboratories, Interventional Radiology, nutritional support services, and social services. Renal biopsy specimens obtained at MDACC are processed and evaluated by the Pathology Department at Hermann Hospital.

Fellows are assigned on a monthly basis two to three times per year. The consult team is composed of the full time U.T. nephrology faculty member and the fellow who evaluates and presents all patients on a daily basis to the Attending nephrologist. No more than every fourth night, the fellow takes call from home for any night or weekend consults/emergencies under the supervision of the Attending nephrologist. Patients requiring outpatient follow-up after discharge are referred to the outpatient clinics at MDACC (see V. Ancillary Education).

B. The patient population is quite diverse since MDACC has an international reputation as a center of excellence. Many patients are from out of state, and often, from foreign countries.

C. Specific educational content on this rotation includes:

- 1) Evaluation and management of Tumor Lysis Syndrome
- 2) Evaluation and management of Acute Renal Failure (ARF) in Bone Marrow Transplantation
- 3) Evaluation and management of paraneoplastic renal syndromes

- 4) Evaluation and management of ARF associated with biological agents
- 5) Evaluation and management of toxin mediated renal disease
- 6) Management of acute and chronic intermittent hemodialysis
- 7) Management of continuous renal replacement utilizing Sustained Low-Efficiency Dialysis (SLED).
- 8) Understand the social and ethical issues of caring for patients with cancer and learn from the faculty how to address them in the best interests of the patient.

Core competencies obtained: PC, MK, PBL, ICS, P, SBP

IV. Procedures: Trainees are expected to learn the indications, contraindications and performance of:

- 1) Intravenous access for temporary dialysis (internal jugular, subclavian, and femoral veins)
- 2) Percutaneous renal biopsy
- 3) Urinalysis
- 4) Hemodialysis
- 5) Peritoneal dialysis
- 6) Continuous dialysis

Fellows are required to maintain a record of all procedures performed, which is verified by the Attending nephrologist.

V. Ancillary Education:

1. M.D. Anderson Outpatient Clinics: In addition to the inpatient consult service, while on this rotation the fellow and the Attending nephrologist attend two half-day renal clinics at MDACC per week. These patients are typically being seen in follow up after discharge from the hospital, or have underlying renal disorders and have recently been referred to MDACC because of malignancy. Approximately 2-4 new patients and 3-6 return patients are seen each week.
2. Trainees are supplied with a supplemental reading list and are expected to attend the two weekly Divisional educational conferences at the Medical School.

VI. Methods of Evaluation:

1. At the start of the rotation, the fellow is provided a list of educational objectives, expected to be met by the end of the rotation. The fellow and faculty at the rotation's conclusion will sign off this list.
2. At the end of the rotation, the Attending nephrologist on standardized forms, which are submitted to the program committee, which meets quarterly, evaluates trainees. On at least a semi-annual basis, the program director or associate director meets with each trainee and discusses his or her performance. Trainees also complete forms at the end of the rotation identifying the strengths and weaknesses of the Attending nephrologist as well

as the sponsoring institution. These forms are reviewed by the program director.

L.B.J. GENERAL HOSPITAL **CONSULT SERVICE**

I. Educational Purpose: The purpose of this rotation is to develop expertise in the evaluation and management of nephrologic disorders in a county hospital, which provides care mainly to the poor and uninsured.

II. Principle Teaching Method: The principle teaching method on this rotation is daily teaching rounds with the Attending nephrologist where bedside teaching is stressed.

III. Educational Content:

A. Lyndon B. Johnson (LBJ) General Hospital is a 306-bed acute care facility operated by the Harris County Hospital District and staffed solely by the faculty of the University of Texas – Houston Medical School. It serves as one of two county hospitals providing care to indigent people in Harris County, and is located approximately 12 miles from the Texas Medical Center. It has a busy emergency room and intensive care unit, and active medical, surgical and obstetrical services from which consultations are derived. LBJ General Hospital offers full clinical laboratories and imaging facilities: CT scan diagnostic radionuclide laboratory, biochemistry and serologic laboratories, MRI/MRA, Interventional Radiology, nutritional support services, and social services. Renal biopsy specimens obtained at LBJ General Hospital are processed and evaluated by the Pathology Department at Hermann Hospital.

Fellows are assigned on a monthly basis two to three times per year. The fellow, under the supervision of a full time faculty Attending coordinates the consulting teach of rotating internal medicine residents and medical students, and meets daily with the Attending nephrologist to evaluate and discuss new patients and all follow-up patients. Fellows, no more than every fourth night, take call from home for any night or weekend consults/emergencies, always under the supervision of the Attending nephrologist. Patients requiring outpatient follow-up after discharge are referred to the outpatient renal clinics at LBJ General Hospital (See V. Ancillary Education).

The mix of disease on this rotation is quite diverse. Given the patient population, in many circumstances, the trainee will see late or severe manifestations of common diseases because of inadequate, or lack of, previous treatment.

B. The population consists mainly of uninsured residents of Harris County with mostly African-American and Hispanic people. There is also a small contingent of illegal residents.

C. Specific educational content on this rotation includes:

- 1) Evaluation and management of acute renal failure (ARF)
- 2) Management of intermittent hemodialysis for ARF, poisonings and intoxications
- 3) Evaluation and management of proteinuria and hematuria

- 4) Evaluation and management of glomerular diseases including immune complex diseases (e.g. SLE) and vasculitis
- 5) Evaluation and management of diabetic nephropathy
- 6) Evaluation and management of primary and secondary hypertension
- 7) Evaluation and management of renal diseases in pregnancy
- 8) Evaluation and management of acid base disturbances
- 9) Evaluation and management of fluid and electrolyte disorders
- 10) Evaluation and management of vascular diseases of the kidney
- 11) Understand the social and ethical issues of indigent care and learn from the faculty how to address them in the best interests of the patients
- 12) Appreciate the emotional impact of achieving ESRD and to understand means of providing emotional support during the potentially devastating period

Core competencies obtained: PC, MK, PBL, ICS, P, SBP

IV. Procedures: On this rotation, trainees will learn the indications, contraindications, and performance of:

1. Intravenous access for temporary dialysis (internal jugular, subclavian, and femoral veins)
2. Percutaneous renal biopsy
3. Urinalysis
4. Hemodialysis

Fellows are required to maintain a record of all procedures performed, which is verified by the Attending nephrologist.

V. Ancillary Education:

1. LBJ Renal Clinics: While on the consult service at LBJ General Hospital, the trainee and Attending nephrologist see patients in three weekly outpatient renal clinics. Patients are referred from community clinics, resident clinics, the emergency room, or are hospital follow-ups from the inpatient consult service. The mix of diseases is very broad, including hypertension, glomerulonephritis, renal failure, and proteinuria.
2. In addition, trainees are supplied with a supplemental reading list and are expected to attend the two weekly Divisional educational conferences at the Medical School.

VI. Methods of Evaluation:

1. At the start of the rotation, the fellow is provided a list of educational objectives, expected to be met by the end of the rotation. The fellow and faculty at the rotation's conclusion will sign off this list.
2. At the end of the rotation, the Attending nephrologist on standardized forms, which are submitted to the program committee, which meets quarterly, evaluates trainees. On at least a semi-annual basis, the program director or associate

director meets with each trainee and discusses his or her performance. Trainees also complete forms at the end of the rotation identifying the strengths and weaknesses of the Attending nephrologist as well as the sponsoring institution. These forms are reviewed by the program director.

RENAL INPATIENT SERVICE **MEMORIAL-HERMANN HOSPITAL**

I. Educational Purpose: The educational purpose of this rotation is to develop expertise in the evaluation and management of medical problems in patients with chronic renal failure, particularly dialysis patients. As an inpatient service, issues such as cost effectiveness, length of stay, and use of home health agencies become paramount.

II. Principle Teaching Method: The principle teaching method on this rotation is daily teaching rounds with the Attending nephrologist. Rounds are made every day where bedside teaching takes place.

III. Educational Content:

A. This rotation takes place on a 24-bed inpatient ward at Memorial-Hermann Hospital (previously described) dedicated to the care of patients of the Division of Renal Diseases and Hypertension at the Medical School. There are approximately 40 admissions to this unit per month. The hospital provides a full array of clinical laboratory and imaging facilities as previously described. While hospitalized, patients requiring dialysis are treated in an inpatient dialysis unit located on the floor directly above the ward. The mix of diseases on this service reflect the typical medical and surgical disorders seen in dialysis patients such as sepsis, congestive heart failure, pulmonary edema, malfunctioning vascular access, diabetes, hypertension, coronary artery disease, and peripheral vascular diseases. Unique to this rotation is a weekly multidisciplinary conference (**ESRD Conference**) composed of representatives from nephrology, nursing, psychiatry, nutrition, social service, and case management, which discuss the unique problems of each patient in order to provide exemplary and cost effective patient care (see V. Ancillary Education).

Fellows are assigned on a monthly basis two to three times per year. The fellow leads a team composed of a rotating internal medicine resident, two interns, and two to three medical students. The team meets daily with the Attending nephrologist to discuss and see all new and previously admitted patients. By example of the faculty, the fellow learns effective communication with consultants and other members of the health care team, as well as the nuisances of managed care, length of stay, home health services, and the social/ethical issues relating to patients with ESRD. No

more than every fourth night, fellows take night call from home for any admissions/emergencies under the supervision of the Attending nephrologist.

- B. The patient population is predominantly composed of the dialysis and clinic patients of the Division's faculty and fellows. Most patients receive Medicare and are predominantly Hispanic or African-American.
- C. Specific educational content on this rotation includes:
 - 1) Evaluation and management of malfunctioning dialysis vascular access
 - 2) Evaluation and management of metabolic bone disease
 - 3) Evaluation and management of anemia of renal failure
 - 4) Prescription and management of peritoneal dialysis (P.D.)
 - 5) Management of intermittent hemodialysis
 - 6) Evaluation and management of P.D. peritonitis
 - 7) Evaluation and management of medical disorders in dialysis patients, such as heart failure, hypertension, diabetes and sepsis.
 - 8) Evaluation and management of P.D. catheter related problems such as nonfunction, exit site and tunnel infections, and hernias and catheter leaks.
 - 9) Understand the social and ethical issues of caring for patients with ESRD and learn from the faculty and the weekly multidisciplinary team meeting including how to address them in the best interests of the patient.

Core competencies obtained: PC, MK, PBL, ICS, P, SBP

IV. Procedures: Trainees are expected to learn the indications, contraindications and performance of:

- 1. Intravenous access for temporary dialysis (internal jugular, subclavian, and femoral veins)
- 2. Laproscopic placement of peritoneal dialysis catheters
- 3. Hemodialysis
- 4. Peritoneal dialysis

Fellows are required to maintain a record of all procedures performed, which is verified by the Attending nephrologist.

V. Ancillary Education: In addition to daily teaching rounds, trainees are expected to attend the Division's two weekly educational conferences at the Medical School, as well as Internal Medicine Grand Rounds. Trainees also attend the weekly **ESRD Meeting**, a multidisciplinary evaluation of patients hospitalized on the service to expedite discharge planning (see Educational Content). Finally, a supplemental reading list is supplied.

VI. Methods of Evaluation:

1. At the start of the rotation, the fellow is provided a list of educational objectives, expected to be met by the end of the rotation. The fellow and faculty at the rotation's conclusion will sign off this list.
2. At the end of the rotation, the Attending nephrologist on standardized forms, which are submitted to the program committee, which meets quarterly, evaluates trainees. On at least a semi-annual basis, the program director or associate director meets with each trainee and discusses his or her performance. Trainees also complete forms at the end of the rotation identifying the strengths and weaknesses of the Attending nephrologist as well as the sponsoring institution. These forms are reviewed by the program director.

MEMORIAL-HERMANN HOSPITAL **Interventional Nephrology Service**

I. Educational Purpose: The purpose of this rotation is to gain exposure to the field of interventional nephrology (IN). This rotation also stresses effective communication skills.

II. Principle Teaching Method: : The principle teaching method on this rotation is direct supervision of nephrology fellows by Interventional Radiology attendings. All procedures are performed in the IR suites at Memorial-Hermann Hospital.

III. Educational Content:

A. Fellows are assigned one month per year to do procedures with the Interventional radiologist.

B. Specific educational content:

1. Coordinate the care of vascular access complications in dialysis patients
2. Operate as patient advocates in the area of quality care in helping patients deal with dialysis access complications
3. Operate as a partner with health care manager, social workers, and other health care providers to assess, coordinate, and improve the vascular access health of dialysis patients
4. Communicate effectively with referring physicians and out patient dialysis clinics
5. Learn to place temporary dialysis catheters and tunneled dialysis catheters under visualization with ultrasound and fluoroscopy
6. Removal of tunneled dialysis catheters
7. Evaluation of arteriovenous (AV) fistulas and grafts
8. Percutaneous access and angioplasty of AV access
9. Vein mapping for dialysis access placement

Core competencies obtained: PC, MK, ICS, P, SBP

IV. Methods of Evaluation:

At the start of the rotation, the fellow is provided a list of educational objectives, expected to be met by the end of the rotation. The fellow and faculty at the rotation's conclusion will sign off this list.

At the end of the rotation, the Attending Radiologist on standardized forms, which are submitted to the program committee, which meets quarterly, evaluates trainees. On at least a semi-annual basis, the program director or associate director meets with each trainee and discusses his or her performance. Trainees also complete forms at the end of the rotation identifying the strengths and weaknesses of the Attending radiologist as well as the sponsoring institution. These forms are reviewed by the program director.

MEMORIAL-HERMANN HOSPITAL **RENAL TRANSPLANTATION**

I. Educational Purpose: The purpose of this rotation is to develop expertise in the evaluation and management of patients undergoing renal transplantation.

II. Principle Teaching Method: The principle teaching method is daily teaching rounds with the Attending nephrologist and Transplant Surgeon at the bedside.

III. Educational Content:

- A. The transplant service at Memorial-Hermann Hospital (previously described) is quite busy, having performed more than 100 transplants last year. The hospital provides a full array of clinical, laboratory, and imaging facilities as previously described.

Fellows are assigned to the transplant service for 3-months over a 2-year period where they provide care to all patients on the service. The patients are seen on a daily basis with both an Attending Nephrologist and Attending Transplant Surgeon. During the rotation, the fellow functions as an integral part of the transplant service and will spend time in the operation suite to observe both organ harvesting and transplantation. All patients are followed after discharge in the Renal Transplant clinic (see Ancillary Education).

The mix of diseases is quite varied. The leading causes for transplantation include diabetes, hypertension and chronic glomerulonephritis. Problems encountered include rejection, unusual infections and secondary malignancies.

- B. Physicians in the local community or adjacent states refer most patients for transplantation. There is also a large contingent of international clients.

C. Specific educational content on this rotation includes:

- 1) Evaluation and selection of the transplant recipient
- 2) Evaluation of the transplant donor
- 3) Medical management of acute and chronic rejection

- 4) Clinical diagnosis of all forms of rejection including laboratory, histopathologic, and imaging techniques
- 5) Mechanism of action and side effects of immunosuppressant drugs, including steroids, cyclosporin, azothroprine, mycophenolate, tacrolimus, rapamycin, ALG and monoclonal antibodies.
- 6) Drug – drug interactions in transplant patients
- 7) Evaluation and management of post transplant hypertension
- 8) Evaluation and management of infections in transplant patients
- 9) Secondary malignancies in transplant patients
- 10) Transplantation immunology
- 11) Socio-economic barriers to transplantation
- 12) Long term transplant follow-up in clinics
- 13) Management of intermittent dialysis
- 14) Management of continuous dialysis (CVVHD/F)
- 15) Management of immunosuppression

Core competencies obtained: PC, MK, PBL, ICS, P, SBP

IV. Procedures: On this rotation, trainees will learn the indications, contraindications and performance of:

1. Intravenous access for temporary dialysis (internal jugular, subclavian, and femoral veins)
2. Transplant percutaneous renal biopsy
3. Urinalysis
4. Hemodialysis
5. Peritoneal dialysis
6. Continuous dialysis

The fellow is required to maintain a record of procedures performed, which is verified by the Attending nephrologist.

V. Ancillary Education:

1. Outpatient Transplant Clinics: Each fellow throughout the 2-year training period is assigned to a monthly renal transplant clinic. This provides fellows an opportunity to follow more than 20 transplant patients longitudinally in an ambulatory setting. The patients are derived from the inpatient service described above.
2. Fellows are supplied with a supplemental reading list, the book “The Handbook of Renal Transplantation,” and are expected to attend all Transplant Conferences including the Morbidity & Mortality Conference.

VI. Methods of Evaluation:

1. At the start of the rotation, the fellow is provided a list of educational objectives, expected to be met by the end of the rotation. The fellow and faculty at the rotation’s conclusion will sign off this list.

2. At the end of the rotation, the Attending Nephrologist and Transplant Surgeon on standardized forms, which are submitted to the program committee, which meets quarterly, evaluate trainees. On at least a semi-annual basis, the program director or associate director meets with each trainee and discusses his or her performance. Trainees also complete forms at the end of the rotation identifying the strengths and weaknesses of the Attending nephrologist, Transplant Surgeon, and the sponsoring institution. These forms are reviewed by the program director.

KINDRED/VENCOR HOSPITAL

Background: Kindred Hospital is a long-term or acute care facility (LTAC), located in the Texas Medical Center. Fellows under the direct supervision of a faculty member, manage patients previously cared for by The Renal Service at Memorial Hermann Hospital and M.D. Anderson Cancer Center, who are transferred to Kindred Hospital. This rotation provides fellows the opportunity for long-term follow up if patients debilitated from prolonged illness.

Educational Goals and Objectives:

1. Continuity of care of patients debilitated from prolonged illness.
2. Role of LTAC, in disease state management
3. Role of multidisciplinary approach to patient care
4. Education and management of chronic renal failure
5. Principles and practice of hemodialysis

Core competencies obtained: PC, MK, ICS, P, SBP

Methods of Evaluation

1. At the start of the rotation, the fellow is provided a list of educational objectives, expected to be met by the end of the rotation. The fellow and faculty at the rotation's conclusion will sign off this list.
2. On a quarterly basis the Attending Nephrologist fills out a standardized evaluation form on the trainee, which is forwarded to the program committee. On at least a semi-annual basis, the program director or associate director meets with each trainee and discusses his or her performance.

RENAL CONTINUITY CLINIC

Each fellow is assigned for two years to an outpatient renal continuity clinic directly supervised by an Attending nephrologist. It meets one-half day per week, and it is expected that the fellow will attend the clinic during all rotations. Typically, the fellow in each clinic sees 1-3 new patients and 3-6 return patients. In addition, as previously discussed, fellows assigned to LBJ General Hospital, and MDACC rotations attend the weekly Renal Outpatient Clinics at the respective institutions.

I. **Educational Purpose:** The educational purpose of this experience is to provide trainees an opportunity to evaluate and manage patients with a variety of renal diseases in a longitudinal manner. In this way, trainees gain insight into the progression of renal disease and the impact of therapy. Several patients are over the age of 70 allowing for an

opportunity to manage the physical, social, and psychological problems prevalent in elderly patients.

II. Principle Teaching Method: The principle teaching method on the rotation is discussion at the bedside with the Attending nephrologist.

III. Educational Content:

- A. The Renal Continuity Clinic takes place in the Memorial-Hermann Professional Building (HPB) located in the Texas Medical Center directly across the street from Memorial-Hermann Hospital, connected by an elevated walkway. The full array of clinical laboratory and imaging facilities are provided at MHPB or Memorial-Hermann Hospital as previously described. Fellows evaluate all patients first and then present them to the Attending nephrologist who then also evaluates the patient. Together, the fellow and faculty determine diagnostic procedures and therapeutic plans. By example of the faculty, the fellow learns the skills necessary to provide outpatient consults in the managed care environment and effective communication with primary care providers. The mix of diseases typifies what outpatient nephrologists in the community traditionally see. In addition, many unusual or rare disorders are referred to the clinic because of its association with the Medical School.
- B. The patients are diverse and are referred from faculty in other divisions of the Medical School, private physicians in the community, and occasionally other nephrologists in the community. This renal clinic also provides hospital follow-up for patients seen by the fellow while on the Inpatient Consult Service at Hermann Hospital. Most patients have Medicare/caid, managed care, or private health insurance.
- C. Specific educational content:
 - 1) Evaluation and management of proteinuria and hematuria
 - 2) Evaluation and management of primary and secondary hypertension
 - 3) Evaluation and management of urolithiasis
 - 4) Evaluation and management of glomerular diseases
 - 5) Evaluation and management of diabetic nephropathy
 - 6) Evaluation and management of tubulointerstitial diseases
 - 7) Evaluation and management of acquired and congenital cystic disease
 - 8) Evaluation and management of acid base disorders
 - 9) Evaluation and management of fluid and electrolyte disorders
 - 10) Evaluation and management of urinary tract infections
 - 11) Prevention of progression of renal failure
 - 12) Dietary therapy of chronic renal failure
 - 13) Indications and contraindications of renal biopsy
 - 14) Management of metabolic bone disease
 - 15) Management of anemia of renal failure
 - 16) Management of renal disease in pregnancy
 - 17) Renal function testing
 - 18) Pharmacology of drugs in renal diseases
 - 19) Evaluations and management of vascular diseases of the kidney

- 20) Assessment of ESRD and need for initiation of dialysis
- 21) Effective communication skills to provide consultation in the managed care environment and timely feedback to primary care physicians.
- 22) Evaluation and management of geriatric patients.

Core competencies obtained: PC, MK, PBL, ICS, P, SBP

IV. Procedures:

1. Interpretation of renal function tests such as:
 - a) ultrasound
 - b) IVP
 - c) renal nuclide scans
 - d) renal biopsy results
 - e) urinalysis
 - f) renal function testing of GFR

V. Ancillary Education: The trainee is supplied with a supplemental reading list and is expected to attend the two weekly Divisional educational conferences at the Medical School.

VI. Methods of Evaluation: On a quarterly basis, the trainee's supervisory Attending nephrologist fills out a standardized evaluation form, which is submitted to the program committee. On at least a semiannual basis, the program director or associate director meets with each trainee and discusses his or her performance.

TRANSPLANTATION CONTINUITY CLINIC

Each fellow is assigned for 2-years to an outpatient renal transplant clinic that meets monthly. An Attending Nephrologist/Transplant Surgeon directly supervises the fellow.

I. Educational Purpose: The educational purpose of this experience is to provide trainees an opportunity to evaluate and manage renal transplant patients in an ambulatory setting.

II. Principal Teaching Method: The principle teaching method on the rotation is discussion in the clinic with the Attending Nephrologist/Transplant Surgeon.

III. Educational Content:

A. Renal Transplant Clinic takes place in Memorial-Hermann Hospital. Physicians in the local community or adjacent states refer most patients for transplantation. There is also a large contingent of international clients. Follow-

up transplant patients are derived from the previously described renal Transplant Inpatient Service.

B. Specific educational content on this rotation includes:

- 1) Evaluation and selection of the transplant recipient
- 2) Evaluation of the transplant donor
- 3) Medical management of acute and chronic rejection
- 4) Clinical diagnosis of all forms of rejection including laboratory, histopathologic, and imaging techniques
- 5) Mechanism of action and side effects of immunosuppressant drugs, including steroids, cyclosporin, azothioprine, mycophenolate, tacrolimus, rapamycin, ALG and monoclonal antibodies.
- 6) Drug – drug interactions in transplant patients
- 7) Evaluation and management of post transplant hypertension
- 8) Evaluation and management of infections in transplant patients
- 9) Secondary malignancies in transplant patients
- 10) Transplantation immunology
- 11) Socio-economic barriers to transplantation
- 12) Management of immunosuppressants

Core competencies obtained: PC, MK, PBL, ICS, P, SBP

IV. Procedures:

1. Interpretation of renal function tests such as:
 - a) ultrasound
 - b) IVP
 - c) renal nuclide scans
 - d) transplant renal biopsy results
 - e) urinalysis
 - f) renal function testing of GFR

V. Ancillary Education: The fellow is supplied with a supplemental reading list and is expected to attend the two weekly Divisional educational conferences at the Medical School as well as the Transplant Morbidity & Mortality Conference.

VI. Methods of Evaluation: On a quarterly basis, the trainee's supervisory Attending Nephrologist/Transplant Surgeon fills out a standardized evaluation form, which is submitted to the program committee. On at least a semiannual basis, the program director or associate director meets with each trainee and discusses his or her performance.

OUTPATIENT DIALYSIS ROTATION

Each first-year fellow is assigned to an outpatient cohort of peritoneal dialysis patients that they follow longitudinally for one year under the direct supervision of an Attending

Nephrologist. Each second-year fellow is assigned an outpatient hemodialysis shift for one year under the direct supervision of an Attending Nephrologist. The fellow is expected to make rounds on these patients on a regular basis, and is recognized as the primary physician for these patients.

I. Educational Purpose: The educational purpose of this rotation is for the trainees to gain experience in the outpatient management of dialysis patients, including patients on home-based therapies.

II. Principle Teaching Method: Discussion on a weekly or bi-weekly basis with the Attending nephrologist on the progress of patients.

III. Educational Content:

A. The mix of diseases is typical of what is seen in chronic dialysis patients such as heart disease, hypertension, diabetes, and peripheral vascular disease. The rotation takes place in 2 outpatient hemodialysis centers staffed solely by the faculty of the Medical School. These centers provide care for 250 hemodialysis and 90 peritoneal dialysis patients. Full laboratory and serologic services are provided. All imaging and inpatient services are provided at Hermann Hospital as well as outpatient Interventional Radiology Services.

The fellow also directs, under the supervision of the Attending Nephrologist, the monthly Patient Care Conference (PCC), a multidisciplinary meeting composed of the nephrologist, dietitian, social worker and head nurse of the unit to discuss each patient's medical, social and emotional needs (see V. Ancillary Education).

B. The dialysis patients are predominantly African American, are often derived from Memorial-Hermann Hospital or LBJ General Hospital, and are the patients of the Attending nephrologists in the Renal Division of University of Texas – Houston Medical School.

C. Specific Educational Contents:

- 1) Principles and practices of hemodialysis
- 2) Principles and practices of peritoneal dialysis
- 3) Assessment of adequacy of dialysis
- 4) Urea kinetic modeling
- 5) Water purification systems
- 6) Metabolic bone disease
- 7) Anemia of renal failure
- 8) Aluminum intoxication
- 9) Calcium, phosphorous and vitamin D metabolism
- 10) Iron therapy in dialysis patients
- 11) Evaluation and management of vascular access malfunction
- 12) Nutritional management of dialysis patients
- 13) Management of medical conditions in dialysis patients

- 14) Understand the social and ethical issues of caring for patients with ESRD and learn from the faculty how to address them in the best interests of the patient.
- 15) Use of automated cyclers in peritoneal dialysis.
- 16) Use of peritoneal equilibration testing and the principles of peritoneal biopsy.
- 17) Understanding the complications of peritoneal dialysis including peritonitis, exit site and tunnel infection and their management, hernias, and pleural effusions.

Core competencies obtained: PC, MK, PBL, ICS, P, SBP

IV. Ancillary Education:

1. Patient Care Conference: Monthly, the trainee will direct the PCC on their dialysis patients. Here, a multidisciplinary team discusses medical, dietary and social issues of each patient.
2. The trainee is supplied with the book "The Handbook of Dialysis," is expected to attend the two weekly divisional educational conferences at the Medical School, and is provided a supplemental reading list.

V. Methods of Evaluation:

1. At the start of the rotation, the fellow is provided a list of educational objectives, expected to be met by the end of the rotation. The fellow and faculty at the rotation's conclusion will sign off this list.
2. On a quarterly basis the Attending nephrologist fills out a standardized evaluation form on the trainee, which is forwarded to the program committee. On at least a semi-annual basis, the program director or associate director meets with each trainee and discusses his or her performance.

RESEARCH TRAINING

I. Education Purpose: The educational purpose is for trainees to learn scientific methods and the means by which to understand and conduct scientific investigations.

II. Educational Content:

1. We offer an optional third year for either laboratory – based research, or clinical research, in a mentored environment, with protected time.
2. For trainees in the two-year tract, participation in research is required. 6-months of protected time for research is provided during the 2-years. We have compiled a list of ongoing or future research projects of the renal faculty and ask the fellows to select a project/mentor. The fellow, under the supervision of the full time faculty mentor then designs and performs a research project. Novel ideas by the fellows are also encouraged. Although protected time is provided, many projects can be continued while fellows are on service since most projects are clinically based research.
3. Fellows are required to attend the University Clinical Research Center's (UCRC) "METHODS in RESEARCH" course offered annually.
4. Fellows attend and present papers in a regularly scheduled Clinical Journal Club. In this forum, papers are presented in the style of critical appraisal of the literature specifically conforming to the ideals formulated in the McMasters series. Study design and validity of data are scrutinized rather than content. The purpose of this exercise is to foster the practice of Evidence Based Medicine.
5. Fellows attend Renal Research Conference where fellows and faculty of the Division, or visiting professors, present updates on research currently on-going in their respective laboratories or clinical settings.
6. Fellows are expected to submit their research for presentations at national scientific meetings and submit manuscripts to peer reviewed journals.

CONFERENCES

Several weekly conferences are provided within the Division, in addition to those offered by the Department of Internal Medicine. These sessions are given both by faculty and by fellows. The goal of these conferences is to provide an in-depth review of a particular clinical or research topic, and to strengthen the teaching and oral presentation skills of the fellow. The various conferences are described below, and actual content is attached:

1. Renal Grand Rounds

Description: A bimonthly one hour didactic session where a fellow, faculty, or visiting professor presents topics outlined in the Core Curriculum of the ASN. The expectation is the presentation will review current literature rather than merely regurgitating what is easily found in textbooks or review papers. Renal Grand Rounds is an intellectual and academic exercise.

In addition, the lecturer should provide a list of 5-7 pertinent learning issues relevant to the topic, and a bibliography of 4-6 articles.

Purposes:

1. To provide clinically relevant in-depth updates on topics important to nephrologists
2. To strengthen the teaching and oral presentation skills of the fellow.

2. Clinical Journal Club/Clinical Epidemiology:

Description: A monthly one-hour session where a fellow and faculty each present a clinical paper from a recent publication pertinent to the practice of nephrology. Presentations are formal and conform to the methods of critical appraisal of the literature as outlined in the McMasters series (which is provided to the fellows). Thus, research methods and results, rather than mere content, are scrutinized.

Purposes:

1. To promote evidence based medicine
2. To teach critical appraisal of the literature, study design and interpretation
3. To promote a life time commitment to scholarship

3. Research Conference

Description: A monthly one-hour session where faculty, fellows, or visiting professors present their research in progress with relevant background. If no recent data is available for presentation, then the expectation is 2 articles relevant to the research area should be presented and critically appraised for the conference.

Purposes:

1. To present basic and/or clinical science topics relevant to nephrology
2. To teach fellows the principles of research design, implementation, and interpretation of research projects.

4. Renal Biopsy Conference

Description: A monthly one-hour session where fellows present interesting patients as unknowns who underwent renal biopsies for various indications. All faculty, fellows, residents and medical students participate in the discussion of the differential diagnosis and the suspected biopsy result. The biopsy results are then presented and discussed by the Attending renal pathologist. Fellows should have reviewed the pertinent literature on the disease ascertained by the biopsy in order to provide the group with a concise review of etiology, prognosis and treatment. A relevant article or bibliography should also be provided.

Purposes:

1. To teach clinical decision making, formulation of an appropriate differential diagnosis and diagnostic work up
2. To teach the indication, contra-indication, and interpretation of renal biopsies

5. Renal CPC/Morbidity and Mortality (M&M) Conference

Description: This hour conference is held quarterly. It is intended to review complications, potential or realized adverse events, and deaths in patients cared for by the Renal Division. Autopsy findings are presented when appropriate.

Purposes:

1. To elucidate potential errors that occur in clinical practice to avoid such occurrences in the future.
2. To learn what disease processes cause death in our patient population.
3. Change behaviors to decrease patient harm and decrease medical liability.

1. Basic Science Conference

Description: A bimonthly conference where faculty from both within and outside the division presents basic science topics relevant to nephrology.

Purpose:

1. To teach fellows basic science topics to facilitate their interpretation of scientific literature.
2. To improve fellows' understanding of the implications of basic science research for clinical medicine.

2. Program Director's Conference:

Description: Fellows meet with the Program Director or Associate Director monthly to cover a variety of topics including medical ethics, medical directorship of dialysis units, Medicare, ESRD program, and the psychological needs of dialysis patients. It also provides an avenue for fellows to provide feedback on the program to address any problems or issues.

OTHER CONFERENCES

1. Internal Medicine Grand Rounds: Weekly didactic lecture by faculty or visiting Professors on a wide range of topics, many relevant to nephrologists.
2. Internal Medicine Clinical Pathologic Conference (CPC): Weekly presentation and discussion by faculty of medicine, radiology and pathology of an interesting case. Nephrology faculty discusses many of the cases.

ETHICS/MEDICAL LEGAL

1. Fellows are required to attend a risk management course on medical documentation and communication.
2. Fellows and faculty are required to read and report on selected journal articles on topics ranging from withdrawal of dialysis to the importance of the doctor – patient relationship.
3. Fellows are expected to attend the weekly **ESRD Meeting**, a multidisciplinary conference that addresses the medical, social, psychiatric, nursing and dietary needs of renal patients admitted to Hermann Hospital.
4. Fellows direct the monthly Patient Care Conferences (PCC) on their dialysis patients, which address the medical, nutritional, social and emotional needs of each patient.